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# Editorial

# Pain management and oligoanalgesia: a challenging task in the Emergency Department

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Oligoanalgesia is a common problem frequently encountered in overcrowded emergency departments and detecting it remains a challenge for emergency physicians despite evolving guidelines and attitudes towards painful patients.

It has been shown that oligoanalgesia is related in some cases to a physician's behavior regarding pain either by fear to specific analgesia molecules or by inherited attitudes over decades to let the patient painful targeting a more effective evaluation by surgeons in the case of abdominal pain.

Nowadays, pain is considered the 4th vital urgency and it's correlated to other life-threatening situations. Hence, it seems to be more ethical and effective in rapidly treat pain in all patients.

In this issue, Ben Soltane et al. conducted a prospective double-blinded controlled and randomized study over 16 month-period including all patients aged over 18 years visiting the ED for severe non-traumatic abdominal pain requiring further evaluation by a surgical team. The severe pain at admission was defined by a visual analogic score (VAS) equal or higher than 50 mm. Selected patients were randomized into 2 groups. They were meant to be either in the morphine nebulized group (10 mg), or the placebo group. The protocol was stopped if the VAS decreased to 30 mm. The pain severity was evaluated at one hour by VAS, and the patients were candidates to the rescue protocol of analgesia if the VAS sustained at 30 mm or over.

The protocol was based on paracetamol or morphine chlorydrate. Moreover, the protocol was discontinued in the presence of side effects predefined in the study design. The main outcome was the degree of protocol's success defined in this study by a decrease of 50% or more regarding baseline value, and the time of resolution was considered.

The clinical judgment of the survey was evaluated. Furthermore, secondary outcomes were evaluated like the occurrence of side effects, the delay in any surgical decision, complications or recurrence within a week after the first presentation.

A total of 100 patients was enrolled in the study with 50 patients randomized in each group. The 2 groups were comparable in terms of baseline characteristics, baseline recorded VAS and vital signs (Blood pressure; heart rate; respiratory rate and pulse Oximetry). Baseline VAS value was similar in the 2 Groups (82.4 mm in the nebulized Morphine group versus 82.6 mm in the placebo group) and expressed, therefore, severe pain.

This study strongly highlights the effect of medical contact in the first 10 to 20 minutes after the presentation as there was a decrease in the 2 groups regardless if they received a placebo or morphine.

From the 20th minute, pain levels were significantly lower in the nebulized group as shown in Fig 1. The rate of success of the analgesic protocol was significantly higher in the nebulized morphine group with 82% success versus 26% in the placebo group at one hour after randomization.

Time to pain relieve was rapid in the morphine group and equal to 38.4 minutes, versus 53.1 minutes in placebo with $p<0.001$. The placebo group needed a much higher a rescue therapy at H-1 (74%) versus only 18% in the group treated with nebulized Morphine and this difference was statistically significant.

Finally, patients were comparable towards hospitalization need or discharge, and the occurrence of side effects. Surgeon's assessment was statistically easier in the morphine group with no difference in the time of surgery need.

In this issue of TJEM, Ben Soltane et al. showed significant results with a strong design study highlighting the benefit of optimal analgesia and morphine breaking drogues of surgeons and painful patients. Nevertheless, some areas remain uncertain.

First of all, authors have chosen to restrict this evaluation in the context of non-traumatic abdominal pain related to surgical presumed etiology. They did not specify the rate of abdominal pain related to other medical causes in which pain is frequently higher and may be more sensitive to morphine. Furthermore, they excluded diabetes patients when the pain perception is different and maybe a bias in the study. The authors did not explain the reason for considering the value of 50 of VAS to enroll candidates in the study instead of the value of 60 or higher VAS defining severe pain. And finally, how do authors explain the deadline of one hour after randomization to decide the adjunction of the analgesic rescue protocol.

As conclusion, a clean protocol of multimodal analgesia is lacking in the all-day work in emergency departments and it depends on the behavior of each team. Conducting multicenter strong studies could help to enhance insufficiencies and to improve the management of pain.

# Editorial

## Bedside echocardiography performed by Emergency Physicians

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The role of ultrasound in emergency medicine as a diagnostic tool and as a guide to therapy is expanding rapidly. As it has become available in many Tunisian Emergency Departments, bedside echocardiography is an interesting tool as it provides insight into a patient's condition like Acute dyspnea or injury patterns such as thoracic trauma. Its practice in the emergency department is worth evaluating. So far, the evaluation of goal-directed emergency department (ED) echocardiography has been focusing on the diagnosis of pericardial effusion and many studies have demonstrated a good agreement between ED sonographers and cardiologists. Besides, bedside echocardiography offers a noninvasive, prompt method of evaluating the left ventricular ejection fraction (LVEF). Its assessment offers a window into the causative or compensatory role of the left ventricle (LV) in the patient's condition. In this issue of TJEM, Ben Lassoued et al. shared the results of a pilot prospective study carried out in a Tunisian ED. The authors tried to evaluate the concordance between emergency physicians and cardiologists in evaluating the LVEF for fifty-two patients. The operators were either an emergency physician who had previously received a three-month training in Doppler echocardiography or a cardiologist. The LVEF was evaluated by both operators using global visual evaluation(GVE) or Teicholtz's method in time movement mode (TM) or Simpson Biplane method (SB). All results showed a high level of consistency in the different methods of LV systolic function estimation. The efforts of the authors should be highlighted. This concordance was comparable with the results found in the literature [1]. Position statements on the use of echocardiography by ED physicians have been published by various organizations, including the American Society of Echocardiography (ASE), the American College of Emergency Physicians (ACEP), and the Canadian Association of Emergency Physicians (CAEP) [2-5]. All groups agree that Point-of-care echocardiography can contribute to a rapid rule in or rule out of life-threatening cardiovascular conditions mainly undifferentiated shock and cardiac tamponade. In regards to other indications, there have been significant differences between the position statements. Furthermore, in certain cases, Emergency department echocardiography does not replace the need for standard comprehensive echocardiography performed by a cardiologist. While the former is goal-oriented and its findings must be integrated into the overall clinical pictures, the latter is more comprehensive with specific measurements. But in the study of Ben Lassoued et al., there is a lack of information about the medical condition of patients. Another question that was widely debated in literature was regarding the training required to perform an ED echocardiography. In their study, Ben Lassoued et al., considered that three-month training in Doppler echocardiography offers proficiency with emergency echocardiography. Refer to literature, national emergency medicine professional organizations in Canada and the U.S have endorsed ED echocardiography as a core skill for emergency physicians and training guidelines include generally theoretical courses followed by a minimum of 25-50 supervised cardiac echocardiographies. But, to become certified, candidates must demonstrate the ability to successfully obtain high-quality images, accurately interpret images, and be able to integrate ultrasound findings into clinical decision-making [3,6]. It's important to point out too that the ASE recommends that only licensed physicians should use ED echocardiography, whereas the ACEP statement allows its use by non-medical staff too [7]. Finally, one limitation of this study was the small sample size that limits the power of the statistical results.

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# Editorial

## Reperfusion Treatment in STEMI, Timing Is Everything

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Acute myocardial infarction (STEMI) is a major cause of morbidity and mortality in the Tunisian population. Patients with acute STEMI should receive coronary reperfusion therapy with either primary percutaneous coronary intervention (PCI) or fibrinolysis. Reperfusion improves clinical outcomes in nearly all groups of patients with STEMI who present within 12 hours of symptom onset.

For most patients with acute STEMI, we prefer primary PCI rather than fibrinolysis. However, fibrinolytic therapy should be used if timely primary PCI is not available which is the case of the majority of Tunisian medical centers. Fibrinolytic therapy is capable of restoring antegrade blood flow in nearly 75 % of patients when administered within the first two hours of symptom onset.

Reperfusion of an obstructed coronary artery can limit myocardial necrosis, improve myocardial salvage, and reduce mortality. It is well known that patients with missed fibrinolysis had higher adverse in-hospital events including death, clinical heart failure and cardiac dysrhythmias than patients who received this therapy.

In this issue of TJEM, Jouini et al report in a single-center observational study the predictors of fibrinolysis success in the emergency department (ED)in patients presenting with STEMI within 12 hours. Two hundred and sixty-three patients were treated with Tenecteplase. The average success rate of fibrinolytic therapy was 72.2%.

In this study, the Independent predictive factors of fibrinolysis success were: the delay from onset of chest pain to the ED visit less than 180 min and the delay for the first medical contact to qualified ECG being less than 10 min.

The most important conclusion of this study is that the median time to reperfusion in our population was too long. This constitutes a problem for effective reperfusion therapy. It is therefore essential to reduce this delay.

It is important to highlight that in Jouini's study,16% of patients had signs of acute heart failure on admission and seven patients presented in a cardiogenic shock. These situations with poor outcomes are closely associated with a delayed request for medical care.

The effectiveness of fibrinolytic therapy is inversely related to time which depends on two major factors: patient factors and medical system factors.

Delay from the onset of acute myocardial infarction symptoms to the initiation of fibrinolysis can be reduced by improving patient recognition of chest pain and encouraging speedier action in seeking medical assistance (patient factors) and improving the time it takes for medical personnel to initiate appropriate therapy (medical system factors).

Prehospital administration of fibrinolytic drugs may be of value, but many patients in our country are not transported by the emergency medical services system. As the hospital entry point for both ambulance patients and walking patients, the (ED) is a major focal point for influencing the timing of fibrinolytic therapy. The (ED) is the most practical site where the delay to the initiation of fibrinolytic administration can be decreased.

It's interesting to note that in Jouini and al study the delay to obtain qualified electrocardiogram was 11 minutes and the time to start fibrinolysis was 32 ± 21 minutes. These delays are in accordance with international guidelines and confirmed that the weak link in the chain of events leading to prompt and effective treatment is a patient delay in seeking care.

Although the benefits of early treatment of STEMI are clear, only a minority of eligible patients receive optimally timed treatment for their symptoms because of delay in seeking care. Unfortunately, even in the developed countries, the delay from the onset of symptoms to reperfusion is still long. More than 50% of the 1.2 million people who suffer an acute myocardial

infarction or coronary death each year in the United States die in an (ED) or before reaching a hospital within an hour of symptom onset [1]. Many of these deaths and significant disability could be prevented if patients received earlier treatment.

In conclusion, coronary reperfusion can reduce mortality and morbidity due to acute myocardial infarction, but its effectiveness is inversely related to time.

Fibrinolysis is generally safe and effective and remains a good option for centers without PCI facility or geographical inaccessibility.

Strategies to reduce patient delay times in Tunisia must focus on educating the public on the recognition of coronary symptoms and the benefits of presenting promptly to hospital by way of the emergency ambulance service.

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# ORIGINAL RESEARCH

# *Efficacy and safety of nebulized morphine compared to placebo in abdominal pain management*

*Houda Ben Soltane*, Lotfi Boukadida**, Mariem Khrouf*, Asma Zorgati**, Zied Mezgat*, Mehdi Methamem*, Riadh Boukef***

* Emergency Department, farhat hached university hospital

** Emergency Department, Sahloul university hospital au lieu de répéter le même service

**Background :** Our aim was to compare the efficacy and safety of nebulized morphine to a placebo in abdominal pain requiring a surgeon's advice.

**Methods :** In a prospective, randomized, controlled and double-blind study, we included 100 patients with abdominal pain. They were assigned to 2 groups: a nebulized morphine group which received a maximum of 3 nebulizations of 10-mg morphine every 10 minutes, and a placebo group which received 3 nebulizations of normal saline serum until pain relief. The visual analog scale was monitored at baseline, 10, 20, 30, 45 and 60 minutes after the start of drug administration. Treatment success was defined by the percentage of patients in whom visual analog scale decreased by a rate equivalent to or greater than50% of its baseline value. When this end point was not reached, rescue morphine was administered. Pain resolution time was defined by the elapsed time between the start of the protocol and reaching treatment success criteria. The secondary endpoints were the appearance of side effects, delay of a possible surgical intervention, complication of a pathology or are-consultation.

**Results :** The lowest resolution time was observed in the nebulized morphine group (mean = 38.4 ± 16 min), compared to the placebo group (mean= 53.1 ± 14 min) ($p < 0.001$). Side effects were minor and comparable in the two groups. The average delay of the opinion of the surgeon in the 2 groups is comparable with 1.56 hours in the nebulized morphine group and 1.44 hours in the placebo group($p = 0.310$).

The surgeon's assessment of the diagnosis was easier in the nebulized morphine group, but not significantly ($p = 0.07$). Nebulized morphine significantly improved the patient's satisfaction ($p < 0.001$). The delays of the surgical procedure were comparable in both groups with an average of 9.94 hours in the nebulized morphine group, and 9.06 hours in the placebo group. No complications were noted in neither of the groups at 30 days.

**Conclusion :** Nebulized morphine is safe and has more efficacy than a placebo to treat patients with non-traumatic abdominal pain.

**Keywords :** Morphine; Nebulized; Abdominal pain; Emergency Department.

## INTRODUCTION

Pain is a common reason for emergency department (ED) visits. Its control remains a challenge and a health priority worldwide [1]. Several international recommendations [2,3] have been developed to optimize analgesic treatment, particularly in busy and crowded care settings like the ED [4-6]. However, poor care quality in patients with severe pain is frequent, and there are still barriers to prescribing opioids in the ED [7,8]. The major factors precluding the optimal use of opioids in the treatment of severe pain are the fear of serious side effects and the necessity to have an intravenous (IV) access requiring an additional nursing availability and workload [9-11]. With the emergence of easier and potentially safer methods of morphine administration, such as inhalation and nebulization, the approach to analgesia in the ED may improve the willingness of ED nurses and physicians to use opioid analgesics [12-16]. Oligoanalgesia is quite frequent, especially in cases of the acute abdomen pains, because of a compulsive concern for the diagnosis. We still think that analgesia could mask the clinical signs that guide the diagnosis and cause a diagnostic delay and complications [12].

The purpose of our study was to evaluate the efficacy and safety of nebulized morphine compared to a placebo in the management of non-traumatic acute abdominal pain in adult ED patients.

## METHODS

- Population: This is a prospective, randomized, controlled and double-blind study performed between October 2013 and December 2014 at Farhat Hached and Sahloul University Hospitals (Sousse, Tunisia).

  We included in this study patients older than 18 years of age admitted to the ED for non-traumatic acute abdominal pain with a visual analog scale (VAS) greater than or equal to 50 on a scale ranging from 0 to 100, and requiring a surgical opinion. Exclusion criteria included a known allergy to morphine, nausea or vomiting at admission, Glasgow Coma Scale less than 15, inability of the patient to cooperate (alcohol consumption or abnormal mental status), hypotension with systolic blood pressure less than 110 mm Hg, bradypnea less than 12 breaths per minute, SaO2 less than 95% while breathing room air, facial trauma, presence of rhinitis, nasal obstruction, or allergy to opioids. We also excluded all patients who received analgesics within 6 hours before ED admission.
- Study protocol: After inclusion and obtaining informed written patient consent, randomization was performed using sealed envelopes before the start of enrollment in the study. Patients were assigned to 2 groups. The Nebulized group, including patients who received 1 nebulization of 10-mg (1 mL) morphine diluted in 4 mL of normal saline serum(to repeat at a maximum of three times according to the visual analog scale results). In the placebo group nebulization was done with 5-mL normal saline serum. The protocol is stopped if the visual analog scale is equal to or less than 30. If after one hour the visual analog scale is equal to or higher than 30, we use a rescue analgesia with paracetamol or morphine. For all patients included in the study ,the demographic data and clinical characteristics were collected, including age, sex, comorbidity, intensity of pain estimated by VAS, systolic and diastolic blood pressures, heart rate, respiratory rate, oxygen blood saturation (SaO2), temperature, and final diagnosis at ED discharge. We noted the results of the complementary examinations if they had been carried out. Side effects were continuously monitored during the protocol, and immediate discontinuation of the protocol treatment was decided in case of occurrence of serious side effects. Serious side effects included respiratory depression, oxygen desaturation less than 95%, significant hypotension defined by a decrease of baseline arterial pressure by more than 20%, and consciousness disturbance defined by a Glasgow Coma Scale less than 15. Treatment success was defined by the percentage of patients in whom visual analog scale decreased by a rate greater than or equal to 50% of its baseline value. Resolution time was noted. We noted whether the clinical judgment of the surgeon was easy or not. Secondary outcomes were the occurrence of serious side effects, delay of a possible surgical intervention, and complications of the pathology or re-consultation within a week.
- Data analysis: Variables are expressed as mean, SD and median, and 25% to 75% interquartile range or 95% confidence interval (CI) as appropriate. Comparisons were made among continuous variables using analysis of variance for independent samples. 2 Fisher exact test was used for discrete variables. P <0.05 was considered statistically significant. Calculations were performed with a software package for windows (version 18; SPSS, Inc, Chicago, IL).

## RESULTS

During the study period, 100 patients with non-traumatic acute abdominal pain were included:50 in the Nebulized morphine group, 50 in the placebo group.

At baseline, the 2 study groups were comparable in terms of demographic characteristics; previous medical and surgical history, and clinical presentation at admission including VAS, blood pressure, heart rate, respiratory rate, and SaO2 (Table 1).

**Table 1. Baseline characteristics in the 2 treatment groups**

| | Nebulized morphine group n = 50 | Placebo group n=50 | P |
|---|---|---|---|
| Age ; years (mean) | 46 | 41 | Ns |
| Sex-ratio male /female | 25 /25 | 25/25 | Ns |
| ***Comorbidity*** | | | |
| Diabetes mellitus (n) | 6 | 3 | Ns |
| Hypertension (n) | 5 | 7 | Ns |
| History of abdominal surgery | 9 | 6 | Ns |
| ***Diagnosis*** | | | |
| Appendicitis | 15 | 14 | Ns |
| Gastrointestinal ulcer | 6 | 3 | Ns |
| Acute intestinal occlusion | 3 | 4 | Ns |
| Acute cholecystitis | 3 | 4 | Ns |
| Acute pancreatitis | 1 | 3 | Ns |
| ***Vital signs on admission in the ED; mean (SD)*** | | | |
| Heart rate; beats/min | 89,68 | 91,88 | Ns |
| Systolic blood pressure; mm Hg | 129,1 | 122,9 | Ns |
| Diastolic blood pressure; mm Hg | 75,54 | 69,42 | Ns |
| Baseline VAS; mm | 8,24 | 8,26 | Ns |

*VAS : visual analog scale*

The VAS change from baseline is shown in Figure1. There was a significant decrease in the VAS at all-time points in the 2 groups. From the 20-minute time point, the Nebulized group had a significantly larger decrease in pain levels compared to the placebo group. This difference persisted throughout the whole protocol period.

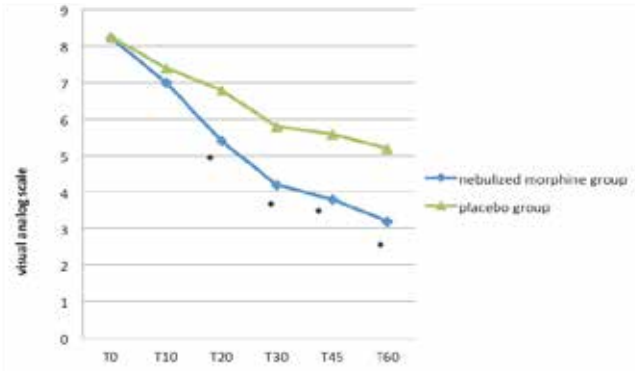


**Figure 1. Success rate at T30 min and T60 min**

Success rate was significantly different between the Nebulized morphine group and the placebo as shown in figure2. The lowest resolution time was observed in the nebulized morphine group; the difference was statistically significant compared with the placebo group (P ≤0 .01) (figure 3).

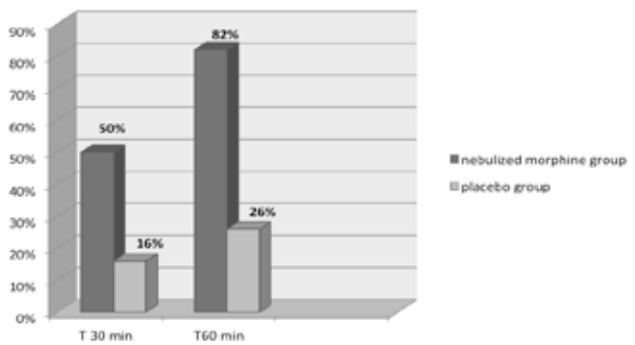


**Figure 2. Sucess rate at 30 and 60 minutes'**

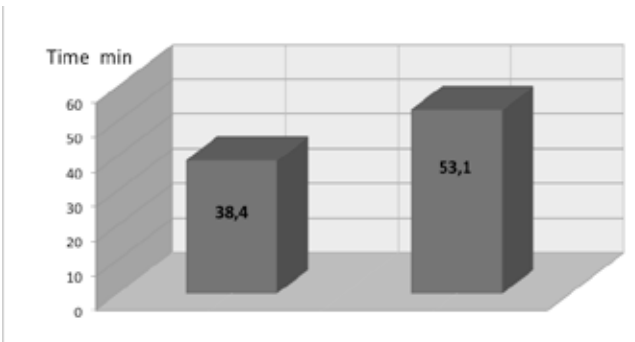


**Figure3. Mean time of pain resolution (minutes)**

The outcome of patients is similar between the two groups (Table 2).

**Table 2. Outcome of patients**

| | Nebulized morphine group n = 50 | Placebo group n= 50 | P |
|---|---|---|---|
| Success at 60 min; (%) | 82 | 26 | p=0,000 |
| Time to pain resolution; min (mean) | 38.4 | 53.1 | p< 0.001 |
| Rescue analgesia; (%) | 18 | 74 | p< 0.001 |
| ***Outcome of patients*** | | | |
| Hospitalization; n | 28 | 28 | NS |
| Discharge; | 22 | 22 | NS |

Overall, 12 patients (12%) experienced minor side effects: 9 (18%) in the nebulized morphine group, and3 (6%) in the placebo group; the difference was significant (Table 3).

**Table 3. comparison of the side effects in the two studied groups of patients**

| Side effects | Nebulized morphine group n = 50 | Placebo group n= 50 | P |
|---|---|---|---|
| **Minor side effects; (n)** | 9 | 3 | NS |
| Dizziness | 4 | 1 | NS |
| Vomiting and/or nausea | 4 | 2 | NS |
| Palpitations | 1 | 0 | NS |
| **Major side effects; (n)** | 0 | 0 | - |

The most frequent side effect was dizziness (44%) and vomiting (44%). No major side effect was recorded during the study protocol. The mean time of the surgeon decision is comparable between the two groups (1.56 hours in the nebulized morphine group vs 1.44 hours in the placebo group). The surgeon's assessment of the diagnosis was easier in the nebulized morphine group, but not significantly (p = 0.07) (figure 4). Nebulized morphine improved patient's satisfaction significantly (p <0.001)(figure 5).

The mean of the delay of the operative act in the two groups is comparable (p = 0.08) (9.94 hour in the nebulized morphine group vs 9.06 in the placebo group). No significant complications in both groups were noted. At one month, two re-consultants for the same symptomatology in each group and one death of an elderly patient with acute intestinal obstruction belonging to the placebo group were recorded.

## DISCUSSION

Our study demonstrates that, in patients with non-traumatic acute abdominal pain, nebulized morphine was superior to the placebo to

manage pain. In addition, time resolution of the pain was shorter in the nebulized morphine group. There were minor side effects in the nebulized morphine group but the patients were more satisfied. Surgeon's assessment of the diagnosis was easier in the nebulized morphine group and we have not noted any delay in the operative act or any complication. Pain management is a common routine in EDs[17-18]and it is often over-looked. Most of the studies carried out have shown that, despite an important therapeutic arsenal, oligoanalgesia remains important in EDs [19-20] because pain is not documented in emergencies in more than 50% of the cases, and that 60% of emergency physicians do not know the current recommendations [21-22]. The problem of oligoanalgesia in emergency situations is even more important for abdominal pain [23,24]. In case of abdominal pain, there is a compulsive concern for the diagnosis: physicians in general are often focused on clinical diagnosis. This focus means that they attach less importance to the treatment of pain, wrongly considered as a collateral sign and should, thus, be tolerated by the patient. The most important thing is to find the underlying diagnosis. The example of appendicitis is edifying. It has been demonstrated that the management of pain in case of suspicion of appendicitis does not involve any specific complication such as the delay in the surgical procedure, for instance. In contrast, the comfort of the patient is greatly improved. This has been demonstrated with appendicitis but also in a more general context of abdominal emergencies in adults [25]. A review of the literature regarding analgesia in acute abdominal pain, and particularly the use of opioids, shows that it is effective and safe (Table 4).

**Table 4. Comparison of the side effects in the two studied groups of patients**

| Authors | Level of Evidence | Clinical studied parameter | Medication | Sample size | Main results |
|---|---|---|---|---|---|
| Attard AR et coll.1992 (27) | 2 | Treatment of abdominal pain with papaverine: effect on diagnosis and management | Papaverine vs placebo | 100 | Early opioid administration can significantly attenuate acute abdominal pain. It does not affect the diagnosis. It can even facilitate the diagnosis despite the attenuation of some physical signs. |
| Pace et Burke .1996 (28) | 2 | Early analgesia of acute abdominal pain | Placebo vs morphine up to 20mg | 71 | Pain is treated Morphine does not mask physical signs especially peritoneal signs |
| LoVecchio et coll.1997(29) | 2 | Modification of the clinical examination | Placebo vs morphine 5mg vs 10mg | 48 | Local defense can be better demonstrated |
| Vermeulen et coll.1999 (30) | 2 | Determining the influence of analgesia on the diagnostic performance of ultrasound in case of appendicitis | Morphine vs placebo | 340 | Morphine does not affect the ultrasonography to establish the diagnosis of appendicitis |
| Gallagher et coll .2006 (31) | 2 | The reliability of diagnosis and initial attitude is compared with their definitive equivalents | Morphine vs placebo | 160 | Morphine produces effective analgesia without significant impairment of clinical examination or affect diagnostic reliability |

These results are consistent with the literature review done by Carlos Manterola [26].This review shows that the administration of opioid analgesics as part of the diagnostic process for patients with acute abdominal pain prior to making any decision did not increase the risk of making unsuitable treatment decisions. It also significantly improved the patient's comfort when compared with the placebo.

## CONCLUSION

Acute abdominal pain is a common cause for consultation in emergency departments (EDs). It is one of the top three symptoms for which patients go to the ED, and it represents between 5% and 10% of all the illnesses treated in the ED [32]. For decades, the indication of analgesia inpatients with acute abdominal pain has been contraindicated or, in the best cases, it has been deferred at least until a definitive diagnosis has been established for fear of masking symptoms, generating a change in the physical exploration, or obstructing the diagnostic process of a surgically treatable disease. Our study has shown that the use of nebulized morphine as analgesics in the diagnostic process of patients with acute abdominal pain leads to a significant reduction in pain without affecting diagnostic accuracy. These results are consistent with many series that confirm that effective analgesia does not interfere with the diagnosis in patients with acute abdomen pain[27-31].

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# ORIGINAL RESEARCH

# *Assessment of left ventricular ejection fraction by the emergency physician versus the cardiologist: A concordance study about 52 cases*

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**Key Words :** left ventricular ejection fraction -emergency physician- cardiologist

## INTRODUCTION

Transthoracic echocardiography examination (TTE) that is performed at the patient's bedside in emergency departments has several recognized important indications. It's a brief and rapid usage of cardiovascular ultrasound focusing on specific goal-directed indications. Bedside echocardiography in the emergency department has been shown to help emergency physicians make the correct diagnosis, prescribe the most efficient treatment and take an enhanced disposition decision. It significantly improves patient care [1,2].

Objective: The purpose of our study is to evaluate the agreement of the estimates of left ventricular ejection fraction (LVEF) obtained by emergency physicians with the findings obtained by cardiologists in patients admitted to emergency departments.

Material and methods: This randomized prospective study was carried out in the emergency department of the military hospital of Tunis (Tunisia) over a period of 6 months going from September 2017 through February 2018, and involving patients aged > 16 years whose condition required an emergency TTE.

The patients included in the study had to undergo a double echocardiographic examination: An initial investigation that was performed in the emergency department by an emergency physician who had previously received a three-month training in Doppler echocardiography.

A subsequent echocardiographic examination that was performed by an echo-Doppler proficient cardiologist.

Left ventricular ejection fraction was evaluated by both readers using the following methods: the global visual estimation (GVE) method, Teicholtz's method in time movement mode (TM) and Simpson Biplan method (SB).

We excluded from the study patients with wall motion abnormalities or with hearts out of alignment. The findings thus obtained were compared using the inter-class concordance coefficient of Cronbach's alpha.

## RESULTS

Fifty-two patients were involved in the study. Mean age was 55 + 11 years; sex-ratio was 7 males/4 females.

For the GVE method, the findings obtained by the emergency physician were similar to those obtained by the cardiologist: alpha = 0.72 (IC 95% = [0.68-0.78]; p<10-3).

The findings obtained by both operators by Teicholtz's method were as follows: alpha = 0.94 (IC 95% = [0.80-0.95]; p<10-3).

The concordance of the findings obtained by the emergency physician and of those obtained by the cardiologist for their assessment of LVEF by SB method was shown by alpha=0.91 (IC95% = [0.80 – 0.98]; p<10-3).

## DISCUSSION

Left ventricular ejection fraction (LVEF) is one of the most

commonly known measurements of left ventricular (LV) systolic function. It is the ratio of blood ejected during systole (stroke volume) to blood in the ventricle at the end of diastole (end-diastolic volume). If the LV end-diastolic volume (EDV) and end-systolic volume (ESV) are known, LVEF can be determined using the following equation: LVEF = stroke volume (EDV - ESV) ÷ EDV

There are many methods for calculating LV systolic function. Each one has its advantages and limitations, especially in a situation of emergency.

This study suggests that ED physician, with additional focused echocardiography training, can perform limited echocardiography successfully for the purposes of obtaining left ventricular systolic function information. Our results showed a high level of agreement with different methods of LV systolic function estimation.

**Visual estimation**

Compared to formal echocardiographic methods for LVEF assesement, visual estimation of LVEF is often fast and easy to perform. In only a few seconds the clinician is able to recognize conserved or low LVEF, pericardial effusion, IVC diameter and even valvulopathy.

It was shown in a study by Akinboboye et al. that visual estimation of ejection fraction is a simple and easy method to learn [3].

Visual estimation of ejection fraction correlated significantly with the cardiologist's reports for the evaluation of left ventricular systolic function. Since it is readily and quickly performed, visual estimation could be used for ED management of patients, instead of the formal quantitative methods, which are more time consuming [4].

**Teicholtz's method in time movement mode (TM)**

This method is commonly used. It employs linear measurements. In situations where there is asymmetry of contraction (e.g., wall motion abnormalities), such as in ischemic LV dysfunction, this method has significant limitations.

**Simpson Biplane**

The biplane method of disks (modified Simpson method) is a 2D echocardiographic technique requiring area tracings of the LV cavity. It requires tracing the LV endocardial border in the apical 4- and 2-chamber views in both end-diastole and end-systole. Similar studies were elaborated to assess the agreement of the emergency physician with the cardiologist in the estimation of LVEF.

Bustam et al. conducted a similar study comparing the estimation of LV function by both the emergency physician (1st or 2nd year postgraduate trainees) and the cardiologist.

Visual estimation of global LV systolic function by the trainees in this study showed substantial agreement with that made by the cardiologist (93%, K=0.79, n=100). This degree of agreement is comparable with the results found in our study [5].

Moore et al. found 84% agreement between ED sonographers and cardiologists in determining LVEF in hypotensive patients [6].

Also Ünlüer et al in their study focusing on visual estimation of LVEF reported comparable results with a highest agreement in the low EF group.

It is now generally accepted that diagnostic ultrasound is not the domain of just one specialty. It's a very useful and helpful tool for the emergency physician as an extension of the physical examination "the so-called ultrasound stethoscope" [7].

## CONCLUSION

Global visual estimation of LVEF can be performed similarly by an emergency physician or by a cardiologist provided they are specially trained. The results yielded by both other methods, Teicholtz's method and SB method, were very similar indicating an excellent concordance independently of the degree of deterioration of the left ventricle contractility. Biplan Simpson's method is, however, a time-consuming procedure.

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# ORIGINAL RESEARCH

# *Acute myocardial infarction with ST segment-elevation: Predictors of fibrinolysis success in emergency department*

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**Background :** The management of myocardial infarction with persistent ST segment-elevation (STEMI) is based on an urgent reperfusion therapy. Fibrinolysis is the reperfusion approach commonly used in emergency department (ED).
The aim of this study was to identify clinical criteria predictive of fibrinolysis success among patients admitted for STEMI to emergencies within 12 hours.
**Methods :** We conducted a single-center, prospective, observational study. Inclusion of patients with STEMI thrombolysed by Tenecteplase. Fibrinolysis success was defined according to clinical and Electrocardiogram criteria. Multivariate study is used to identify the factors associated with thrombolysis success.
**Results :** Two hundred and sixty-three patients were included. Mean age= 57 ± 16 years. Sex ratio= 6.96. The average time lost before admission for chest pain was 184 ± 126 min (30 min to 12 hours). The average success rate of thrombolysis was 72.2%. In multivariate analysis, the independent predicting factors of fibrinolysis success were: the delay from onset of chest pain to the ED visit being less than 180 min [OR=1.5; IC 95%= 1-2.26; p=0.05] and the delay for the first medical contact to qualified ECG being less than 10 min [OR= 1.5; IC 95% = 1-2.36; p=0.05].
**Conclusions :** Regarding the management of myocardial infarction with persistent ST segment-elevation in emergencies, the independent predictors of a fibrinolysis success are the short delays from onset of the chest pain to the ED visit being less than 180 minutes, and the delay between the first medical contact and the ECG interpretation being less than 10 min.
**Key-words :** Acute myocardial infarction; Emergencies; Fibrinolysis; Delay

## INTRODUCTION

The management of acute coronary syndrome with persistent ST segment elevation (STEMI) is based on emergency reperfusion therapy [1]. Two reperfusion strategies are possible: a pharmacological strategy: intravenous thrombolysis, and an interventional strategy: Percutanuous coronary intervention.
Reducing the time from the onset of clinical symptomatology to reperfusion therapy in the acute phase of STEMI is the determining factor in patients' prognosis and is, therefore, an important therapeutic goal and a determining factor in the reperfusion strategy selection [1- 3].
In our conditions, and in the absence of coronary angiography available within the recommended delay, pharmacological fibrinolysis in STEMI remains the most commonly used reperfusion therapy.
This pharmacological fibrinolysis is performed in the emergency department (ED) which reduces the time from STEMI diagnosis to coronary reperfusion [4].
The effectiveness of coronary reperfusion determines the prognosis of STEMI, but with pharmacologic thrombolysis, the success of reperfusion is not constant and it depends on several factors including the consultation time, comorbidities and the territory of the myocardial infarction [4, 5].
The aim of this study was to identify clinical criteria predictive of fibrinolysis success among patients admitted for STEMI to emergencies within 12 hours.

## METHODS

This was a prospective, observational, descriptive study conducted in the emergency department of Charles Nicolle Hospital from June 2012 to May 2015. Patients over the age of 18 who were taken care of for STEMI during this period were included. Patients with transient ST-segment elevation, whose onset of pain to emergency consultation delay was greater than 12 hours, as well as those with a contraindication to pharmacologic fibrinolysis, or who have undergone primary angioplasty have not been included. The therapeutic protocol is based on the combination of antithrombotic treatment: Dual AntiPlatelet Therapy (DAP/Aspirin and P2Y12 inhibitor (Clopidogrel)) and an anticoagulant (enoxaparin or UFH) as recommended in guidelines. Thrombolytic therapy is based on the use of a specific fibrinolytic agent (Tenecteplase TNK-tPA). The treatment of the pain relied mainly on titrated intravenous opioids. The result of thrombolysis was judged at 60 minutes; success was considered if we have pain regression criteria associated with electrical regression criteria of the above ST shift of 50% in the derivation where it was the most important. The ensuing orientation of the patient was done according to the result of the pharmacological lysis:

- Successful lysis: referral to the Cardiology Intensive Care Unit at the cardiology department or to the Surveillance Unit at the emergency department.
- Unsuccessful lysis: orientation to the coronary care unit for rescue angioplasty.

  Our primary endpoint was to identify predictors of successful thrombolysis by Tenecteplase among patients admitted for STEMI in the ER in the first 12 hours. The secondary endpoint was to describe the epidemiological characteristics of these patients.
- Statistical analysis: The data acquisition and the statistical study were carried out by the SPSS 19.0 software for Windows. We carried out a descriptive study (simple frequencies and relative frequencies for qualitative variables; means, medians, standard deviations and range for quantitative variables). An analytical study was conducted with comparison of quantitative variables (Student T-test); comparison of qualitative variables (Pearson chi-square test, and in case of non-validity of this test by Fisher's exact bilateral test). A multivariate study was performed with logistic regression by backward stepwise elimination. The odds ratio (OR) was expressed with the respective 95% CI. The significance level «p» was set at 0.05. Receiver-operating characteristic (ROC) curve was used to analyze the correlation between the success of thrombolysis and the first medical contact and the STEMI delays.

## RESULTS

During the study period, 301 patients with STEMI presented to the emergency department within the delay of reperfusion. Twenty-two patients had an absolute contraindication to pharmacologic reperfusion, among whom fourteen had primary angioplasty and ten had received only conventional treatment. Two hundred and sixty-three patients were thrombolyzed.

The demographic characteristics of the 263 patients included in the study were as follows: The mean age was 57 ± 11 years, with extremes ranging from 30 to 86 years. Males were predominant with a sex ratio of 6.96%. Tobacco was the major cardiovascular risk factor present in 198 (75%) patients, with an average poisoning estimated at 43 ± 24 pack-year. Among our patients, 23% were hypertensive, 22% were diabetic and 20 (7.6%) patients had coronary artery disease.

Several delays (concerning the patients and the management system) were analyzed: the mean delay of the first medical contact (delay from onset of chest pain to the ED visit) was 184 ± 126 min with a median at 150 min and the extremes ranging from 30 to 720 min; STEMI diagnosis (delay to obtain qualified electrocardiogram interpretation) was 11 min with a median at 5 min and extremes [1-80]; and the time to fibrinolysis strategy was 32 ± 21 min with a median at 30 min and extremes ranging from 5 to 120 min.

The ST elevation segment in the electrocardiogram concerned the different segments of the anterior territory in 51.4% of the cases; the inferior territory in 48.3%; basal territory in 32%, and the extension to the right ventricle was noted in 59 (22.4%) patients. Eighty-four percent of patients had no signs of acute heart failure on admission; seven patients presented in a cardiogenic shock.

Opioid analgesia was used in 71% of patients. The mean dose used was 7 ± 2 mg [3 -15].

The success rate of lysis was 72.2% (190 patients). The comparative study between the two groups (success versus failure rates of the lysis procedure) did not show any significant difference concerning: the mean age 56 ± 11 vs 58 ± 10 years ($p = 0.37$), tobacco in 77% versus 68% of the cases ($p = 0.15$). On the other hand, diabetes mellitus was more present in the failure group: 33% versus 18% in the success group, with $p = 0.012$; Hypertension in 32% of the failure group versus 20% for the success group, with $p = 0.028$. Regarding the previous treatment of the patients, 5% of the success group was under a beta-blocking agent against 9% for the failure group ($p = 0.20$); 7% of the success group was under acetylsalicylic acid against 11% of the patients in the failure group, without significant difference $p = 0.43$. Table 1 summarizes the comparative study between the two groups.

**Table 1. Comparative study: success group vs. failure group**

| | Success group n =190 | Failure group n=73 | P |
|---|---|---|---|
| ***Analyzed delays*** | | | |
| First medical contact; min (mean ± SD) | 171 ± 114 | 211 ± 147 | 0.07 |
| First medical contact ≤180 min; % | 69 | 52 | 0.041 |
| STEMI diagnosis; min (mean ± SD) | 9 ± 8 | 13 ± 10 | 0.08 |
| ***The territory of ST elevation in the first ECG; n (%)*** | | | |
| Anterior | 28 (14) | 17 (23) | 0.08 |
| Antero-lateral | 34 (17) | 21 (28) | 0.04 |
| Extension to the right ventricle | 46 (24) | 13 (17) | 0.28 |
| Right bundle brunch block | 2 (1) | 4 (5) | 0.05 |
| ***Hemodynamic examination on admission*** | | | |
| Systolic arterial pressure; mmHg (mean ± SD) | 147 ± 32 | 135 ± 42 | 0.015 |
| Cardiac frequency; beat per min (mean ± SD) | 83 ± 18 | 88 ± 22 | 0.08 |
| KILLIP grade; (mean ± SD) | 1 ± 0.4 | 1.5 ± 1 | 0.000 |
| ***Complications; n (%)*** | | | |
| Hypotension | 7 (3) | 10 (13) | 0.003 |
| Cardiogenic shock | 3 (1.9) | 14 (19) | 0.000 |
| Cardiac arrhythmia | 8 (4) | 7 (9) | 0.09 |
| ***Therapeutics; n (%)*** | | | |
| Dobutamine® | 4 (2) | 10 (13) | 0.001 |
| Adrenaline® | 0 | 3 (4) | 0.02 |
| Intubation | 0 | 6 (8) | 0.000 |
| External electric shock | 8 (4) | 7 (9) | 0.09 |
| ***Death; n(%)*** | 0 | 4 (5) | 0.005 |

*Hypotension: systolic arterial pressure <90 mmHg; STEMI: ST elevation myocardial infraction; SD: Standard deviation*

Of the 73 lysis failures, 52 had a rescue PCI. Four deaths were recorded in the emergency department, all in the failure group (p = 0.005).

In multivariate analysis, only the delays of a first medical contact (less than 3 hours), and the ECG interpretation (less than 10 minutes) were independent factors of thrombolysis success.

Table 2 shows the independent factors of lysis success.

Figures 1 and 2 illustrate the two ROC curves: First medical contact delay-lysis success (AUC = 0.58) and STEMI delay-lysis success (AUC = 0.57).

**Table 2. independent predictors of the lysis success**

| Factors | Adjusted OR [95% CI] | p |
|---|---|---|
| First medical contact ≤ 180 min | 1.5 [1-2.26] | 0.05 |
| STEMI diagnosis within 10 minutes | 1.5 [1-2.36] | 0.05 |

OR: Odds Ratio; CI: Confidence Interval

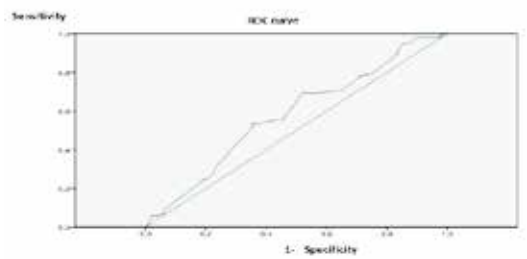

**Figure 1. ROC curve analyzing the correlation between the delay first medical contact to thrombolysis and the success of this treatment**

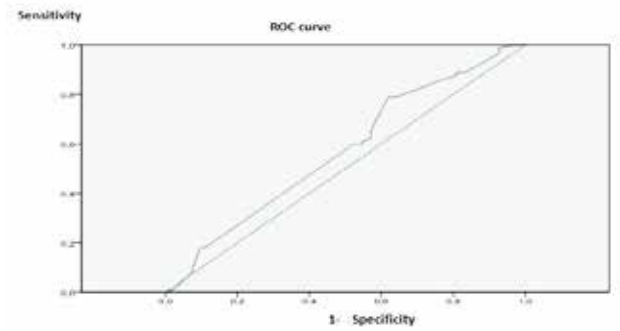


**Figure2. ROC curve analyzing the correlation between the delay of STEMI diagnosis and the success of lysis**

## DISCUSSION

Regarding the management of myocardial infarction with persistent ST segment-elevation in emergencies, the short delays from onset of chest pain to the ED visit being less than 180 minutes, and from the first medical contact to a qualified ECG interpretation being less than 10 min appear as independent factors of a fibrinolysis success.

Among the 263 patients included with STEMI in emergency departments, the combination of DAPT, an anticoagulant and a specific fibrinolytic; allowed a lysis success rate of 72.2%.

Limitations: The study type being an observational monocentric study and the small size of the sample were the main limitations in our study. However, the nature of the prospective study carried out in an emergency department, the current location for the initial management of STEMI was a strong point.

The annual prevalence of STEMI is about 500 000 cases in the United States and 100 000 in France [6-8]. The prevalence of diabetes and tobacco intoxication was greater in our series as in other national series compared to the series reported in the literature. In national series the prevalence of diabetes was about 20 to 25% and smoking about 75%; in international series, it was about 15% for diabetes and 45% for smoking [9-13]. Our country has been witnessing an epidemiological transition with increasing prevalence of cardiovascular risk factors: diabetes, smoking, hypertension, and obesity being the new objectives for national health programs [14].

In the STEMI history, various delays have been individualized and indicated as prognostic factors. Time has always been a therapeutic goal: time is myocardium, time is outcomes [15]. The moving of thrombolysis from cardiac intensive care units to vital emergency rooms at the emergency department has reduced the delay in the management of STEMI [16, 17]. All the recommendations underline the importance of shortening coronary reperfusion delay: it was the major criterion for the

choice of the reperfusion modality. The maximum delay from STEMI diagnosis to bolus of fibrinolysis was set to 10 min and the maximum delay from STEMI diagnosis to PCI was set to 120 min [1]. In this study and in the absence of available PCI within the recommended delay, pharmacological fibrinolysis was the most commonly-used reperfusion therapy. With the combination of two antiplatelet agents, an anticoagulant, a specific fibrinolytic agent and an early initiation of fibrinolysis in the vital emergency room, the success rate of thrombolysis was 72.2% in our series. This rate varied in national and international series, ranging from 54 to 73% [9, 18-20].

Several factors predictive of a successful lysis procedure have been analyzed in the literature. Among these factors we have the «smoke paradox» [21, 22]. This was explained by the young age of active smoking subjects, the absence of comorbidities and the nature of coronary stenosis [21, 22]. Previous beta-blocker therapy has also been stated in several studies as a predictor of a successful lysis, and a factor in improving the survival rate at 1 and 3 months [23-25]. These factors have not appeared as predictors of success in this study.

The delay of the initiation of the thrombolysis from the onset of clinical symptomatology was the determining factor in the effectiveness of the thrombolysis [26-28]. The maximum effectiveness was achieved in the first hour after the pain had started. In addition to the result of thrombolysis, this delay influenced the mortality rate within one month post-episode. In a meta-analysis, the initiation of thrombolysis in the first 3 hours after the onset of the pain reduced mortality within the first month compared to primary angioplasty, hence, the notion of «golden hour of thrombolytic therapy» [26]. In our study, the short delays from onset of chest pain to the ED visit being less than 180 minutes and for first medical contact to a qualified ECG interpretation being less than 10 min appear as independent factors of a fibrinolysis procedure success in the STEMI patients carried out in the emergency department. Although the air under the curve is limited (less than 0.7); the prognostic importance of these two factors must be considered, especially while taking into consideration the limited size of the study sample.

## CONCLUSIONS

Regarding the management of myocardial infarction with persistent ST segment-elevation in emergencies; the delays from onset of chest pain to the ED visit being less than 180 minutes and for first medical contact to a qualified ECG being less than 10 min appear as independent factors of a fibrinolysis procedure success. The shortening of these delays requires awareness raising and education of the population concerning the patient's delay, as well as an early detection and management of STEMI in the ED to improve the outcome.

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# ORIGINAL RESEARCH

# *Predictors of non-invasive ventilation in patients admitted to the emergency department for acute exacerbation of COPD*

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**Background :** The evolution of Chronic Obstructive Pulmonary Disease is marked by the occurrence of exacerbations. The use of non-invasive ventilation during a severe acute exacerbation has demonstrated its benefits; it must be introduced earlywith medical treatment and before severe acidosis to avoid intubation and mechanical ventilation.

Objective: The aim of this research was to study the predictive factors of non-invasive ventilation in patients admitted to the emergency department for acute exacerbation of COPD.

**Methods :** A prospective observational study of one year. We included patients admitted to ED for exacerbation of COPD with analysis of epidemiological and prognostic characteristics.Two groups were individualized and compared: patients requiring non-invasive ventilation and patients who did not require non-invasive ventilation.

**Results :** We included 72 patients. The average age was 70 ± 11 years with extremes of 45 to 94 years. The sex ratio was 2.2. Seventy-five percent of patients were smokers and 69% were hospitalized for exacerbation of their disease during the last 2 years. Dyspnea was the most common reason for consultation, in 81% of the cases. The average pH was 7.32 ± 0.53; the average PaCO2 was 41.69 ± 6.54 mmHg. Thirty-four percent of thepatients received non-invasive ventilation and 5%,invasive ventilation. The median length of stay in the emergency department was 4 days. The intra-hospital mortality rate was 8.4%. In multivariate analysis, three independent predictive factors of non-invasive ventilation were identified: respiratory signs of struggle (adjusted OR=7.015, CI [95%] [2.09 ; 23.46]p=0.002); GCS ≤14 (adjusted OR=6.55, CI [95%] = [1.31 ; 29.77], p= 0.022) and pulse oximetry (SpO2) <88% (adjusted OR=3.55, CI [95%] = [[1.03 ; 12.07]]; p= 0.044).

**Conclusion :** Knowing theclinical factors thatpredict the use of NIV onadmission to the ED may contribute to improve the initial management of patients with acute exacerbation of COPD.

**Key words :** COPD; Non-invasive ventilation; Emergency department; Assessment; Prognosis

## INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD), which is a slowly progressive chronic disease, is a problem of healthcare especially in emergency departments (EDs) [1].The acute exacerbations of COPD mark the evolution of this chronic pathology, they are characterized by an increase of symptoms (cough, dyspnea and sputum) whose severity can be life-threatening and requiring frequent hospitalizations.The current problem of this debilitating pathology is the need for frequent visits to EDs which generates a very important care load and congestion of these services.One third of outgoing patients after their visit to EDs will backslide within 14 days, and 17% will be re-hospitalized [2]. The risk of recurrence and re-consultation in emergencies makes the identification of patients at riskan important strategy for optimizing treatmentand hospitalization decisions.

Non-invasive ventilation (NIV) constitutes a major turning point in the management of COPD, reducing the frequent use of invasive ventilation. It became the preferred ventilation technique for COPD exacerbations and significantly improved the response rate and the prognosis of severe exacerbations of COPD [3].According

to some authors, NIV must be introduced early with medical treatment and before severe acidosis so as to avoid intubation and mechanical ventilation, and toreduce complications, length of stay and mortality [4]. As a result, the identification of specific predictive factors of the use of NIV and failure of NIV from the initial phase of admission to ED based on available clinical and paraclinical criteria has a significant prognostic and organizational impact. The main objective of this work was to study the predictive factors for non-invasive ventilation (NIV) use in patients admitted to the emergency department (ED) for acute exacerbation of COPD. The second objective was to study the predictive factors of failure of NIV in these patients.

## METHODS

- Study design: A prospective observational and prognostic single-center study wasconducted in the ED of an academic Hospitalto which aroundseventy thousand visits are made every year. Patients were enrolled prospectively over a period of12 months (January 2015 to December 2015). Data were collected on a pre-established data collection sheet with demographic, clinical, biological and evolution findings.We included all thepatients admitted to the ED for acute exacerbation, aged over 40 years, withCOPD or meeting the clinical criteria of COPD, and presenting an acute exacerbation responding to the criteria of GOLD [5]. The indication of the NIV was posed on the clinical signs and the results of the gasometry. Patients who received NIV before their arrival to ED were not included. Also were excluded the patients whose data were incomplete. The main outcome measures were the use of NIV and its rate of complications (i.e., failure of NIV).

Acute exacerbation of COPD is defined by the worsening of the respiratory status of apatient with COPD during more than 48 hours, as compared to asteady state and beyond daily variations; the mode of installation being brutal and requiring a change of the usual treatment. The severity of the disease was evaluated from anamnestic elements with reference to the recommendations of the GOLD. Thisclassification identifies 4 severity groups (A, B, C, D) according to two factors of clinical severity: the number of annual exacerbations and the intensity of the symptoms [5]. The Anthonisen classification was used to define the stage of severity of the acute exacerbation in case of infectious etiology.A protocol for atherapeutic management of exacerbations has been pre-established and followed according to the recommendations of GOLD [5].Two groups were individualized and compared:Patients requiring NIV (group 1) and those who did not require NIV (group 2). The complications of NIV were classified as major and minor complications:

- Major complications: hypotension during ventilation; pneumothorax; impairment of neurological status; aggravation of respiratory distress.
- Minor complications: mask allergy; feeling of suffocation and claustrophobia; conjunctivitis; dryness of the mouth, nose and eyes; gastric distension; cutaneous lesions due to the support points of the mask.

- Statistical analysis: We used the Statistical Package for Social Sciences (SPSS 23.0, IBM) for analysis. Comparisons of two independent series were made using Student's Independent T-test and in case of non-validity, the non-parametric Mann-Whithney testwas used. Comparisons of percentages were made by the Pearson chi-square test, and in case of non-validity of this test, by Fisher's exact test. The value of $p < 0.05$ was considered significant. Risk factors were evaluated by univariate analysis and by multivariate analysis by a multiple logistic stepwise regression procedure. Odds ratios were estimated from the b coefficients obtained, with respective 95% confidence intervals (CI 95%). The significance level was a two-sided $p < 0.05$ for all the used tests.

## RESULTS

We recruited72 patients who had beenadmitted to ED for acute exacerbation of COPD. The demographic characteristics, combined GOLD stages, comorbid diseases, baseline clinical and biological parameters are shown in Table 1.

**Table 1. Baseline characteristics of the study patients**

| Characteristics | Values (n = 72) |
|---|---|
| Sex ratio M/F | 2.2 |
| Age mean; years (mean ±SD) | 70 ± 11 |
| Duration of disease evolution; years (mean±SD) | 10 ±6 |
| ***Combined GOLD stages; n (%)*** | |
| A | 7 (10) |
| B | 4 (6) |
| C | 43 (60) |
| D | 8 (11) |
| ***Comorbid diseases*** | |
| High Blood Pressure | 41 (57) |
| Diabetes | 22 (31) |
| Atrial fibrillation | 17 (24) |
| Coronaropathy | 16 (22) |
| Heart failure | 15 (21) |
| Renal failure | 7 (10) |
| Stroke | 3 (4) |
| ***Reasons for consultation*** | |
| Dyspnoea | 58 (81) |
| Increased cough | 30 (42) |
| Increased sputum volume or purulence | 28 (39) |
| Fever | 11 (15) |
| Chest pain | 10 (14) |
| Coma | 9 (12) |
| Other symptom | 16 (22) |

*GOLD: :Global Initiative for Chronic Obstructive Lung Disease*

Smoking was the major risk factor found in 54 patients (75%). Cardiovascular diseases and diabetes represented the 2 comorbidities the most commonly associated with COPD. Sixty-nine percent of ourpatients were hospitalized for exacerbation of their disease during the last 2 years. Dyspnea was the leading reason for consultation in 81% of thecases. Clinical and biological findings of the studied patients are summarized in Table 2.

**Table 2. Clinical and biological findings of the study patients**

| Characteristics | Values (n = 72) |
|---|---|
| ***Clinical signs of severity; n (%)*** | |
| Polypnea (RR> 20 c/min) | 42 (58) |
| SpO2 <88% | 29 (40) |
| Cyanosis | 12 (17) |
| Sweats | 14 (19) |
| Coma | 6 (8) |
| Peripheral signs of shock | 2 (3) |
| ***Laboratory tests results; n (%)*** | |
| White blood cell > 10.000 /L | 43 (60) |
| Glucose> 12 mM/L | 16 (22) |
| Creatinine> 120 microM/L | 15 (21) |
| ***Gas sample analyses; n (%)*** | |
| pH ≤ 7,35 | 22 (31) |
| PaCO2 ≥ 45 mmHg | 24 (33) |
| PaO2 ≤ 60 mmHg | 10 (14) |
| HCO3- ≥ 24 Mmol/L | 24 (33) |
| SaO2 < 88% | 10 (14) |

*RR: Respiratory rate, SpO2: pulse oximetry saturation SaO2: arterial oximetry saturation*

Signs of severity were noted in half of thepatients. Signs of chronic pulmonary heart were found in 20 patients (28%). The pH ranged from 6.83 to 7.55 with an averageof 7.32 ± 0.53; the average PaCO2 was 41.69 ± 6.54 mmHg and the average PaO2 was 58.29 ± 8.27 mmHg.

Infection was the most common cause of exacerbation in 51 patients (71%). NIV was reported in 34 patients (47%). The use of mechanical invasive ventilation was indicated in 5 patients (7%). The evolution was favorable for the majority of thepatients (92%) within a delay of 24 ± 8 hours. Fifty-eight patients (81%) returned home and were addressed to pneumology consultation, 5 patients (7%) came out of ED with long-term home oxygenation,three patients (4%) were transferred to intensive care, and four patients (6%) were transferred to the pneumology department. Six patients died (8%). A complication of NIV occurred in 8 patients (11%). These complications are summarized in Table 3.

In univariate analysis, the predictors of NIV need were:

**Table3. Complications of non-invasive ventilation**

| Complications | Values (n = 72) |
|---|---|
| Hypotension; n (%) | 2 (3) |
| Bronchospasm; n (%) | 2 (3) |
| Feeling of suffocation and claustrophobia; n (%) | 2 (3) |
| Coma; n (%) | 2 (3) |

Hypercapnia (PaCO2 ≥ 45 mmHg), hypoxemia (PaO2 <60 mmHg), pulse oximetry (SpO2) <88%, GCS ≤ 14 and signs of struggle. Three independent predictors of NIV have been identified. Table 4 summarizes these different factors.

The predictors of NIV failure in univariate analysis were: Coma,

**Table 4. Predictive factors of NIV use in patients admitted to the emergency department for acute exacerbation of COPD (n = 72)**

| Settings | Adjusted OR | CI [95%] | p |
|---|---|---|---|
| Signs of struggle | 7.015 | [2.09 ; 23.46] | 0.002 |
| GCS ≤ 14 | 6.552 | [1.31 ; 29.77] | 0.022 |
| SpO2< 88% | 3.554 | [1.03 ; 12.07] | 0.044 |

*OR: Odds Ratio; CI: Confidence Interval; p: p-value significant < 0,05, GCS: Glasgow Coma Scale, SpO2: pulse oximetry saturation*

Serum creatinine>120 micromol/L, glycemia ≥ 14 mmol/L, and stroke. Three independent predictors of NIV failure have been identified. Table 5 summarizes these various factors.

**Table 5. Predictive factors for NIV complications in multivariate analysis.**

| Settings | Adjusted OR | CI [95%] |
|---|---|---|
| Coma | 16.983 | [2.832;25.060] |
| Serum Creatinine >120 micromol/L | 9.915 | [2.294;34.294] |
| Glycemia ≥ 14 mmol/L | 8.137 | [2.096;30.131] |

*OR: Odds Ratio; CI: Confidence Interva*

## DISCUSSION

In our study threeindependent predictors of non-invasive ventilation were identified in patients admitted to the emergency department for acute exacerbation of COPD: respiratory signs of struggle GCS ≤ 14, and pulse oximetry (SpO2) <88%. The identification of these factors at admission can help us, emergency physicians, to make a rapid and early therapeutic decision to put patients on non-invasive ventilation which could ensure abetter prognosis forgrowing numbers of patients presenting this pathology in our country. In Tunisia, at present, there are no exact statistics on the prevalence and incidence of the COPD, it is estimated at 3 to 4% [6]. Acute exacerbation is one of the most important predictors of recurrence, decline in respiratory function, and mortality [7,8].

The use of NIV in patients with acute exacerbation of COPD complicated by hypercapnic respiratory distress is widespread, supported by a strong foundation of evidence and benefits from clinical consensus concerning its contribution. The one-year mortality of patients presenting an acute exacerbation requiring NIV and those requiring intensive care is estimated at 28% and 43%,respectively [9].

In our study, 34 patients (47%) received NIV amongwhom 26 patients (76%) returned home after improvement. NIV has transformed the therapeutic modalities of exacerbations of COPD.It is currently a standard component of the management of these patients and it is included in the most recent international guidelines [10,11]. Multiple studies have demonstrated that NIV is effective in exacerbations of COPD, resulting not only in rapid symptomatic and physiological improvements, but also in a significant reduction in the use of intubation, the rates of complications and mortality and, in some studies, the length of stay in hospital. Compared with mechanical ventilation in randomized clinical trials, observation cohorts or meta-analyses, NIV showed better outcomes [3]. This can be explained by a higher rate of complications in the group treated with mechanical ventilation. Multiple studies now seek to refine these criteria to ensure that NIV is reserved for the most appropriate patients to improve outcomes.

In our study, the independent predictors of NIV failure were coma on admission, serum creatinine>120 micromol/L and blood glucose> 14 mmol/L, with adjusted ORs of 16.983, 9.91 and 8.14, respectively (significant p). The failure of NIV is associated with higher intra-hospital mortality and prolonged length of stay than with successful NIV [12]. A qualitative study examining the clinical factors that contribute to the success or failure of NIV in «high-performance» centers in the United States has shown that the most important prognostic factors for the failure of NIV were: the absence of radiological cleaning; important secretions; poor nutritional status; patient-ventilator asynchrony; significant leaks; and/orno improvement in gas exchange after one hour of NIV [13].

Evidence of indications for the use of High-flow oxygen therapy (HFOT) in acute hypercapnic exacerbations is limited to rare studies and clinical cases. HFOT has been used successfully in patients with acute hypercapnic respiratory exacerbation who didn't improve under NIV [14]. A study showed that HFOT is effective in replacing NIV in acute hypoxemic respiratory failure [15], but remains until now a controversial topic in hypercapnic acute respiratory failure.

Use of HFOT has already startedin some centers in Tunisia but its effectiveness has not yet been evaluated. Limitations:The shortcomings of our study were the small number of included patients, the fact thatonly one center was evaluated, and the lack of follow-up after discharge from the emergency department.

## CONCLUSION

Knowing the factors predicting the use of NIV from the time of admission to the emergency department may contribute to the improvement of the initial management of patients admitted in ED for acute exacerbation of COPD.

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# ORIGINAL RESEARCH

# *Intravenous versus oral paracetamol for acute pain in prehospital: a prospective randomised trial*

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**Objective :** To compare intravenous paracetamol to oral paracetamol in the management of patient with moderate pain in pre hospital setting.
**Methods :** A prospective, randomized, preliminary study was conducted over 6 months at Emergency Mobile Service. Adult patients with moderate pain were randomly assigned to receive either the intravenous paracetamol (IV group) or oral paracetamol (OP group). The primary outcome was Visual Analogue Scale (VAS) pain reduction at 30 min. A clinically significant change in pain was defined as 15 mm.
**Results :** Thirty-eight patients were identified, 20 in IV group and 18 in OP group. There was a predominance of male gender (sex ratio = 1.5), mean age was 33±14 years. No significant difference was demonstrated in this trial with intravenous paracetamol compared to oral paracetamol in terms of average of pain scale reduction at 30 minute (17 ± 1 mm in OP group vs 21 ± 13 mm in IV group; p=0.54). However, a significant difference in paracetamolemia at 30 minute was noted between the two groups (6 ± 5 mg/l in OP group vs 17.5 ± 6 mg/l in IV group; p< 0.001).
**Conclusions :** Our preliminary study, showed a better bioavailability of the intravenous form of paracetamol. However there was no significant difference in analgesia.
**Keywords :** Pre Hospital; Acetaminophen; Analgesia; comparison

## INTRODUCTION

Pain management in pre hospital sitting is an essential aspect of patient care. Pain management protocols involve initial pain assessment, provision of appropriate analgesia and regular pain reassessment [1]. Paracetamol is an effective, safe analgesic for the management of mild to moderate pain.

Potential advantages of intravenous paracetamol over the oral formulation are justified by pharmacokinetic advantages including higher bioavailability, achieving target plasma concentrations faster and avoiding the hepatic first pass effect.

But the higher costs, time inconvenience, and the possibility of complications of intravenous administration require more attention.

In the Emergency Department setting, intravenous paracetamol has been compared with intravenous morphine and other active comparators [2-5], but comparisons with the oral form are limited.

The aim of our study was to compare intravenous paracetamol to oral paracetamol in the management of moderate pain in pre hospital setting.

## METHODS

- Study design: We conducted a prospective, randomized, preliminary study over a period of 6 months (July to December 2018), in the emergency mobile service.
- Population: Patients were eligible for inclusion if they were ≥18 years old, complaining of acute pain corresponding of a Visual Analogue Scale (VAS) ≤ 60 mm. Patients were not included if they had deterioration of the consciousness, allergy to paracetamol, any degree of renal or hepatic insufficiency, pregnant, unable to swallow oral medication or had taken paracetamol within the last 6 hours.
- Study protocol: The procedure consisted to evaluate pain with VAS and patients were randomly assigned to receive either the intravenous paracetamol (IV group) or oral paracetamol (OP group). For the oral form we used the paracetamol effervescent Patient follow-up will be done by re-evaluating pain at 30 minute.

The patient's socio-demographic characteristics and causes of pain were collected. The hemodynamic parameters and VAS were measured before taking medication (paracetamol 1 gram), at 15

minutes and 30 minutes. Paracetamolemia was measured before medication and 30 minutes afterwards. The primary endpoint was VAS pain reduction at 30 min. A clinically significant change in pain was defined as 15 mm. Our secondary endpoint is the difference of paracetamolemia 30 minutes after administration of the paracetamol in the two groups. Statistical analysis: We analysed data using SPSS V.20.0 (IBM, released 2013, IBM SPSS Statistics for Windows) and we presented them as mean ± SD (standard deviation) or as percentages. The clinical data were compared using the student-t test for continuous variables and the Chi-square test for categorical variables. All p values < 0.05 were considered statically significant.

## RESULTS

During the study period 42 patients were eligible, 4 patients were excluded because the dosage of paracetamolemia was not done A total of 38 patients were enrolled into the study; 20 in IV group and 18 in OP group. Mean age was 33±14 years. Males were predominant (60%) with a sex ratio = 1.5. Median time to the pre hospital intervention was 55±17 min. Peripheral trauma was the most frequent cause of pain (76%). Demographics and clinical characteristics of IV group and OP group are shown in table 1.

**Table1. Baseline characteristics of the study population and group comparison**

| Variables | IV group N=20 | OP group N=18 | p |
|---|---|---|---|
| Age; years (mean ± SD) | 36 ± 18 | 28 ± 8 | 0.25 |
| Men; n (%) | 13 (67) | 9 (50) | 0.44 |
| ***Cause of pain*** | | | |
| Cranial trauma; n (%) | 8 (40) | 6 (33) | 0.21 |
| Thoracic trauma; n (%) | 3 (15) | 1 (5) | 0.06 |
| Peripheral trauma; n (%) | 17 (85) | 12 (67) | 0.65 |
| Cervical trauma; n (%) | 2 (10) | 1 (5) | 0.12 |
| Mean time to the intervention; minutes (mean ± SD) | 52 ± 16 | 58 ± 19 | 0.38 |
| Mean VAS at T0; cm (mean ± SD) | 5.7 ± 0.8 | 5.9 ± 0.5 | 0.57 |
| Mean VAS at T30 min; cm (mean ± SD) | 3.7 ± 1.5 | 4.4 ± 1.6 | 0.26 |
| **Hemodynamic parameters** | | | |
| BP at T0; mmHg (mean ± SD) | 122.3±1.2 | 125.6± | 0.13 |
| HR at T0; bpm (mean ± SD) | 96.2±3.4 | 97.6±2.4 | 0.6 |

*SD: Standard deviation; VAS at T0: Visual Analogue Scale before medication; VAS at T30 min : Visual Analogue Scale at 30 min BP at T0 :blood pressure before medication ;HR at T0 :heart rate before medication*

We did not found a significant difference between the two groups in terms of the average of pain scale reduction at 30 minute: 17±1 mm in OP group vs 21 ±13 mm in IV group; p=0.54 (figure 1).

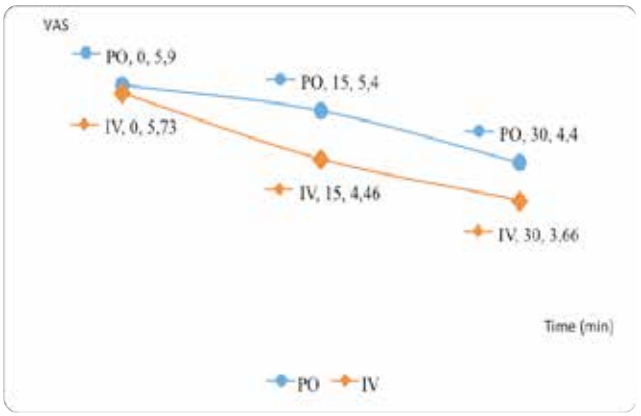


**Figure 1. change in VAS scores (cm) during the management (minutes)**

However, a significant difference in paracetamolemia at 30 minutes was noted between the two groups: 6±5 mg/l in the PO group vs 17.5±6 mg/l in IV group; p< 0.001.

## DISCUSSION

This is the first study comparing intravenous paracetamol to oral paracetamol in the management of moderate pain in pre hospital setting. We found no superiority of pain reduction for the intravenous preparation in patients with moderate pain.

Some previous research had indicated that intravenous paracetamol has a faster onset of action, greater analgesic efficacy and longer duration of action, and these conclusions informed our hypothesis based on the biological plausibility [6,7].

With evidence of higher and more reliable serum levels attained by intravenous paracetamol, it is a reasonable deduction that intravenous paracetamol will provide a better analgesic effect.

There is a large volume of data to support the use of intravenous paracetamol for the short-term treatment of moderate to severe pain in adults [8]. IV paracetamol has become widely used in clinical practice and incorporated into clinical guidelines [2,8].

However, oral paracetamol, in healthy individuals with normal gastric emptying, should also achieve adequate serum levels for analgesia and this study would appear to support this.

Studies comparing intravenous and oral paracetamol for the reduction of pain are limited.

A recent systematic review [9] comparing oral and intravenous paracetamol in a variety of settings, included six randomised trials, only three studies assessed efficacy outcomes and all were in the postoperative setting. They found no clinically significant difference in efficacy. However, these conclusions were based on low-quality evidence overall, with methodological limitations in all included trials, such as issues with blinding and allocation concealment.

In the emergency department setting Furyk J et al [10] demonstrated that there was no superiority of intravenous paracetamol compared with oral paracetamol in terms of efficacy of analgesia and no difference in length of stay, patient satisfaction, need for rescue analgesia or side effects.

It was also demonstrated that oral paracetamol is not inferior of intravenous paracetamol for postoperative analgesia after lower third molar extraction [11].

Other study [12] also support the use of oral paracetamol in many situations, with low side-effects and good response compared with other analgesic drugs.

With this information, clinicians may choose to avoid the additional costs and risks attached to the intravenous preparation.

Our study has some limitations. First, the number of patients included was relatively limited to generalize the findings. Second, our study enrolled a sample of traumatized patients in pre hospital sitting with acute pain, which may have resulted to selection bias.

Finally, clinical evaluation parameters were recorded during patient transport time, which may influence some values.

## CONCLUSION

In this pre hospital study, there was no significant difference in analgesia between intravenous paracetamol and oral paracetamol in the management of moderate pain. However, we found a better bioavailability of the intravenous form. Multicenter studies including a larger number of patients are needed in order to confirm this result.

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# ORIGINAL RESEARCH

# *Drug-related adverse events due to cardiotropic agents: Epidemiology and prognosis in the emergency department*

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**Introduction :** Cardiotropic agents overuse is correlated to poor prognosis and is related to the risk of cardiac and hemodynamic life-threatening situations. Toxicity is attributed to their narrow therapeutic spectrum and pharmacodynamic properties. The aim of this study was to evaluate epidemiological, clinical and prognostic profile of patients visiting an emergency department and in whom iatrogeny secondary to cardiotropic use was diagnosed.
**Methods :** This was a single-center prospective study over 12 months. We included, successively, all the patients aged over 18 years in whom diagnosis of cardiotropic iatrogeny was made. Cardiotropic-related drug-induced events were selected following a collegial decision-making process. Prognosis was evaluated in terms of severity and mortality at day 30.
**Results :** We enrolled 51 patients. The median age was 72 years with IQR [25-75]. The sex ratio was 0.64. Twenty cases of misuse were identified (39%) with 51% of the cases being related to the physician. Accountability of the adverse drug event (ADE) was 51%. The ADE was considered severe in 45% of the cases and the death rate within the first 30 days was 12%. Drug classes were dominated by beta-blockers in 20 patients (39%). They were significantly the most incriminated agent in the occurrence of severe ADE. A double iatrogeny was found in 13 patients (25%). Misuse and physician-related ADE were found to be predictive of the severity of ADE in univariate analysis with, respectively, for misuse: (OR brut=22, CI95%=[5.2;93.5]; p < 0.001) and for related physician ADE (OR brut = 3.7; CI95%=[1.11;12] ; p= 0.015). Predictive factors of mortality within the first 30 days in the univariate analysis were: Past renal failure: OR 5.8; CI95% [1.29-26.5]; p=0.015; Misuse with OR =16.7; 95% CI=[1.9-143.5]; p=0.002 and severe ADE with OR =15.0; 95% CI=[1.75-129]; p=0.032.
**Conclusion :** Cardiotropic iatrogeny is frequent and serious because of its hemodynamic repercussions responsible for a high rate of hospitalizations and mortality. ADE is preventable in 50% of the cases and related to prescription. Preventability of ADE is possible well before the arrival of the patient at the Emergency Department (ED).
**Keywords :** Cardiotropic agents; Adverse drug event; Emergency department; Outcome

## INTRODUCTION

Iatrogeny is a common situation in emergency medicine but it often remains under-diagnosed because of the overall polymorphic clinical presentation. This situation has been defined by the World Health Organization (WHO) as any adverse and unwanted event that may be related to the usual doses of a drug used for the prophylaxis, diagnosis, treatment of a disease, or to modify physiological functions [1]. The WHO also defined iatrogeny in 1969 as any harmful and unwanted reaction related to medication and occurring accidentally [2]. The High Council for Public Health (HCSP) defines iatrogeny as an undesirable or negative consequence on the individual or collective state of health of any act or measure practiced or prescribed by an authorized professional aimed at preserving, improving or restoring health [3,4]. Anglo-Saxons substitute the term iatrogenic by an «Adverse-event» [5]. Some attribute iatrogeny to a positive response to the discontinuation of the incriminated treatment within 48 hours [6]. According to Edwards and Aronson, the ADE is defined as a harmful or unpleasant reaction related to the use of a drug, which could lead to danger in case of subsequent administration and justify prevention, specific treatment, changing doses or discontinuation of the product [7]. Cardiotropic agents are widespread and largely used especially with aging population and cardiovascular leading diseases. Moreover, polymedication is frequent in the elderly, exposing to the settlement of this

pathology. It has been demonstrated that iatrogeny is correlated to poor prognosis and represents a public health problem burdened with a heavy morbi-mortality [8]. Cardiotropic iatrogeny is the second leading cause of toxic death in the United States [9]. Cardiotropic iatrogeny is a life-threatening situation frequently encountered in the emergency field but remains under-estimated, inducing a lack of sufficient epidemiological data. Pharmacological specificity of cardiotropic agents is characterized by a strong ability to bind to plasma proteins and a large volume of distribution. Clinical presentation, however, remains polymorphic and represents a challenge for emergency physicians to relate accountability to these drugs.

The aim of this study was to evaluate the epidemiological, clinical and prognostic profile of patients consulting in emergency with final diagnosis of cardiotropic-related iatrogeny.

## METHODS

- Study design: This was a prospective observational and single-center study conducted in an ED of a teaching hospital with 125.000 annual visits. Patients were enrolled prospectively over 12 months (March 2012 to March 2013). Data were prospectively collected on a pre-established check-list with demographic, clinical, biological and evolution findings. We included all the patients aged over 18 years in whom diagnosis of cardiotropic iatrogeny was retained after evaluation and following collegial decision-making of the accountability of the responsible drug and the probability of iatrogeny. We didn't include voluntary poisoning, iatrogeny acquired after admission for another initial health problem and non-pharmacological adverse events (linked to invasive technical procedures). Patients in whom data were incomplete were also excluded.

The main outcome was evaluated by the occurrence of severe ADE on admission or during emergency management, and mortality at day 30. Patients were assessed for severity and considered at a high-risk with serious ADEs if they fulfilled any of the following criteria: Hemodynamic instability (defined by a systolic blood pressure (SBP) < 90 mmHg), bradycardia (less than 40 bpm), severe conduction or rhythm disturbances and/or impairment of neurological status (GCS<13). Severity was assessed by Ambulatory Simplified Severity Index (IGSA). Moreover, for each patient with an ADE, the event was assessed for the occurrence of two factors: Misuse and preventability. Misuse was further analyzed for being part of a physician prescription or due to the patient himself. For follow-up, patients or their relatives, or the hospitalization ward staff were contacted by phone at day 30 to check on the evolution of the case.

## DEFINITIONS

Misuse: a use that is not in accordance with the summary of a product's characteristics.

Evitability: identification of adverse effects that can be prevented, it seeks to propose preventive actions to reduce risks.

Adverse drug event (ADE): harmful and unwanted reaction occurring at doses normally used in humans for the prophylaxis, diagnosis or treatment of a disease, or for the restoration, correction or modification of a disease or a physiological function, or resulting from misuse of the drug or product. The adverse drug event (ADE) may be related to the physician or the patient himself. An ADE was considered severe in the presence of one or more of the following criteria: respiratory, circulatory and / or neurological distress; need for an initial evaluation in the Emergency resuscitation room (ERR); need for hospitalization and/or intensive care unit supervision: cardiology intensive care unit (ICUU), close emergency unit (USR) or resuscitation unit; use of intensive therapeutic means: vasoactive and/or inotropic drugs, external electric shock (EEC), mechanical ventilation (MV) or need for an urgent technical gesture: systolic training catheter, pacemaker; or death.

### *Statistical analysis:*

Statistical Package for Social Sciences (SPSS 20.0, IBM) for analysis was used. Gaussian distribution nature of each quantitative variable was verified using the Kolmogorov-Smirnov test to guide the subsequent statistical study. In all statistical tests, the significance level $p < 0.05$ was considered significant. Variables with normal distribution were expressed as mean ± standard deviation, while quantitative variables with non-Gaussian distribution were expressed in median and 25th and 75th IQR. Univariate and multivariate analyses with logistic regression were conducted to perform a comparative study in order to assess the severity and mortality at day 30.

## RESULTS

### *Characteristics of the population:*

During the study period, 165 cases of pharmacological iatrogeny managed in the ED were collected over the 12 months period. Iatrogeny related to cardiotropic agents was collected in 51 patients. The incidence was 0.45‰. The median age was 72 years: IQR [25th,75th]=[62, 78]. Twenty per cent of the patients were more than 80 years old. The sex-ratio was 0.64 with a female predominance. Forty-nine patients (96%) arrived in the ED by their own means. Table 1 illustrates the medical history of the patients.

**Table 1. Medical history of the patients**

| Chronic disease | Values (n = 165) |
|---|---|
| Hypertension; n (%) | 38 (74) |
| Diabetes; n (%) | 24 (47) |
| Atrial fibrillation; n (%) | 14 (27) |
| Renal failure; n (%) | 10 (20) |
| Heart failure; n (%) | 7 (14) |
| Stroke; n (%) | 8 (16) |
| Cardiac ischemic disease; n (%) | 8 (16) |
| Disease of the thyroid; n (%) | 7 (14) |
| Chronic respiratory disease; n (%) | 3 (6) |

Vital signs at presentation were: Systolic Blood Pressure (SBP) < 90 mmHg in 10 patients (20%); heart rate (HR) < 50 bpm in 30 patients (59%); Pulse Oximetry (SpO2) < 90% in 6 patients (12%) and Glasgow Coma Scale (GCS) ≤ 13 in 5 cases (10%). Vertigo and dizziness were the leading reasons for consultation in 33% and 27% of the cases, respectively, followed by dyspnea in 14% of the cases. Twenty-six patients (51%) had serum creatinine level greater than 120 micromoles/l, among whom 10 (20%) were known to have renal failure. Eight patients (16%) had hyperkalemia on admission and 3 patients (6%) had hypokalemia. Mean IGSA was 5.5 ± 2.6 with extremes of 0 and 12. Thirteen patients (25%) had an IGSA ≥ 8.

***Analysis of the medical prescription:***

The average number of drug items consumed daily by patients was 5 ± 1 with extremes of 1 to 10 items. Thirty patients (59%) consumed at least 5 drugs. Moreover, fifteen patients (30%) did not know the name of the drug and 9 patients (18%) did not know the related effects. A double cardiotropic iatrogeny was found in 13 patients (25%). The incriminated drug classes were dominated by beta-blocking agents in 20 patients and anti-arrhythmic agents (Amiodarone ®) in 18 patients as shown in table 2.

**Table 2. Different incriminated drug classes found in the medical prescription**

| Drug classes | Values (n = 165) |
|---|---|
| Beta-blocker agents; n (%) | 20 (39) |
| Amiodarone; n (%) | 18 (35) |
| Calcium channel blockers; n (%) | 11 (22) |
| Digitalics; n (%) | 7 (14) |

***Management at the emergency department:***

Seventeen patients (33%) required optimizing the circulatory state by isotonic saline infusion, and 9 of them (18%) required vasopressor agents. No patient required mechanical ventilation. Thirty-nine patients (76%) were hospitalized in ED. Twelve patients (23%) were discharged on the same day.

***Analysis of the adverse drug events: Severity and Mortality***

Misuse was found in 26 patients (51%). ADE was related to the prescriber in 27 cases (53%) and to the patient in 9 cases (18%). ADE was preventable in 26 patients (51%). It was severe in 27 cases (53%). Physician-related ADE and misuse were identified as predictive factors of severe ADE in univariate analysis.

The mortality rate at day 30 was 23% (12 cases). Table 3 summarizes the comparison of the severe and non-severe ADE groups in univariate analysis.

**Table 3. independent predictors of death**

| Items | OR | CI [95%] | P |
|---|---|---|---|
| ADE related to physician | 3,7 | [1,11 - 12] | 0,015 |
| Misuse | 22 | [5,2 - 93,5] | <0,001 |

*OR: Odds ratio, CI: confidence interval*

Renal failure, misuse and severe ADE were found to predict mortality at day 30 in univariate analysis. Table 3 summarizes the comparison of the two groups.

## DISCUSSION

In the present study, it has been shown that a patient's misuse of drugs and physician-related ADEs are predictors of severity, and that past renal failure, misuse and severe ADEs are predictors of mortality at day 30 in patients visiting the emergency department for iatrogeny related to cardiotropic agents. The incidence in our emergency population was estimated to a rate of 0.45‰. There are not many studies evaluating the occurrence of cardiotropic iatrogeny and the numbers in emergency medicine remain low.

***Baseline characteristics of the ADE:***

This study showed that the onset of severe ADE (53%) was primarily related to misuse, a physician's prescription and to double iatrogeny conditions, which are preventable factors. Knowledge of these factors would prevent their occurrence and guide the therapeutic approaches in patients requiring treatment with cardiotropic agents. The rate of preventability was 51%, approaching the rates found in the literature [10,11].

ADE was preventable in 15 patients who had severe ADE (55%) and in 3 patients who died (25%). In the literature, the incidence of severe ADEs has not changed in five years [12].

***Iatrogeny and difficult clinical decision making:***

The medical management of acute intoxications is most often motivated by the presence of neurological signs [1]. In this study, more than half of the patients (n=31; 60%) presented to the ED with vertigo, dizziness or lipothymia. Those are non-pathognomonic signs and do not lead to a clear diagnosis pathway. Making a clinical decision in such situations is in itself a difficult task which may delay not only the identification of the incriminated agent but also the installment of the appropriate treatment at the right moment. The emergency physician should be aware of the fact that iatrogeny may be responsible for some neurological signs.

***Incriminated drug class:***

In this study, beta-blockers and amiodarone were the two most incriminated agents in 39% and 35% of the cases, respectively, followed by calcium channel-blockers (22%) and digitalics (14%). Beta-blockers were the most related to mortality (67%; p = 0.031). Beta-blockers and calcium channel blockers represent the most widely used cardiotropic agents in the world [14,15]. In overdose, they have similar effects, mainly hypotension and bradycardia by a myocardial depression effect. In addition, calcium channel blockers can induce vasoplegia that triggers the onset of hypotension and shock [14,15].

Calcium channel blockers and beta-blockers account for approximately 40% of cardiotropic iatrogeny according to "The American Association of Poison Control" and account for more than 65% of deaths due to cardiotropic drugs [16,17].

***Severity assessment:***

In this study, severe ADE occurred in 27 patients (53%). Severity was primarily related to misuse, physician's prescription and double iatrogeny, which are preventable factors. In one retrospective study conducted in Korea over two years (2005-2007), the factors most related to the occurrence of severe bradyarrhythmia were the history of coronary artery disease, ventricular arrhythmia, impaired systolic function, advanced age and double iatrogeny [6]. Double iatrogeny was correlated to severity in a retrospective study [18], the factors related to the occurrence of severe bradycardia were advanced age and double iatrogeny.

***Therapeutic issues:***

Compared to other clinical presentations of ADE-related situations with cardiotropic agents, mortality is mostly related to circulatory failure. The presence of a state of shock during intoxication is the cornerstone of prognosis. The usual symptomatic therapeutic targets the optimization of the circulatory status but may rapidly be insufficient and require other devices. Tonic heart failure is dynamic, transient and reversible, depending on the pharmacokinetics of the drug. One of the proposed therapeutic strategies is the peripheral circulatory assistance, allowing to reduce the concentration of the agent in target organs by maintaining its renal and hepatic elimination [19]. The indication of a temporary pacemaker for assistance has been proposed in some studies in iatrogenic bradycardia [15,20]. The indication of a permanent pacemaker has also been discussed, especially in particular and serious cardiac conditions. One study showed that in almost 25% of the cases, bradycardia was not due to the drugs but rather revealed by them, making the indication of a permanent pacemaker justified [6]. External electro systolic training does not seem ineffective in most of cardiotropic toxicities because of a lack of inotropism [14]. It remains a solution in the absence of isoprenaline.

***Toxic dose for cardiotropic agents?***

Determining an exact toxic dose is difficult given the inter-individual variability, polymedication and frequent drug interactions [14]. Thus, in a clinical review elaborated by Baud F and al., minimum or threshold doses of the main toxic cardiotropic agents, or more precisely the presumed ingested doses (PID) expected to cause early serious cardiovascular disorders which may even require circulatory assistance, have been defined to help and guide primary care physicians (emergency physicians, EMS regulatory physicians, etc.) to assess and estimate the severity of cardiotropic iatrogeny at an early stage [21].

However, the time elapsed between ingestion and clinical evaluation is crucial to judge the severity of the iatrogeny and not to underestimate it.

This study highlighted the fact that the emergency department and emergency physicians are the first actors in the chain of detecting and managing an iatrogeny. Cardiotropic agents are widespread among the elderly and the polymedicated population. Difficult clinical presentation and severity of dynamic evolution are challenging physicians who should be aware of such etiology. Moreover, the role of the physician takes place well before the arrival of a patient in ED: it is therefore essential in the genesis of iatrogeny. In our study, we identified 26 physician-related ADE cases (51%) and the same rate for the preventability. The role of ongoing education and teaching

hospitals has been demonstrated in the study of Thomas and al. [22] in the prevention of iatrogeny, finding a lower incidence of ADEs in teaching hospitals compared to first-line structures and regional hospitals.

## CONCLUSIONS

The clinical presentation of cardiotropic iatrogeny is polymorphic and represents a challenge for the emergency physician to relate accountability to one drug. Its severity is related to the risk of cardiovascular impact involving the life-threatening prognosis, the delay induced by the clinical decision making and the underlying elderly, polymedicated population. Beta-blockers and calcium channel blockers represent the most widely used cardiotropic drug classes in the world. In our study, beta-blockers were significantly more incriminated in the occurrence of mortality.

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# ORIGINAL RESEARCH

# *Pediatric transport analysis: characteristics and organization in Tunisian emergency care system*

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**Objective :** To analyze characteristics of our pediatric transport and to identify final orientation of transported children.
**Methods :** This was a prospective observational study of the activity of Emergency Care System including the population aged from 0 to 14 years over a period of 12 months (January 2016 to December 2016). We analyzed two types of intervention: primary and secondary. Data was collected by a standardized document used by all our emergency mobile services (EMS) during pediatric transport.
**Results :** We included 422 patients. There were 73 primary interventions (17%) and 349 secondary interventions (83%). The median age was equal to 2 years [0,7] and the sex ratio was 1.47 The distribution of calls noted a peak in June and February (10% for each). For primary transport, the reason for medicalization was trauma in 44% of the cases. Secondary transport requests came from peripheral hospitals in 58% of cases and reason for transport was a respiratory distress in 49% of cases. During only 4% of secondary transport, our EMS teams were accompanied by a pediatrician and we noted 45 complications (13%). Sixty-two percent of them were related to manipulation and 38% were related to patients. Final orientation was pediatric emergency in 90% of primary intervention, and pediatric intensive care unit in 56% of secondary intervention.
**Conclusion :** The use of standardized document to evaluate pediatric transport remains very helpful to identify deficiencies. More effort should be made to reduce complications during secondary transport for a critically ill children
**Keywords :** Pediatrics; Emergency Mobile Service; Pre hospital management; Complication

## INTRODUCTION

Medical pediatric population needs are different from adult, especially in pre hospital care. The pediatric Emergency Mobile Service (EMS) is not yet well-defined in our country. Few studies have been published about pediatric pre-hospital care. However, a better knowledge of the specificities of the pediatric population's pre-hospital needs is necessary in order to optimize the care provided.

The aim of our study was to analyze our pediatric transport and to identify final orientation of transported children

## METHODS

This was a prospective observational study of the activity of EMS including the population aged from 0 to 14 years over a period of 12 months (January 2016 to December 2016). The Emergency Care System (ECS) cover the pre hospital activity of 6 governorates: Tunis, Mannouba, Ben Arous, Ariana, Nabeul and Bizerte.

We defined two types of interventions: primary and secondary. The primary medical intervention took place entirely out of the hospital. For the second one, patients had been already stabilized in a sanitary structure

We have divided our pediatric population into 3 subgroups: newborns (from 0 to 28 days); infants (from 1 to 24 months) and children (from 2 to 14 years old).

Data collection from patients included demographic and clinical characteristics, durations of transport, therapeutic management, as well as the final orientation after transport, have been collected from the pre hospital sheet of our ECS. All calculations were carried out using the statistical Package for Social Sciences (SPSS) software 19.0 for windows, the reported data were expressed in median and the first and fourth quartiles [Q1 - Q4] for numerical variables and in percentages for qualitative variables.

## RESULTS

During the study period, 599 pediatric calls were recorded.

We included 422 EMS interventions: seventy-three primary intervention (17%) and 349 secondary intervention (83%) as represented in figure 1.

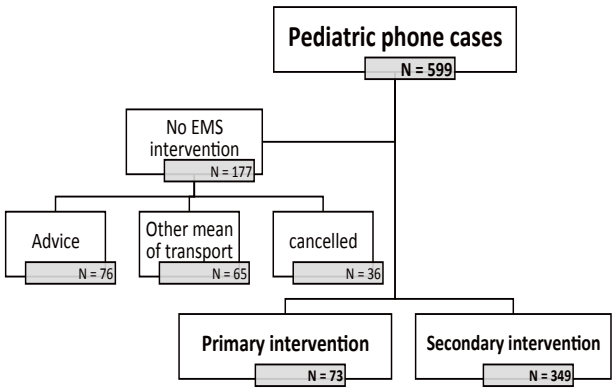


**Figure 1. flow chart explaining the inclusion algorithm**

For the total included population (422 patients), the median age was equal to 2 years [0-7] and the sex ratio was 1.47

The distribution of calls noted a peak in June and February (10% for each). The peak of calls has been recorded from 8 am to 2 pm (38%). The mobilized EMS were those of Tunis 165 cases (39%), Nabeul 93 cases (22%), Ben Arous 84 cases (20%), Bizerte 46 cases (11%), and Marsa 34 cases (8%).

- Primary interventions (N=73):
  Concerned children aged over 2 years (90%) and infants (10%). No intervention was recorded for newborns. Median age was at 9 years [3 - 13]. Callers were the parents in 77% of cases and the pediatricians in 20% of cases. Reasons for EMS primary interventions were described in table 1.

**Table 1. Reasons for primary interventions**

| Reasons for medical transport | N=73 |
|---|---|
| Trauma cause; n (%) | 32 (44) |
| Respiratory distress; n (%) | 17 (23) |
| Seizure; n (%) | 14 (19) |
| Intoxication; n (%) | 10 (14) |

Three patients (4%) were intubated and ventilated in pre hospital setting without any complications during the transport.

- Secondary interventions (N=349): Concerned children over 2 years (45%), newborns (35%) and infants (20%). Median age was equal to 1 year [0-5]. Secondary transport requests came from peripheral hospitals in 58% of cases. Main reasons for medical transport were a respiratory distress in 49% of cases, a neurological distress in 22%, and a polytrauma in 10%. During thirteen secondary transports (4%) our EMS teams were accompanied by a pediatrician. We noted 45 complications (13%) during secondary transports (table 2).

**Table 2. Reasons for primary interventions**

| Complication | N = 45 |
|---|---|
| Dysadaptation to the ventilator | 16 |
| Hemodynamic instability | 14 |
| Desaturation | 11 |
| Arrhythmia | 4 |
| Cardiac arrest | 2 |
| Unplanned extubation | 0 |

Sixty-two percent of them were related to manipulation and 38% were related to patients. Final orientation of our pediatric transports have been detailed in the table 3

**Table 3. Complications during secondary transports**

| Destination | Primary transport N=73 | Secondary transport N=349 |
|---|---|---|
| Pediatric intensive care unit; n (%) | 2 (3) | 195 (56) |
| Pediatric emergency department; n (%) | 66 (90) | 63 (18) |
| Neonatal intensive care unit; n (%) | - | 91 (26) |
| Left on the site of intervention ; n (%) | 5 (7) | - |

## DISCUSSION

The median age of our population was 2 years with a bimodal distribution observed between secondary interventions and primary interventions with, respectively, 1 year old and 9 years old. This could be explained by the large proportion of neonatal secondary transports, whereas primary transport concerned mainly the older child. This bimodal distribution was also found by Tesnière and Tsai [1,2].

In our study, we observed a male predominance (60%). This predominance was also reported by Tesnière, Tsai, Applebaum and Miller [1-4] with respectively 56.7%, 54.6%, 59.6% and 55%

We observed an increase in transport during the winter period,

with a peak in December and February, which could be explained by the seasonal upsurge of respiratory infections. The second increase was observed during the summer period coinciding with the increase in birth rate and in road accidents.

In Ramenofsky's study [5], the use of pediatric transport increased by up to 43% during the summer season as well as in January and March (local school holidays). In Tesnière and Tsai studies [1,2], there was no significant difference in the distribution of interventions between different months and different seasons.

For secondary interventions, the calls came mainly from a public hospital with a majority for peripheral hospitals. This indicates the absence of technical platforms adapted to the care of the children in these areas, thus requiring the use of EMS units to transfer them to a more appropriate care structure.

During secondary interventions, 62% of complications were related to manipulation. This can be explained by the difficulty and the specificity of the pediatric care and also by the insufficient training of the EMS teams. This result was supported by Mata et al [6] in their study. Consequently, the authors conclude that specific theoretical and practical trainings of the caregivers is essential for an adequate pediatric transport. Furthermore, the availability of clinical guides can facilitate the management and the transfer of critically ill patients [7,8].

For primary interventions, calls were received mainly from the parents in 77% of cases. Camasso-Richardson [9] studied the use of pediatric EMS. He found that most transports (61%) were found to be medically unnecessary. In 86% of cases, parents had not called their doctor before ECS and most patients (74%) returned home without any help.

In primary interventions, trauma emergencies were the most common reason of call (44%), and mainly concerned the older child. For secondary interventions, the main reason of call was a severe respiratory disease of the newborn and the infant. Only 4% were accompanied by a pediatrician and there was 13% complication during transport.

This duality of reasons calls was also found by Tesnière [1], with a majority of trauma (48.9%) for primary interventions and of respiratory diseases (34%) for secondary interventions.

For primary interventions, the majority of patients were referred to a pediatric emergency department (90%). Only 3% of patients were admitted directly to an intensive care unit. E. Krennerich et al. [10] reported that majority of their patients (82%) required admission to a critical care unit and this majority was likely to benefit from the available expertise of a mobile pediatric intensive care unit with expert caregivers to augment care delivery during transport. Still now we do not have a well-identified pediatric EMS. Our EMS teams managed pediatric and adult population. This organization was similar to pediatric transport at Spain, Portugal and Latin America [6] where there was no unified and specific pediatric transport system, with qualified and trained staff, or with specific transfer material resources.

Study limitations: This study was conducted at a single institution in a large academic center in a busy urban environment; it may not be generalizable to all centers and/or pediatric transport teams

## CONCLUSION

The profile of primary interventions has mainly concerned the old child. It was similar to the adult's transport, with a majority of trauma emergencies. Secondary interventions accounted for the biggest part of ECS activity. Use a standardized document to evaluate our practice in the management of pediatric population in out of hospital setting remains very helpful to identify deficiencies. More effort should be made to reduce complications during secondary transport for critically ill children.

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# ORIGINAL RESEARCH

# *Pre-hospital management of traumatic brain injury in Kairouan seven-year retrospective study*

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**Introduction :** Traumatic brain injury (TBI) is a critical health problem worldwide. The prognosis is directly correlated with the precocity and quality of the Pre-hospital management. The aims of this study were to evaluate epidemiological data and analyze the Pre-hospital management of TBI patients in Kairouan, and to compare the results obtained to those identified in the literature review and major guidelines.
**Methods :** A retrospective study of 147 patients injured from January 2011 until December 31st2017 and managed by the SMUR unit of Kairouan.
**Results :** The mean age was 35.3 years. The male to female ratio was 4.1. Fifty-six percent of the accidents took place in rural areas. The most common causes were car accidents (64.6%) followed by falls (11.6%). Motorcyclists were the most vulnerable group of road users (50.5%). The average response time was 26minutes. SpO2 was assessed in 98.6% of the cases and hypoxia occurred in 13.8% of the cases. Endotracheal intubation was performed in 1.1% of the patients with mild TBI, in66.7% with moderate TBI, and in92.5% with severe TBI. Blood pressure was assessed in 98% of the cases, fluid resuscitation was used in 79.6% of the cases and the majority of the patients (88.9%) received normal saline.98.6% of the patients were successfully transported to hospital while 1.4% deceased on their way to a healthcare center.22.4% had a CT scan, and abnormal CT findings were seen in 60.6%ofthecases. The most common findings were cerebral contusions. The severity of TBI appears to be influenced by the rural environment(P=0.16), accident involving motorcycles or bicycles (p=0.045), a response time that is longer than 60minutes(p=0.006) and an associated extremity injury (p=0.045).
**Conclusion :** These results may contribute to the ongoing debate on the optimal Pre-hospital treatment of TBI patients. Given the proximity to the site of impact, advances in Pre-hospital practice are a key target for further improvements in long-term functional outcomes following TBI. Further research is needed to identify the effect of different treatment protocols on patients' safety and outcome.
**Keywords :** Traumatic brain injury; Prehospital; Epidemiology; Management

## INTRODUCTION

Traumatic brain injury (TBI)refers to the potential for significant injury to the brain parenchyma following a head trauma. TBIs are a critical public health concern worldwide as they represent a major public health, medical, and societal challenge globally [1,2]. According to the World Health Organization, TBI will have surpassed many diseases as the major cause of death and disability by the year 2020[3]. Severe TBI is a leading cause of mortality and morbidity in the first decades of life [4] with a tremendous burden on the society due tothe high costs of care and loss of productive life years[5,6].Pre-hospital emergency care is the first step in the chain of survival and effective treatment. During this period, it is considered crucial for a beneficial outcome. The aims of this study were to evaluate epidemiological data and analyze the Pre-hospital management of TBI patients in Kairouan and compare the results obtained to those identified in the literature review and major guidelines

## METHODS

- Population: Were included, all the patients with isolated TBI, or associated to other injuries, who were managed by

the SMUR unit of Kairouan in the governorate of Kairouan. Exclusion criteria were: age < 18 years, and/or the absence of pre-hospital transport (patients pronounced dead at the scene of the incident or handed over to a Civil Protection unit) and/or patients subject to secondary transfer from a healthcare facility to another.

- Study design: a retrospective and descriptive study. This study was based on the Pre-hospital records over a seven-year period, from January 1st, 2011 to December 31st, 2017.Itwas set in an emergency medical service (EMS) that adopts the principles of the Franco-German model. We collected the characteristics of the patient and the incident, initial assessment and management (airway, circulation, spine collar, use of mannitol and analgesic) and outcome (destination, health care facility, medical imaging).
- Data analysis and interpretation: Statistical analysis was performed using a statistical software, IBM SPSS Statistics 23.0. Our results are presented in tables and graphs. Data reported in the text and tables indicate the mean ± standard deviation for numeric variables and percentages or ranges for dichotomous variables. To compare qualitative variables, we used the Pearson's Chi-square test and the Fisher's exact test. To compare quantitative variables, we used the student's t test. The significance level was a two-sided $p < 0.05$.

## RESULTS

Of the 478 records reviewed, 147 met our inclusion criteria. The average age was 35±13.7years with extremes of 18 to 87 years. The prevalence of TBI was clearly higher in the male population than among females. The sex ratio M/F was 4.1. Almost two-thirds (29.3%) of the accidents occurred in the city of Kairouan. In more than half (56%) of the cases, the accidents occurred in a rural area while 44(30%)occurred in urban areas. The most frequent time was between 11pm and 2am (36.8%) (Table 1).

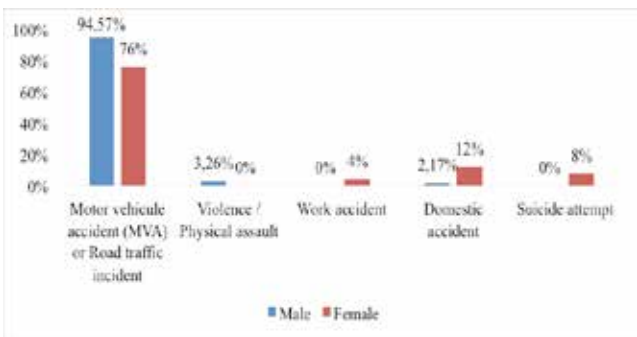


**Figure 1. Distribution of patients according to the context of injury**

Concerning the context of injury, motor vehicle accidents(MVAs) were in the vast majority (86.4%) the cause of TBI. Far behind, come the other contexts of injury (Table 1).

**Table 1. Baseline characteristics of the study patients**

| Characteristics | Values (n = 147) |
|---|---|
| Average age | 35±13,7 |
| Male gender | 118(80,3%) |
| Female gender | 29(19,7%) |
| **Environment of TBI; n (%)** | |
| Urban | 44(30%) |
| Rural | 82(56%) |
| Unknown | 21(14%) |

The average response time was 25.9 ±13.8 min with a minimum of 2 min and a maximum of 65 min. Pre-hospital care was provided during the 30 minutes following the accident.

Initial oxygen saturation was evaluated in 98.6%of the patients. It was less than 90% in 13.8%of the cases. Initial blood pressure (BP) was evaluated in 98% of the cases. It was below 110 mmHg in 22.9% and higher than 160mmHg in 9%. The Glasgow coma scale (GCS) was assessed in all patients. TBI were classified as mild (GCS 13-15) in 64.6% of the cases, moderate (GCS 9-12) in 8.2%, and severe (GCS3-8) in 27.2%. The capillary glucose level (CGL) was measured in104 patients (70.7%).The average value was 140 ±52 mg/dl. The brain injury was associated with other injuries in 89 out of the147 patients (60.5%). Limb injury was the most common lesion associated with TBI (50.3%), followed by chest injuries and spinal injuries.

During the initial management of patients with mild TBI, only 1.1% were intubated while 66.7%with moderate TBI were intubated. In patients with severe TBI, 92.5% were intubated. The rapid sequence intubation was performed using Hypnomidate and suxamethonium in almost 70% of the cases. A neuromuscular blocking agent, NMBA, was used in 89% of the cases. In all the patients, the sedation was performed by the use of fentanyl as an opioid agent and midazolam as a hypnotic agent.

In 34(23%)cases, a cervical collar was used. One hundred and seventeen patients out of 147 (79.6%)received a fluid loading. The majority were given normal saline. Succinylated gelatin was used in 20.5%of the cases. Only 3 patients out of 147 were

given Mannitol as a hyperosmolar fluid.

Analgesia was given to only 31 patients (21.1%). Paracetamol was used in 58%of the cases while morphine in 41.9%. Univariate analysis showed that the severity of TBI appears to be influenced by the environment and mechanism of injury (Table2).

**Table 2. Severity of TBI according mechanism and environment**

| | Value | p |
|---|---|---|
| Motor cycle or bicycle | 48 | 0.045 |
| Urban environment | 44 | 0.1 |
| Rural environment | 83 | 0.016 |

## DISCUSSION

Our study group consisted of patients aged 18 to 87 years with a median age of 35.3 ± 13.7 years. The highest peak of incidence of TBI according to age was in young adults (26-35 years). This age group is one of the most active groups in a society. They usually spend most of their time out of their houses for educational or professional reasons, and are more prone to accidents. Our results go hand in hand with the data from the literature [7,8,9,10].

This study showed that there is a high male-to-female ratio. Males are common road users, and are predominantly affected in road traffic injuries as well as most commonly involved in disputes. The other reason for male predominance is that males move more frequently out of their homes and are more active on the labor market than females.

This finding is in accordance with other studies that have reported the ratio of head injuries in men as compared to women to be 3-4.5 to 1[11-13]. More than half of the accidents occurred in rural areas with a percentage of 56.5%, a finding similar to the results of other studies conducted in Colorado [14], Oregon [15], and Tanzania [16]. These differences in incidence between urban and rural areas could also be accounted for by many factors, including high motorcycle use rate, low helmet use rate, and drunk driving. Furthermore, the rural areas tend to lack safe roads with enforced public safety measures. The major cause of serious head injury in our series was road traffic accidents (RTAs) with a percentage of 64.6%, followed by falls from height (11.6%). This finding correlates with previous studies from Pacific low- and middle-income countries as well as with other international studies [7,9,17,18].

In Sweden, the incidence of TBI due to RTAs has changed over time to be replaced by falls as the main mechanism of TBI. This was attributed to the success of public safety measures and preventive strategies for RTAs [19]. Likewise, in Canada, falls represent 51% of the most common mechanisms of TBI.

Our present study has shown that the average response time (RT) was 26 minutes. An RT which was not far from other findings from studies conducted in countries that have adopted the Franco-German model, which is the model adopted by our Tunisian EMS. These studies showed an RT varying between 15 and 25 minutes [20,21].

Factors such as traffic, poor roads, inadequate infrastructure, and remote and out of reach areas are the causes of delay for pre-hospital care in emergency cases. Furthermore, the RT interval is directly affected by the distance to an incident and the maximum speed at which an ambulance can travel safely, including traffic and roadway conditions. Geographic distribution plays an important role in the RT interval. SMUR units often have to travel long distances. The governorate of Kairouan has only one SMUR unit covering 6,712 square kilometers. It is not unusual for the unit to respond to calls outside an 80-kilometer radius within the governorate.

According to the Second Edition of the brain trauma foundation, BTF's Guidelines, the Pre-hospital assessment of a patient with TBI should include continuous pulse oximetry monitoring. Hypoxemia defined by a pulse oximetry(SpO2) < 90% should be avoided, and corrected immediately upon identification.

Assessment of TBI patients' SpO2 in pre-hospital settings was reported in 100% of our patients. SpO2 on scene was above 95% in 81.4% of the cases, between 90 and 94% in 4.8% of the cases, and less than 90% in 13.8% of the cases. Hypotension is a major secondary brain insult and many studies have demonstrated that hypotension dramatically worsens the outcome [22,23]. The duration and number of episodes of hypotension are correlated with mortality [22]. Assessment of TBI patients' blood pressure in pre-hospital settings was reported in 100% of our patients. Initial hypotension (SBP lower than 110 mmHg) was encountered in 22.9% of the patients. Initial hypertension (SBP higher than 160 mmHg was encountered in 9% of the patients. Among those in the discharged group, 20.6% had hypotension and 6.4% had an SBP greater than 160 mmHg.

According to the Second Edition of the BTF's Guidelines and the Second Edition of the SFAR's Guidelines, pre-hospital measurement of the GCS is a significant and reliable indicator of the severity of TBI, and should be used repeatedly

to detect improvement or deterioration over time. Many studies demonstrated a significant correlation between the initial GCS and the patient's outcome following a TBI. In a prospective study by Narayan et al.[24], a positive predictive value of 77% for a poor outcome (dead, in a vegetative state, or severely disabled) was measured for patients with a GCS of 3 to 5. In another study from Australia conducted by Fearnside et al.[25], a significant inverse correlation was found between the initial GCS in the hospital (obtained 6-48 hours after injury) and mortality.

In our study, the assessment of the patients' neurological status was performed in 100% of the cases using the GCS. 27.2% of the patients had a severe TBI (GCS <= 8), 8.2% had a moderate TBI (GCS between 9 and 12) and 64.6% had a mild TBI (GCS >= 13).

According to the Second Edition of the BTF's Guidelines and the Second Edition of the SFAR's Guidelines, patients with severe TBI require definitive airway protection throughout tracheal intubation and mechanical ventilation because they are at risk of pulmonary aspiration or compromised respiratory drive and function. Confirmation of placement of the tube in the trachea should include end-tidal CO2 (ETCO2) determination. ETCO2 monitoring using capnography devices has been widely established for pre-hospital environment and is of particular use for verification of endotracheal tube placement in noisy and difficult environments [26].

In the present study, 40.8% of the cases received high-flow oxygen via a non-rebreather mask, while 31.3% were orotracheally intubated and 27.9% did not receive any oxygen therapy. All intubations were performed using a reusable direct Macintosh laryngoscope and cuffed endotracheal tubes.

In patients with severe TBI, only 7.5% were received high-flow oxygen via a non-rebreather mask, while 92.5% were orotracheally intubated.

There is a perceived benefit of resuscitation with hypertonic solutions (HTS) in volume expansion [27]. As a result of hyper osmotic effect, such solutions provide the potential benefit of enabling blood pressure stabilization with smaller volumes. Furthermore, the addition of a colloid solution in HTS might prolong hemodynamic improvements, which could be advantageous in long-distance transport. However, in a recent Canadian study [27], no clinically significant benefit with the use of HTS was observed compared to other resuscitation fluids for patients with TBI. In nine randomized controlled trials and one cohort study of pre-hospital fluid treatment in patients with TBI, HTSs were not more effective than isotonic saline [28,29].

In our study, 79.6% were given a plasma volume expander. The vast majority of patients (88.9%) received NS. Patients received 6% HES in 20.5% of the cases, Succinylated gelatin in 20.5%, and Ringer's lactate in just 0.9%. Hyper-osmotic and hypo-osmotic solutions were never used. Pharmacological pain management immediately following TBI can influence post-injury outcomes. Therefore, it is imperative to design analgesic protocols for pain management after TBI.

BTF and SFAR guidelines indicated that adequate sedation and analgesia were essential in TBI patients. In the present study, more than half of the patients (52.4%) received neither analgesia nor sedatives. In our study, 21.1% of the patients received analgesia (41.9% of them received intermittent boluses of morphine and 58.1% received paracetamol), while 26.5% were sedated by fentanyl.

The management of pain remains inadequate in our pre-hospital setting. As a result, the use of pain killers in our study depended largely on the severity of TBI and the site in which the trauma occurred. The severity rate in rural areas was 34.94% compared to 9.09% in urban areas. This difference is statistically significant (p=0.16). Furthermore, according to our multivariate analysis, the occurrence of the accident in a rural area is an independent predictor of severity of TBI. This fact should incite ER caregivers to early-manage pain in rural TBI victims, even in a pre-hospital setting. Many factors are possible contributors to the increased severity of TBI observed in rural areas. Rural residents are less likely than urban ones to wear helmets or seat belts, and they are more likely to consume alcohol. Furthermore, in comparison with urban roads, rural roads have fewer traffic control checkpoints, worse infrastructure, and speeds are often higher because of the presence of uninterrupted segments of roadway. In addition, other prognosis factors of severity, such as crashes involving motorcycles or bicycles or slow RT, are more common in rural environments.

Motorcycle riders are far more likely to suffer a severe TBI than other accident victims. The reason for this is that at the moment of impact in a motorcycle accident, the skull can crash against the sidewalk, or the pavement. The brain is violently jostled around inside the skull, against the sides and the top of the skull. Moreover, since in many cases motorcyclists do not wear a helmet, the brain is more vulnerable to traumatic injury. In our study, the severity of TBI appears to be influenced by trauma caused by an accident involving motorcycles or bicycles. The severity rate in motorcycle and bicycle accidents was 16.67%. This difference is statistically significant (p=0.045).

Limitations of the study: Given the retrospective nature of our study, the validity is related to the quality of the initial filling of the files. Some important information was missing due to poor filling and bad handwriting. It appears that during interventions, the files are rarely fully filled at the scene, the

priority being of course always given to the care of the patient. A large portion of the missing information was not recovered, which unfortunately reduced the number of patients included in the study. Thus, many files were not appropriately coded and, therefore, have not been selected. Moreover, the majority of the files are filled out at the end of the intervention, usually with data obtained once the patient is well-stabilized. The hemodynamic parameters observed when the patients are in distress are often omitted involuntarily. In our study, in the absence of information, a gesture or treatment was considered as being not administered. The study is limited to discharge outcome. A follow-up study investigating serial post-prehospital care management and quality of life could be more effective.
However, the present study provides basic details of TBI. And despite these limitations, to the best of our knowledge, this study is the first large population-based study to investigate TBI in the governorate of Kairouan.

## CONCLUSION

TBI is common, with potentially devastating consequences. In the governorate of Kairouan, head injury is an important public health problem. The goals of Pre-hospital care for TBI are to stabilize patients for transport, to triage those with mass lesions who are impending cerebral herniation, and to prevent secondary insults and injury.
Our results may contribute to the ongoing debate about the optimal pre-hospital management of TBI patients. Advances in pre-hospital practice are a key target for additional improvements in long-term functional outcomes following TBI. Further research is needed to identify the effect of different treatment protocols on patient safety and outcome.

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# ORIGINAL RESEARCH

# *Pre-hospital management of drowning: strategies and epidemiological aspects*

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**Background :** Drowning is a serious and potentially fatal event. Our study aims to describe the epidemiological and clinical characteristics, and to evaluate the management of pre-hospital drowning.

**Methods :** A retrospective study over a period of one year in an Emergency Medical Assistance Center. Data were recorded from the medical regulation and intervention files. The demographic characteristics, the circumstances of occurrence, the drowning stage (Stage I: aqua stress; Stage II: minor hypoxia; Stage III: major hypoxia; Stage IV: anoxia: cardiopulmonary arrest) , the pre-hospital care and the fate of the patients were collected.

**Results :** were included 50 patients. The population was mainly made of young adults (28 to 48 years) with a higher rate of men (sex ratio at 1.77). The intervention took place in a public area in 66% of the cases. The stage of drowning was stage IV (cardiopulmonary arrest) in 46% of the cases, for 91.3% of them the cardiac massage had already started, with an average duration of NO FLOW of 11.35mn. Patients recovered in 26.6% of the cases. Three of them presented hemodynamic instability after recovery. For the patients who were transported, the most frequent destination was an intensive care unit in 51.8% of the cases, followed by emergencies in 44.4%.

**Conclusion :** Drowning in or country is frequently severe and requires specialized care by trained teams. The affected population is predominantly young male adults. The management of drowning in our advanced pre-hospital care team is globally satisfyingwith the exception of a few deficiencies like the fact that the resuscitation started with chest compressions, which we will make sure to correct in the future. Because of the risk of death and heavy neurological sequelae, the emphasis must be put on the prevention of these accidents.

## INTRODUCTION

According to the new definition adopted by the WHO in 2002, "Drowning is the process of experiencing respiratory impairment from submersion/immersion in liquid."

Unintentional Drowning is a serious issue of public health since it is responsible of more than 500,000 deaths worldwide every year according to the World Health Organization(WHO)[1]. Drowning is the leading cause of mortality among children aged between 5 and 14years all over the world[2]. Coastal drownings are estimated in U.S. dollars at more than 273 million per year in the United States and more than 228 million per year in Brazil[3,4]. Tunisia is a coastal country with a warm climate, especially during the summer season, which makes drowning a public health problem because of its high mortality and morbidity mainly caused by neurological sequelae[5], with a high socio-economic impact[6]. The aim of our study is to describe the epidemiological-clinical characteristics and to evaluate the management of pre-hospital drowning.

## METHODS

- Study design and population: This was a retrospective study during a year, conducted in the emergency medical help service in the Sahel (SAMU03). Were included any patient that experienced drowning. The demographic characteristics, the circumstances of the occurrence (primary drowning: such as exhausted swimmer, falling into the water…; or secondary drowning: syncopal drowning, trauma, medical condition (neurological, cardiac ...).), the drowning stage (Stage I: aqua stress; Stage II: minor hypoxia; Stage III: major hypoxia; Stage IV: anoxia: cardiopulmonary arrest), the pre-hospital care and the fate of the patients were collected.
- Statistical analysis: Data reported in the text numbers and percentages or ranges for categorical variables. All calculations were carried out using the statistical Package for Social Sciences (SPSS) software 19.0 for Windows.

## RESULTS

Fifty patients were enrolled, with a mean age of 28.48 years, with

a higher rate for men (a sex ratio at 1.77). The majority of the patients (68%) didn't have any medical history, 4 patients were epileptic, three with hypertension and three were diabetic. The most frequent callers were respectively: civil protection (36% of the cases), doctors (32%), a third part (16%),
paramedical and rescuers in 16 % of the cases. The place of call was a public place in 66% of the cases a regional hospital in 26% of the cases, university hospital in 8% of the cases. The reason for the call was cardiopulmonary arrest (44%), dyspnea (13 patients, 26%), and impairment of consciousness (13patients, 26%). The decision of the doctor was to engage a medical team in 96% of the cases. The mission was primary in 70% of the cases, and "primary-secondary" in 24%. The place of intervention was a public place in 66% of the cases and emergencies in 30%. Drowning was primary in 84% of the cases, in fresh water in 72% of the cases. The extraction from water was made in 70% of the cases by a person from the public and by a rescuer in 30% of the cases. The stage of drowning was, respectively, stage IV (46%), stage II (28%), stage III (14%), stage I (12%). Forty-six percent of the patients were found in cardiopulmonary arrest; for 91.3% of them the cardiopulmonary resuscitation (CPR)had already started, the average of NO FLOW period was 11.35mn, the rhythm was not shockable in 95.7%. The average duration of RCP was 37.7mn, with an average dose of adrenaline at 5mg, orotracheal intubation was the most frequent mode of ventilation (52.2%). Six patients (26.6%) were brought back to life but three of them presented hemodynamic instability.

The patients who were found alive (54%), had an average respiratory rate at 25.44, average oxygen pulse saturation at 88.59%, pulmonary auscultation found crackles in 59.3% of the cases, and a solicitation of accessory respiratory muscles was necessary in 37%. Oxygenation was required in 85. 2% of the cases (via a high concentration mask, in 40.7%), the non-invasive ventilation (Continuous positive airway pressure mode) was performed in 22.2% of the cases, and invasive ventilation was required in 18.5%. Mean systolic blood pressure was at 118mmHg, mean diastolic blood pressure was 71.2mmHg, normal saline solution was started in 37% of the cases, two patients needed a continuous infusion of vasoactive amines. Neurological status was predominantly conserved, mean Glasgow Coma Scale (GCS) between 13 and 14 (with a minimum of 7 and a maximum of 15). Only one patient had a traumatic head injury. Seventy-eight percent of the patients were warmed up by blankets. For the patients who were transported, the most frequent destination was the intensive care unit, in 51.8% of the cases (pediatric intensive care unit in 40.7%), followed by emergencies in 44.4%.

## DISCUSSION

Our results are consistent with those of the literature in that the drowning population is a young, predominantly male population [7–9]with a high mortality rate[10,11]. CPR conducted by our teams started by chest compressions followed by ventilation, which should not have been the case in cardiac arrest due to drowning. The sequence must imperatively start with ventilation before chest compression [12,13], and we are willing to correct that in our future field missions.

Limitation of the study: it's a monocentric retrospective study. It does not include a long-term follow-up of patients.

Strength of the study: although our study is monocentric, it includes six interventional teams in three governorates; and a fairly large number of patients for a circumstantial pathology.

## CONCLUSION

Drowning in or country is frequently severe and requires specialized care by trained teams. The affected population is predominantly young male adults. The management of drowning in our advanced pre-hospital care team is globally satisfying jwith the exception of a few deficiencies like the fact that the resuscitation started with chest compressions, which we will make sure to correct in the future. Because of the risk of death and heavy neurological sequelae, the emphasis must be put on the prevention of these accidents.

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REVIEW

# *Confusion in the elderly: What are the organic causes to look for in the emergency department?*

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**Background :** Delirium is a complex medical problem affecting many elderly patients admitted to the emergency department (ED). Many descriptions and terms were proposed in the literature, including acute confusional state, septic encephalopathy, acute brain failure, and intensive care unit psychosis. It remains poorly recognized because of its heterogeneous and polymorphic presentation: a study showed that 60% of patients presenting to the ED with delirium were under-diagnosed [1].

Delirium is often the first symptom for many diseases whose underlying cause can be multifactorial. Despite medical progress, it remains a major challenge for health care workers with the increasing burden of an aging population [2].

In this mini review, we address the issues of diagnosis and the forms of confusion among the elderly, summarizing the pathophysiology and diagnosis approach for the emergency physician.

## CLINICAL FEATURES

Delirium is global cerebral dysfunction characterised bya disturbance of consciousness, accompanied by cognitive changes that cannot be explained by a pre-existing or evolving dementia. The disturbance occurs over a short period of time, usually a few hours or days, and tends to fluctuate with time.

The Diagnostic and Statistical Manual of Mental Disorders (DSM-5) description of delirium includes the following criteria [3]:

A. Disturbance of consciousness with reduced ability to focus, sustain or shift attention.
B. A change in cognition or development of perceptual disturbances that is not better accounted for by a preexisting, existing or evolving dementia.
C. The disturbance develops over a short period and tends to fluctuate during the course of the day.
D. There is evidence from the history, physical examination or labs that the disturbance is caused by the physiological consequence of a medical condition.

Several diagnostic tools for delirium have been developed, the most commonly used of which is the CAM (Confusion Assessment Method) algorithm which has high sensitivity (94% to 100%) and specificity (90%) [4].

Recommended by the High Health Authority, The CAM is a well-validated and useful tool to aid in the diagnosis of delirium in emergency department [5].

Delirium subtypes: There are three distinct clinical forms:

- Hyperactive form: the patient is hyperactive, combative, uncooperative and may appear to be responding to internal stimuli.
- Hypoactive form (hypo alert): the patient appears to be napping on and off throughout the day, unable to sustain attention when awakened, quickly falling back asleep.
- Mixed form: a combination of the two types just described.

The most common type is the hypoactive one and is often misdiagnosed as a psychiatric illness, which can result in delaying the appropriate medical intervention. Differential diagnoses are mainly dementia, depression and psychosis. It is extremely detrimental to consider that all delirium patients are insane, a demented patient may present with delirium.

Epidemiology

There is disparity in the literature between studies regarding the incidence of delirium because diagnosis criteria have not been well-established. There is also the possibility that some cases of delirium were overlooked by mistake.

Prevalence of delirium at admission ranges from 10 to31%, incidence of new delirium per admission ranges from 3 to 29%, and the occurrence rate per admission varies between 11 and 42% [6,7].

Even when detected early and managed appropriately, delirium can lead to significant mortality and morbidity in frail elderly patients: prolonged hospital stay (on average 8 days longer) [8], increased mortality whilst in hospital (up to 75%) and in the months following discharge (40% 1-year mortality) [9], and poor physical and cognitive recovery at 6 and 12 months [10].

As noted previously, diagnosis of delirium in the ED may increase the burden of healthcare cost as compared with patients without delirium. It has been shown that more than 100 billion dollars were spent in the United States because of delirium in 2005[11, 12].

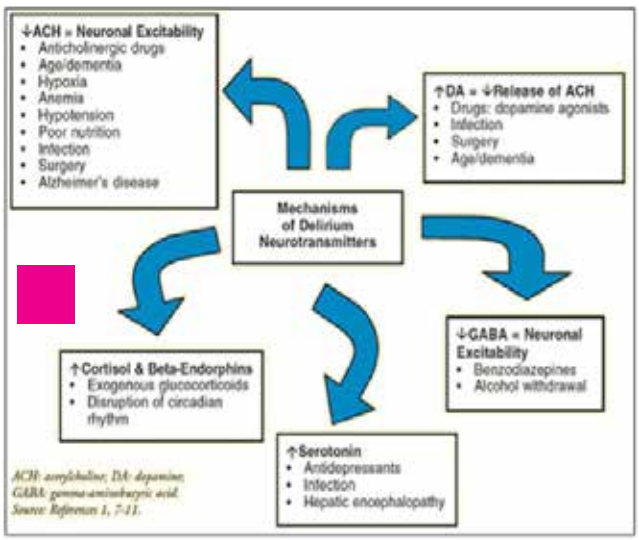


**Figure 1. Schema of pathophysiological mechanisms of delirium [13]**

Acute confusional syndrome results from global brain dysfunction. It is a structural brain disorders without any specific neuro-anatomical abnormalities [13]. On the other hand, it is generally a reversible condition that contrasts with brain lesions. Multiple neurotransmitter abnormalities, especially cholinergic deficiency, have been proposed to occur at the time of delirium onset.

A depletion of the acetylcholine occurs in delirious patients [14] (awakening pathways); a study showed that recent changes or fluctuations in behaviour have been observed in case of prescription of drugs with anti-cholinergic activity [15, 16]. Thiamine deficiency and hypoglycemia reduce acetylcholine transmission [17].

Many studies further support a role of dopamine and serotonin in the changes in the functioning of the brain. The elevation of these two neurotransmitters during delirium may be important for the production of hypoxic/ischemic-induced cell damage [18, 19].

Dopaminergic drugs such as L-dopa, dopamine, and buproprion may induce a disturbance of the acetylcholine imbalance [20,21]. Anti-dopaminergic drugs are used to treat anticholinergic confusions [22].

## PREDISPOSING RISK FACTORS

Several risk factors have been implicated in the development of acute confusion, the most prominent of which are advanced age, dementia, and previous episodes of delirium [23].

The landmark study conducted by Inouye in 1999 [24] and other prevention studies have demonstrated that delirium can be prevented or at least moderated by addressing modifiable risk factors.

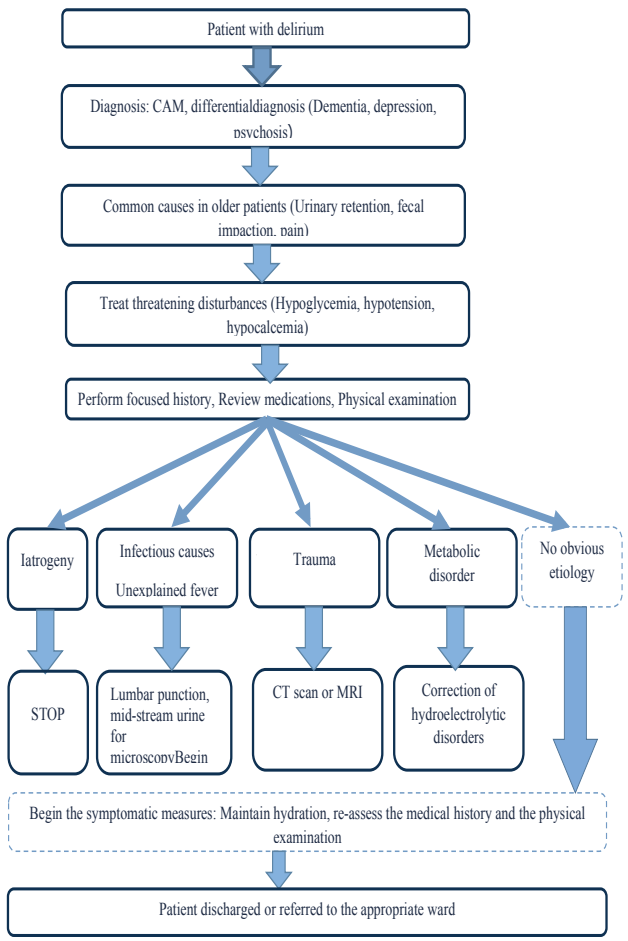


**Figure 2. Algorithm of delirium management in the emergency department**

A collaborative history from family members or caregivers is the first step for delirium management, and it must identify the most likely precipitating factors, the level of function and cognition prior to the presentation, and if there have been any previous episodes of suspected delirium in the past.

History is obtained by interviewing family members, caregivers, and friends.

Once delirium is diagnosed, a provider should look forpotentially reversible factors. Therefore, it is important to rule out common causes in older patients such as urinary retention, fecal impaction, and pain often underestimated by young doctors, especially as the patient is unable to express it [25].

- Medication causes: Iatrogeny is the major cause for all delirium in older people. A listing of medications including: the introduction of new medications or medication that was suspended, adherence to treatment, a recent modification, and it is very important to keep in mind self-medication that may be hidden by the family or the patient. Several medications or combinations of drugs can trigger delirium, including some types of particularly anticholinergic drugs. It has been estimated that20-50% of older people have been prescribed at least one medication with anti-cholinergic activity [26]. Other medications that may cause delirium are psychoactive drugs, opioids, pain drugs, corticosteroids, cimetidine, and digoxin, antihistamines and muscle relaxants [27].
- Metabolic causes: Many conditions cause delirium if they are prolonged and severe (e.g. hypoxia, hypoglycemia), presumably related to excito-toxic damage and the death of neurons. Hypoglycemia is the most common, reversible cause for delirium which makes its treatment crucial for the patient. Disturbances of the cholinergic metabolism are implicated in cases in which delirium is caused by hyponatremia, hypocalcemia, uremic or hepatic encephalopathy [28].
- Toxic causes: There are conditions that are more serious than others; they include alcohol and carbon monoxide poisoning. Opioids, amphetamine, cannabis and ecstasy were associated with increased risk of delirium especially at high doses [29].
- Infectious causes: Urinary and pulmonary infections are the common etiologies responsible for delirium among the elderly; they occur in 40% of the cases [30]. Sepsis–a life-threatening illness caused by the body's response to severe infection contributing to the generation of inflammatory markers, including C-reactive protein, interleukin-1 beta and 6, and tumor necrosis factor-alpha–is often associated with changes in brain function, especially among people who are vulnerable.
- Neurological causes: Fever, meningismus, or Kernig and Brudzinski signs suggest central nervous system (CNS) infection such as meningitis, encephalitis, meningo-encephalitis, cerebral abscess, cerebral thrombo-phlebitis, etc. Lumbar puncture should be performed as soon as the diagnosis has been suspected and the contraindications eliminated [31]. Focal neurologic abnormalities (e.g., cranial nerve palsies, motor or sensory deficits) or papilledema suggests a structural CNS ischemic disorder or an hemorrhagic stroke. Scalp or facial lacerations, bruising, swelling, and other signs of head trauma suggest traumatic brain injury.
- Endocrine causes: Dysthyroidism, dysparathyroidism, adrenal insufficiency, Sheehan's syndrome, acute porphyria, Cushing's syndrome.
- Circulatory causes: Multiple clinical risk factors have been identified signaling the interruption of the neuronal activity secondary to systemic disturbances that impair the function of the brain such as arrhythmia, cardiogenic shock, pulmonary embolism, myocardial infarction, respiratory failure, disseminated intravascular coagulation, thrombocythemia. Multiple brain dysfunction clinical risk factors – namely arrhythmia, cardiogenic shock, pulmonary embolism, myocardial infarction, respiratory failure, disseminated intravascular coagulation, and thrombocythemia – have been identified. These systemic troubles induce several neuronal activity disturbances.
- Post-operative delirium: Delirium is a serious complication for the postoperative older patients. It has been noticed that Serum levels of anticholinergic activity are high in post-operative confusion syndromes, and high rates would be correlated with higher severity. In contrast, low anticholinergic levels are associated with a with drawal of the confusional syndrome.

## ASSESSMENTS TO BE PERFORMED

In most of the cases, the cause of delirium is not identified by this approach, and it may be necessary to conduct additional investigations aimed at identifying less common causes. The other tests to run are: serum electrolytes, including calcium; serum creatinine; serum glucose; full blood count; mid-stream urine for microscopy; as well as blood cultures and an Electrocardiogram.

Further testing, including a head CT, lumbar puncture and/or EEG should follow if a treatable cause could not be easily identified.

## CRITERIA FOR HOSPITALIZATION

According to the recommendations of the high health authority [5], hospitalization is necessary in case of: a threat of vital or functional prognosis, dangerousness of the patient for himself or for those around him, a difficulty or the impossibility to perform the necessary complementary examinations, a need for a multi-daily medical surveillance that is necessary after stopping a potentially confounding treatment. Moreover, for the elderly, abusive hospitalization could trigger delirium, highlighting the crucial importance of such a decision.

Non-pharmacologicalmanagement of Delirium:

Recommended by the General Directorate of Health, the General Directorate of Social Action and the French Society of Geriatrics and Gerontology in 2007[32] the non-pharmacological management of delirium consists of: reassuring the patient and his entourage; placing the subject in a calm environment avoiding restraint; and compensating for neurosensory deficits (wearing glasses, hearing aids). Thus, the goal of non-pharmacological management of a confusional syndrome is to eliminate the precipitating factors of delirium and to provide optimal stimulation in a climate that is familiar to the patient.

## DRUG THERAPY

The goal of pharmacological treatment is essentially the management of dangerous and risky behaviors of the patient towards himself for his relatives. Mono-therapy and the minimum effective dose are recommended. Oral intake should be preferred.

Finally, we propose this algorithm for the management of confusion in the elderly (2002):

Limits: Rapid population aging is a growing public health concern and presents major challenges to all health services, including hospitals. In our country, there is no specific geriatric medical institution for the management of elderly patients.

## CONCLUSION

Once manifest, delirium is associated with a worrisome prognosis and higher rates of morbidity and mortality. Early recognition and treatment are crucial for a prompt management of delirium.

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# BRIEF REPORT

# *Early diagnosis of acute heart dysfunction in scorpion envenomation: a challenging task for emergency physicians*

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Cardiac dysfunction is one of the most serious consequences of scorpion envenomation. In the Emergency Department (ED), the early evaluation of cardiac function is a corner stone of the management of scorpion-stung patients. The best tool to evaluate the cardiac function is the echocardiography. Many studies aimed to describe biological predictive factors of cardiac injury in scorpion envenomation, mainly when the echocardiography is not routinely feasible in the ED.

## INTRODUCTION

Scorpion envenomation is still a serious public health problem in North Africa and many other tropical or subtropical regions around the world [1]. In Tunisia, there are many species of scorpions. The most dangerous ones are Androctonusaustralis, Androctonusaeneas and Buthusoccitanus [2, 3]. The clinical manifestations of scorpion envenomation are easy to recognize. The challenging task for the emergency physicians is to recognize the signs of heart dysfunction, the leading cause of death in this pathology, in its early stages [3, 4].

Pathophysiological mechanisms of heart dysfunction in scorpion envenomation:

The clinical signs of scorpion envenomation are easy to recognize. They could be pain, vomiting, nausea, sweating, or hypertension. Cardiac dysfunction is one of the most serious consequences of scorpion envenomation [2, 5]. The leading signs of death are cardiopulmonary complications which are mainly pulmonary edema, myocarditis and cardiogenic shock [4]. The clinical manifestations of the cardiac dysfunction may be dyspnea, respiratory distress, chest pain or shock. The mechanisms of the cardiac dysfunction in scorpion envenomation are complex. Mainly three hypotheses have been reported (Figure 1) [3].

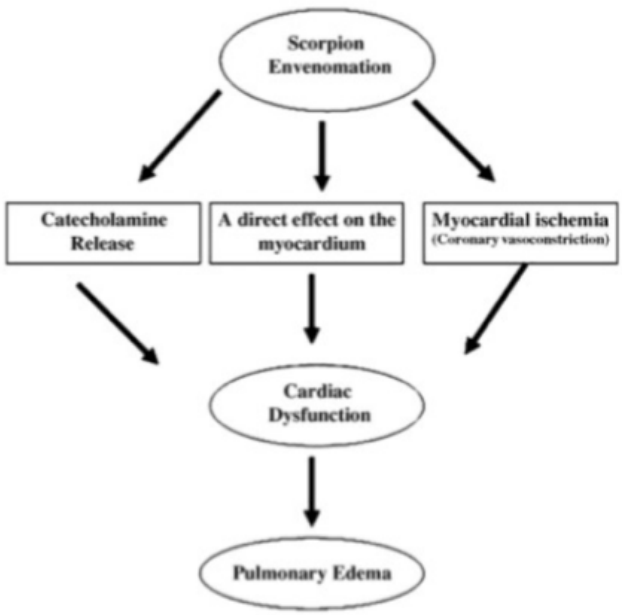


**Figure 1. Mechanisms of cardiac dysfunction in scorpion envenomation [3]**

1- The massive release of the catecholamines [6]. Severe scorpion envenomation is accompanied by a massive discharge of adrenaline and norepinephrine, secondary to a

direct stimulating effect of the venom on the sympathetic and adrenergic nerve endings [7, 8]. The release of the abovementioned catecholamines increases the blood pressure, the peripheral resistance and the left ventricular pressure. On the other hand, these catecholamines decrease the left ventricular compliance and induces ventricular arrhythmia [2]. These phenomena lead to both systolic and diastolic left ventricular dysfunction, which explains the acute heart failure and acute hemodynamic pulmonary edema.

2- Direct effect of scorpion venom on myocardial fibers [9]. Nouira et al. [10] supported the theory of toxic myocarditis in their study. The authors showed that during severe scorpion envenomation, there was simultaneous alteration of performance of the right and left ventricles. This biventricular alteration leads to diffuse myocardial involvement of toxic origin.

3- Myocardial ischemia due to cytokines [2, 11-13]. The hypothesis of ischemic attack has been confirmed by several studies showing a high level of troponin in patients with pulmonary edema [12-14]. In severe scorpion envenomation, there is a massive inflammatory reaction by the secretion of high amounts of cytokines, which decreases cardiac contractility [2]. Additionally, epinephrine and norepinephrine induce a constriction of the coronary arteries by a direct stimulation of alpha receptors [11]. These disturbances are thought to cause a myocardial hypo-perfusion and hypoxia.

To improve prognosis of scorpion-stung patients, it is important to early detect the cardiac injury at the emergency department. The early evaluation of cardiac functions helps in the decision-making concerning therapeutic management and time of discharge.

Symptoms and diagnosis of cardiac dysfunction:

The clinical signs are various but there is no ideal clinical marker to identify the patients presenting with a heart dysfunction on arrival to the ED [15, 16]. The heart dysfunction should be immediately suspected if the patient has any respiratory symptoms (cough, dyspnea, tachypnea), chest pain or signs of shock. Pulmonary auscultation may reveal crackling rales.

However, all these clinical signs may be absent. Several tools have been suggested to early diagnose the cardiac dysfunction in these circumstances [3, 13]. Electrocardiographic abnormalities were well-described in scorpion-envenomed patients. Sinus tachycardia is the most frequent abnormality but its specificity is poor [5]. Obviously, the best tool to evaluate the cardiac function is the echocardiography. Many studies showed its value in early detection of myocarditis in scorpion envenomation [17 - 21]. Unfortunately, echocardiography is not yet routinely used in all emergency departments. Many studies aimed to describe biological abnormalities predicting the cardiac dysfunction in scorpion envenomation. Earlier ones had shown a correlation between elevated levels of creatinine phosphokinase and signs of cardiac injury [15, 16, 22]. During the 1980s, the measurement of creatinine phosphokinase, especially MB activity, became the gold standard to verify suspected cardiac dysfunction after scorpion envenomation [12]. The low specificity of these biomarkers has made it necessary to develop other ones such as troponins. Troponins became, in few years, the most sensitive and specific biochemical marker of acute heart injury, especially in patients with myocardial ischemia. Many other clinical situations of myocardial injury were assessed by troponins such as post-traumatic myocardial contusion, myocarditis, pericarditis, etc. [4]. Nowadays, troponin measurement is routinely done as a cardiac injury biomarker at emergency departments. The decision making is guided by the baseline troponin level or the rise of these levels in serial measurements. The most accurate cut-off predicting a cardiac injury in scorpion-envenomed patients is still controversial [13]. The first study which provided an evident correlation between high levels of troponins on admission and myocardial injury in scorpion envenomation was conducted at 2003 by Meki et al. [23]. In an animal experimental research, El Atrous et al. found that serum troponin concentrations increased sharply following the injection of scorpion toxin. Troponin levels increased significantly by the 120th minute [24]. Sagarad et al. found a troponin cut-off value at 0.11 ng/ml or under among patients with normal heart function [16]. We found in a previous study a significantly higher troponin level among patients with a confirmed myocarditis in echocardiography [13].

In conclusion, the echocardiography is the best tool to detect the myocarditis even if the delay between the envenomation and the arrival to an emergency department is very short. Otherwise, repetitive measurements of troponins could help physicians in the early detection of a cardiac injury due to a scorpion envenomation.

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# CASE REPORT

# *Wellens' Syndrome: a particular form of acute coronary syndrome: A case report*

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Wellens' syndrome, also called left anterior descending (LAD) coronary T-wave syndrome, is a characteristic electrocardiographic (ECG) pattern suggestive of coronary artery disease in the preinfarction stage. ECG changes in Wellens' syndrome may signify critical stenosis in the proximal LAD coronary artery. Furthermore, ECG changes may occur during a pain-free period with no other evidence of ischemia or unstable angina and none to a minimal elevation of cardiac enzyme levels. Hence, recognition of the aforementioned pattern is important in preventing the development of a devastating anterior wall myocardial infarction.

**Keywords :** Chest Pain; Wellens Syndrome; Acute Coronary Syndrome; Emergency department

## INTRODUCTION

Wellens' syndrome is a special electrocardiographic (ECG) entity of the coronary syndrome without ST-segment elevation due to critical stenosis of the proximal left anterior descending coronary artery (LAD). Patients with Wellens' syndrome have a major risk of developing an anterior myocardial infarction. Therefore, the emergency physician needs to be able to recognize the ECG criteria of this syndrome. We present a case of Wellens 'syndrome diagnosed in the emergency department in a patient consulting for chest pain.

## OBSERVATION

A 53-year-old man was admitted to the emergency department (ED) for a retrosternal chest pain radiating to his left arm for three days. He had a 10 pack-year smoking history and he had no family history of coronary artery disease. He had normal physical examination findings. The electrocardiogram (ECG) showed an ST-segment elevation of 1 mm in leads V1, V2 and biphasic T-waves from leads V1 to V3 (figure 1).

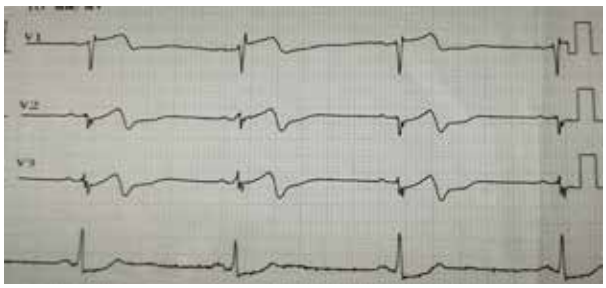

**Figure 1. Baseline ECG showing an ST-segment elevation of 1 mm in leads V1, V2 and biphasic T-waves from leads V1 to V3**

The chest X-ray showed no abnormalities. The basic laboratory tests including cardiac enzyme testing were normal.

The diagnosis was a Wellens' syndrome. A dual anti-platelet (aspirin and clopidogrel) and anti-coagulant (subcutaneous low molecular-weight heparin) medication were given.

One hour after admission, the patient presented the same chest pain. An ECG was performed and showed the disappearance of the biphasic T waves which became positive in leads V1 to V3. (Figure 2).

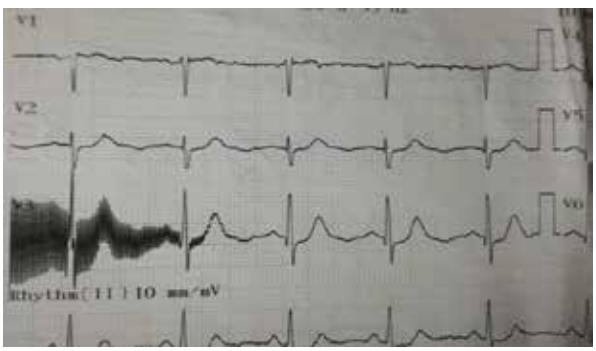

**Figure 2. ECG performed one hour after the admission, and showing a positive T waves and disappearance of ST- segment elevation in leads V1 to V3**

The patient was transferred to the cardiac intensive care unit for emergency coronary angiography, which showed sub occlusive stenosis of the proximal left anterior descending coronary artery (figure 3). A stent was set up with a good angiographic result.

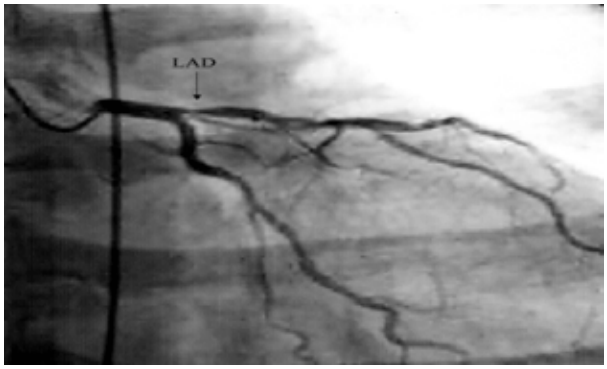


**Figure 3. Coronary angiography showing a sub-occlusive stenosis of the proximal left anterior descending (LAD) coronary artery**

## DISCUSSION

Wellens' syndrome was described by de Zwaan C, Bar FW, and Wellens HJ in 1982 [1]. It is typically caused by critical stenosis in the LAD coronary artery leading in 75% of cases to anterior myocardial infarction within a few days [2]. The physiopathology of the Wellens' syndrome ECG manifestations is not fully understood. Interestingly, the T wave abnormalities seen in the Wellens' syndrome are also reported in the patients who were diagnosed having an acute myocardial infarction and who recently underwent reperfusion therapy [3]. It is therefore hypothesized that the Wellens' syndrome is incidental reperfusion following occlusion of the LAD [4]. So that the reperfusion may be unstable and this vessel may re-occlude, causing further angina and ischemia. This cycle of occlusion and reperfusion will continue until the coronary blood supply can no longer be reestablished and an acute myocardial infarction occurs. Currently, two types of electrocardiographic findings for Wellens' syndrome exist. Type A involves biphasic T waves in the precordial leads that begin positive then become negative, as demonstrated in Figure 4. This type is found less frequently than type 2 in around 25% of cases. Type B, which occurs in around 75% of cases, demonstrates inverted T waves (Figure 4) [5].

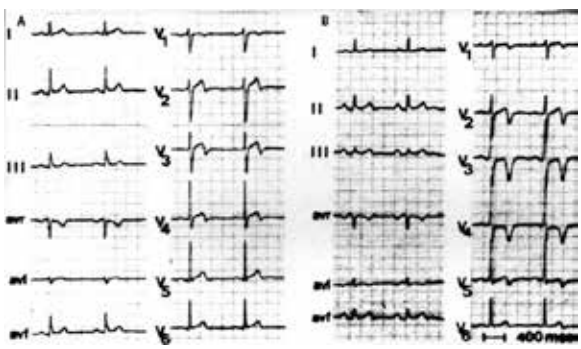

**Figure 4. the typical ECG Wellens' waves; A, Less common pattern showing biphasic T waves in the precordial leads; B: More common pattern showing deeply inverted T waves in the precordial leads [5]**

In our case, the patient had type A of Wellens' syndrome. The characteristic electrocardiographic pattern often develops when the patient is not experiencing angina. Throughout the cycle of occlusion and reperfusion that occurs over time, the ECG findings will usually fluctuate through the different types of Wellens' waves. If the coronary supply is prone to worsen, the ECG findings may show hyperacute T waves, indicating an anterior myocardial infarction. It is also important to note that the Wellens' syndrome does not always have to occur in the anterior leads, as it was reported in other areas of the myocardium as well [6].

The clinical and electrocardiographic criteria for Wellens' syndrome are [1]:

- A biphasic T waves in leads V2 et V3 (type 1),
- Deeply inverted T waves in leads V2 and V3 (type 2), and occasionally in leads V1, V4, V5, and V6,
- No or minimal elevation of cardiac enzymes,
- No or minimal ST-segment elevation (< 1 mm), no loss of precordial R-wave progression, no pathological precordial Q wave and a history of angina.

The presence of these criteria in an asymptomatic patient requires urgent management. In our case, the diagnosis of Wellens's syndrome was made immediately: chest pain, the ECG findings (a biphasic T waves in leads V1 to V3, an ST-segment elevation and the disappearance of the biphasic T waves which became positive in leads V1 to V3) and normal cardiac enzymes.

Patients with Wellens' syndrome are at high risk of development of extensive myocardial infarction of the anterior wall and death [1]. Performing exercise stress tests for these patients can be fatal due to the severe stenosis that might lead to infarction at the time of increased cardiac demand [7]. The patient, in this case, was transferred to the cardiac intensive care unit for emergency coronary angiography without performing the exercise test.

## CONCLUSION

Accurate identification of patients with Wellens' syndrome allows more rapid and appropriately aggressive management. It becomes imperative that the emergency physician recognize these patients to prevent prolonged stays in the emergency department and inappropriate conservative therapy.

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# ORIGINAL RESEARCH

# *Acute type II respiratory failure and myxedema in emergency department: a case report*

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Hypothyroidism can cause respiratory failure associated with hypoventilation and sleep apnea syndrome. Here, we report the case of a 59-year-old woman presenting with weight gain, whole-body edema and dyspnea. On admission in emergency department, she had type II acute respiratory failure. Blood examination revealed hypothyroidism with an elevated TSH level: 55.24 µIU/mL and a very low level of Free T4: 1.21 ng/L. A chest X ray showed cardiomegaly and the echocardiogram showed diffuse hypokinesis. She immediately received thyroid hormone with steroid substitution therapy along with non-invasive positive pressure ventilation (NIPPV).

**Key words:** myxedema, hypothyroidism, type II respiratory failure

## INTRODUCTION

Hypothyroidism is a common endocrine disease especially in women. Severe and chronic hypothyroidism may lead to myxedema, an extreme manifestation of hypothyroidism, accompanied by weight gain, constipation, fatigue, cold intolerance, sparse hair and is rarely complicated by hypercapnic respiratory failure (type II). Here, we report a rare case of a patient with refractory myxedema presenting with respiratory failure and we also discuss the mechanism by which severe hypothyroidism induced such a severe condition in our patient.

## OBSERVATION

A 59-year-old woman presenting with dyspnea and productive cough with purulent sputum was transferred to our hospital. A whole-body edema, weight gain over the previous year, and a three-month history of increasing general tiredness and constipation were reported. On admission, she was sleepy (Glasgow Coma Scale score was 14) and her voice was hoarse. Her body mass index was 37.46. She had muco-cutaneous paleness with a puffy face, macroglossia (Figure 1) and homogeneous goiter. Blood pressure levels were100/60 mmHg; temperature, 37.2°C; a pulse of 74 beats per minute; a respiratory rate at 12 breaths per minute with occasional apnea; and oxygen saturation at 79% in room air. The physical examination revealed facial edema with sparse hair. The thyroid was palpable. The heart sounds were distant with a regular rhythm. The abdomen was not distended, she had dry skin with pretibial edema. The results of laboratory examinations are shown in Table 1. Peripheral blood tests showed normocytic anemia and a slightly decreased level of serum sodium. Thyroid function



**Figure 1. Macroglossia**

**Table1. Laboratory Data on Admission**

| Laboratory analyses | Values |
|---|---|
| ***Complete blood count*** | |
| White blood cells; cells per mm3 | 12850 |
| Red blood cells; cells per mm3 | $312\times10^4$ |
| Hemoglobin; g per dL | 5 |
| Platelets; per mm3 | 255000 |
| ***Blood chemistry analyses*** | |
| Blood urea; mg/L | 10 |
| Creatinine; µmol/L | 131 |
| Sodium; mEq/L | 132 |
| Potassium; mEq/L | 4.0 |
| Creatinine kinase; IU/L | 755 |
| Lactate dehydrogenase; IU/L | 893 |
| Glucose; mmol/L | 6 |
| ***Arterial blood gas analysis (oxygen flow rate of 8 liters/ min)*** | |
| pH | 7.30 |
| pCO2; mmHg | 72 |
| pO2; mmHg | 89 |
| HCO3; mmol per l | 35.4 |

tests demonstrated an elevated level of TSH: 55.24 µIU/mL (reference values: 0.35-4.94 µIU/mL) with a very low level of free T4 (FT4): 1.21ng/L (reference Values: 7- 15 ng/L). An electrocardiogram revealed low voltage. The chest X ray showed cardiomegaly, diffuse alveolar opacities with ascension of the left diaphragmatic cupola, while an echocardiogram revealed diffuse hypokinesis (figure 2).



**Figure 2. Chest X ray showed Cardiomegaly,diffuse alveolar opacities with ascension of the left diaphragmatic cupola.**

We diagnosed type II respiratory failure with hypothyroidism, she was initially treated with non-invasive ventilation with positive pressure (NIPPV) and antibiotics. The oral administration of levothyroxine was started and increased to a maximum of 300 µg daily with an initial dose of 25 µg, physiological steroid replacement (dexamethasone 0.2 mg/kg daily) was administered immediately.

Her respiratory state improved gradually then she was transferred to the intensive care unit after three days of hospitalization in the emergency department. Normalization of respiratory function was obtained after seven days of hormone substitution therapy and NIPPV.

## DISCUSSION

In the present case, the patient presented with type II respiratory failure due to myxedema. Mechanisms proposed for the development of hypercapnic respiratory failure in hypothyroidism include: direct involvement of the respiratory muscles, caused by weakness of the diaphragm andother respiratory muscles secondary to loss of total skeletal muscle mass, phrenic nerve injury [1,2], or depression of the respiratory center with impaired central ventilator responses to hypoxia and hypercapnia, reported in approximately half of the hypothyroid patients [3] and associated with obstructive sleep apnea syndrome (OSAS), occurring in 25%-35% of subjects suffering from hypothyroidism. After treatment, hypercapnic and hypoxic respiratory responses usually normalize after 7-14 days of hormone substitution [4]. However, respiratory muscle dysfunction may either be permanent or take months to improve [1]. Ventilation-assist therapy, including non-invasive positive pressure ventilation (NIPPV) can be necessary in acute severe hypothyroidism [5] and may improve the quality of life in chronic cases. In our case, normalization of respiratory function was obtained after seven days of hormone substitution therapy and NIPPV was not necessary in the long term.

## CONCLUSION

Hypothyroidism can cause hypoventilation and OSAS. Although it is rare, hypothyroidism should be considered in front of each patient presenting to the emergency department with type II respiratory failure.

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# CASE REPORT

# *Verapamil intoxication: a case report*

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Poisoning with Calcium antagonists is rare and has a bad prognosis that's why we report the case of a 16-year-old girl who ingested huge amount of verapamil under the influence of an electronic game. On admission, she was stable then she developed a respiratory distress. The electrocardiogram was normal. Then she developed a hemodynamic instability and the ECG showed a complete Sino-atrial block with a heart rate 40 beats per minute. A continuous infusion of Isoprenaline was administered with a slight improvement. At H16, the evolution was marked by the installation of an unrecovered cardiac arrest after 45 minutes of cardiopulmonary resuscitation.

Verapamil is a calcium channel blocker used in the treatment of different cardiovascular pathology. Beyond therapeutic doses, intoxication causes various cardiovascular, digestive and metabolic disorders. It can lead to significant vasodilatation, adding to the negative inotropic effect on the heart pump, it can contribute to Hemodynamic distress [1]. On the other side, the negative chronotropic effect explains the severe bradycardias [1, 2].

The peak effect of calcium channel blockers is between 5 and 10 hours [3].

In fact, verapamil inhibits gastric motility and modifies the absorption of the active ingredient resulting in a delayed effect [1, 2] .that why the delay of the clinical degradation of our patient can be explained by this effect.

The fatal evolution of our patient despite appropriate management reflects the severity of this intoxication, which depends not only on the ingested dose but also on the unpredictable delay effect.

## INTRODUCTION

Poisoning with Calcium antagonists is rare and has a high mortality rate of 10 to 15%. We have observed in our practice a case marked by an unpredictable and fatal evolution.

## OBSERVATION

We report the case of a 16-year-old girl who willingly ingested 30 tablets of verapamil 120 mg LP, under the influence of the electronic game, «Blue Whale Challenge».

Two hours after ingestion, the patient consulted the emergency department of the Regional Hospital of Kerkenah.

The initial examination noted a stable hemodynamic status, Blood Pressure (BP) 120/78 mm Hg, a heart rate at 72 beats / minute, unstable respiratory status with abnormal pulmonary auscultation.

At the admission, the electrocardiogram, showed a regular sinus rhythm at 76 beats / minute, it doesn't show any conduction or repolarization disturbances. A gastric tube was urgently realized with introduction of activated charcoal. Five hours after the drug-ingestion, the patient presented vomiting with a BP 100/60 mmHg, heart rate (HR) at 40 beats / min. The second electrocardiogram showed a complete sino-atrial block with a heart rate 40 beats per minute.

A continuous infusion of Isoprenaline was administered to the patient (2 mg/h dose); with a good response. She was then transferred to the Emergency Department of Habib Bourguiba Hospital in Sfax. Seven hours after ingestion (H7), the examination showed a BP at 104/69 mm Hg, HR at 60 beats per min. The electrocardiogram showed a sinus rhythm at 60 B/ min, the patient received a second dose of activated charcoal. At H10, the patient presented a third degree sino-atrial block, with 35 beats per minute. The biological assessment showed renal insufficiency with creatinine at 137 mmol / l, hypokalemia at 3.2 mmol/l, hyperglycemia at 17.2 mmol/l, metabolic acidosis with pH at 7.22 and bicarbonates at 10.3 mmol / l. Later, we have changed the isoprenaline by adrenaline at the rate of 1mg / h. She also received potassium supplementation, intravenous insulin therapy, 2g of calcium gluconate, 2g of sulfate magnesium and semi-molar bicarbonates.

The evolution was marked by the improvement of the heart rate at 50 beats per min. The patient had a stable hemodynamic and respiratory status throughout her management.

At H15 the patient showed signs of shock: BP at 80/56, mottling and coldness of the extremities, a heart rate at 30 / min and crackling at the auscultation of pulmonary bases. So, Dobutamine was introduced at 10 microG/kg/min. The patient also received semi-molar bicarbonates infusion. At H16, she had an unrecovered cardiac arrest after 45 minutes of cardiopulmonary resuscitation.

## DISCUSSION

Verapamil is a calcium channel blocker used in the treatment of high blood pressure, coronary heart failure, and heart rhythm disorders. It is the fourth-arrhythmic drug class.

Beyond therapeutic doses, intoxication causes various cardiovascular, digestive and metabolic disorders.

At therapeutic doses, the vasodilator effect is less important or even negligible compared to dihydropyridine calcium channel blockers, but toxic doses can lead to significant vasodilatation, adding to the negative inotropic effect on the heart pump, it can contribute to Hemodynamic distress [1].On the other side, the negative chronotropic effect explains the severe bradycardias[1, 2].

The peak effect of calcium channel blockers for sustained-release forms is 5 hours, but this peak can be delayed for up to 10 hours because of the toxic digestive effect [3].

In fact, verapamil inhibits gastric motility and modifies the absorption of the active ingredient resulting in a delayed effect [1, 2].The delay of the clinical degradation of our patient can be explained by this effect: the first manifestation which was the sinus dysfunction occurred at H5, the most severe aggravation responsible of collapse and death occurred at H15-16.

Other digestive effects may explain this delayed manifestation, such as hypo intestinal Perfusion and bezoars formation [1].

Decreased calcium flux in pancreatic cells leads to decreased insulin secretion and subsequent hyperglycemia.This induces adeviation of aerobic metabolism to fatty acid oxidation and a decrease in overall tissue perfusion,mainly forthe heart and the brain,exacerbating metabolic acidosis [4].

Insulin therapy can supplement this insulin deficiency and improve the contractility of myocardial cells and vascular smooth muscle cells [5, 6].

We used adrenaline for its positive inotropic and chronotropic effect as well as its vasoconstrictor effect as an alternative to isoprenaline to correct the sinus node dysfunction.

Our goal was to avoid the vasoplegic and myocardial depressant effects at high doses of the product but these two occurred at H15.

In the literature, epinephrine is the gold standard when these two effects are incriminated in the shock mechanism or when it is difficult to specify it [7, 8].

We used calcium gluconate as adjuvant therapy. Some Anglo-Saxon centers use calcium salts as first-line continuous infusion instead of catechol amines[1, 3]. They ensure a membrane stabilizing effect on the myocardial cells.

The clinical deterioration at H15 is probably hemodynamic due to the collapse associated with acute pulmonary edema, suggesting a myocardial dysfunction probably associated with vasoplegia. Unfortunately, we did not have any echocardiographic data to confirm it.

This late degradation of the clinical state is explained by the delay of absorption of verapamil because of digestive disorders. The pulmonary edema, described in the poisoning with calcium channel inhibitors, is related to a probable pulmonary toxicity. It appears towards the 3rdday of a massive ingestion.

The fatal evolution of our patient despite appropriate management reflects the severity of this intoxication, which depends not only on the ingested dose but also on the unpredictable delay effect.

## CONCLUSION

Verapamil intoxication is rare. Mortality is usually due to cardiovascular failure by various mechanisms. But the main lesson to be drawn isthat the delayed absorption of the molecule related to digestive toxicity sometimes explains the delayed occurrence of unexpected hemodynamic alterations that threaten the vital prognosis.

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# CASE REPORT

# *An intricate clinical presentation of theophylline intoxication at the emergency department*

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Theophylline is widely used for the treatment of chronic asthma. The therapeutic serum concentrations of theophylline (10 to 20 mg/L) correlate well with the desired biologic effects. The incidence of toxic effects increases notably at serum concentrations exceeding 20 mg/L (1). The early signs of toxic effects, nausea and vomiting, may be misdiagnosed as evidence of gastrointestinal abnormality, while later, more severe symptoms, such as seizures and cardiac arrhythmias, may be attributed to cardiovascular or neurologic abnormalities. Hence, ascertaining an immediate diagnosis in cases of theophylline toxicity at the emergency department is a very challenging endeavor, especially when the patient presents with altered mental status.

**Key words:** Theophylline, Acute intoxication, emergency department

## INTRODUCTION

Theophylline is a commonly used drug in the treatment of acute or chronic lung diseases. Despite the considerable potential benefit of theophylline, its narrow therapeutic index, and erratic absorption and elimination contribute to the potential for toxicity, which can have high morbidity and mortality rates (1, 2). Serious intoxications can lead to death, mortality at 0.6%, due mainly to cardiac and neurological complications. The toxidrome manifestation can present as an overlap with other pathologies, especially in patients who have altered neurological status. We present a case of a fatal intoxication with theophylline that illustrates the difficulties inherent in assessing the clinical picture of theophylline toxic effects. This is the first case to be reported from our department.

## OBSERVATION

We report the case of a 73-year-old man with a history of poorly monitored COPD and self-administered theophylline intake. He presented to the Emergency Department with wheezy dyspnea, atypical chest pain, and profuse diarrhea. The patient's dyspnea lingered for 4 days. Its diagnosis as an exacerbation of his COPD motivated him to take additional doses of theophylline. He was agitated but conscious, his respiratory rhythm was equal to 25 cycles per minute with wheezing on auscultation. His blood pressure was 160/90 mmHg at both arms and his pulse was more than 120 beats/minute with a regular rhythm. Peripheral pulses were present and symmetrical. The abdomen was painless. His axillary temperature was 37°C. His capillary blood sugar was 1.2 g/L. His pupils were 3 mm in diameter, bilaterally equal, and reactive to light. The initial electrocardiogram (ECG) demonstrated sinus tachycardia at 120 bpm without repolarization disorder (Figure 1).



**Figure 1. The electrocardiogram on admission, showing a sinus tachycardia**

Showed a Metabolic Acidosis with high anion gap and hyperlactatemia.

Serum chemical analyses were notified for the following values: K+= 2.9, GB= 7400, HB=14.2, troponin 1st point=2.9, 2nd point= 82.2.

The patient was admitted to the emergency room for monitoring. While in the ER, he developed a supraventricular tachycardia (SVT) at 170 bpm (Figure2) with hemodynamic instability



**Figure 2. The second electrocardiogram, showing a supraventricular tachycardia**

requiring a synchronized electrical cardioversion followed by a pharmacological cardioversion associated with anticoagulation peri cardioversion. This SVT was successfully reverted back to a rapid sinus rhythm. He was given supplemental intravenous potassium. To restore normal blood pressure, the patient was put on an infusion of noradrenaline aiming for a mean arterial pressure at 65 mmHg.

The patient underwent a generalized tonico-clonic seizure which lasted approximately 5 minutes and was aborted with intravenous diazepam (1 mg of Rivotril). He was later intubated for airway protection, hemodynamic distress, and cerebral resuscitation.

It was an intricate clinical presentation, a dissection of the aorta and a mesenteric infarction couldn't be eliminated so we did, after stabilization of the patient, a thoraco-abdominal CT scan with radiocontrast and a cerebral scanner which returned without abnormalities.

In the case of suspected theophylline intoxication, the theophylline level in the blood is monitored systematically and a hemodialysis session, not done in this case because of the patient's hemodynamic instability, is usually planned.

The patient was transferred to the intensive care unit where he died after 12 hours of admission. The blood sample taken on admission revealed a theophylline level of 111 mg/l. This piece of information was – unfortunately – transferred to the ER only after the patient's death.

## DISCUSSION

Acute intoxication by theophylline, a drug with a narrow therapeutic index, is characterized by a clinical polymorphism. The severity and the prognosis are correlated with serum theophylline concentrations. Mild toxicity represented by gastrointestinal symptoms, such as diarrhea, nausea and vomiting, is secondary to stimulation of the vomiting center (3). Major toxicity occurs at concentrations above 100 mg / l (3). In the central nervous system, theophylline blocks the presynaptic release of acetylcholine, which decreases cerebral blood flow, causing seizures and an alteration of the neurological status (4,5). In the cardiovascular system, it coordinates with sympathomimetic amines, leading to rhythm disorders and hypotension.

The most common metabolic responses to theophylline toxicity in literature are hypokalemia, hyperglycemia, lactic acidosis, hypomagnesaemia and hypophosphatemia (1). Thus, the presence of such abnormalities should raise suspicions of theophylline toxidromes. In this situation, detecting the toxin would be beneficial. Early screening in the emergency department helps to guide the specific management of the identified drug toxicity.

The clinical signs observed in our patient are similar to those in the literature and these signs are correlated with theophylline dosing at 111mg / l.

Seizure is a sign of neurotoxicity and is considered a poor prognostic sign. The serum concentration at which seizures are triggered is unknown. Convulsions induced by theophylline are often difficult to control. The injection of diazepam may be used alone but it is generally insufficient and should be regularly associated with phenobarbital, or carbamazepine and phenytoin in combination because these drugs increase theophylline metabolism, thus, reducing the theophylline serum concentration (1,6). If unsuccessful, the use of general anesthesia should be considered (1). The clinical effects of Theophylline intoxication are summarized in table 1.

**Table 1. Clinical Effects of Theophylline intoxication**

| | Clinical signs | Laboratory abnormalities |
|---|---|---|
| CNS | Agitation, Hyperreflexia, Tremor, Ataxia, Seizures. | Hypercalcemia |
| | | Hypokalemia |
| GI | Nausea, Vomiting, Diarrhea, Abdominal pain, | Metabolic acidosis with |
| | Hematemesis | Respiratory alkalosis |
| CV | Sinus tachycardia, Hypotension, Volume depletion, | |
| | Supraventricular tachycardia, Ventricular tachycardia, | |
| | Cardiac arrest | |
| PULM | Tachypnea | |

CNS=Central Nervous System, GI=Gastro-Intestinal, CV = Cardiovascular, PULM= Pulmonary

The only way to counteract the metabolic and cardiac effects is by using beta-blockers. Propranolol is considered to be the drug of choice in the treatment of supraventricular and ventricular tachycardias induced by theophylline (1), but it remains contraindicated in cases of hemodynamic instability, as is the case of our patient.

In our observation, the patient did not benefit from a specific treatment. Therefore, the best method available in the ED to reduce drug absorption from the gastrointestinal tract is the administration of activated charcoal, which is both rapid and very efficient. Orally-given activated charcoal may be the most effective treatment for a sustained-release theophylline overdose by Enterohepatic bypass, at a repeated-dose cycle of 15 to 25 g every four hours. The maximum benefit is obtained when it is administered soon after an overdose, although later administration might still be of value (7). Gastric emptying before administration of activated charcoal appears not to improve outcomes. There are several studies that failed to document any benefits from gastric emptying prior to the administration of activated charcoal (8).

In this case, extracorporeal elimination of toxin would have been beneficial, but the patient was hemodynamically unstable. Due to the absence of a specific treatment, the patient developed seizures and hypotensive episodes that required inotropic support, a sign of life-threatening intoxication.

## CONCLUSION

Theophylline intoxication is associated with high mortality rates because of its serious cardiac and neurological complications. An accurate diagnosis of the toxidrome by gaining adequate patient medical history, and by conducting a thorough physical examination and early serum toxicology screening, coupled with good knowledge of toxicology, will lead to better patient outcomes and will reduce mortality due to a delayed diagnosis.

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# *Note*

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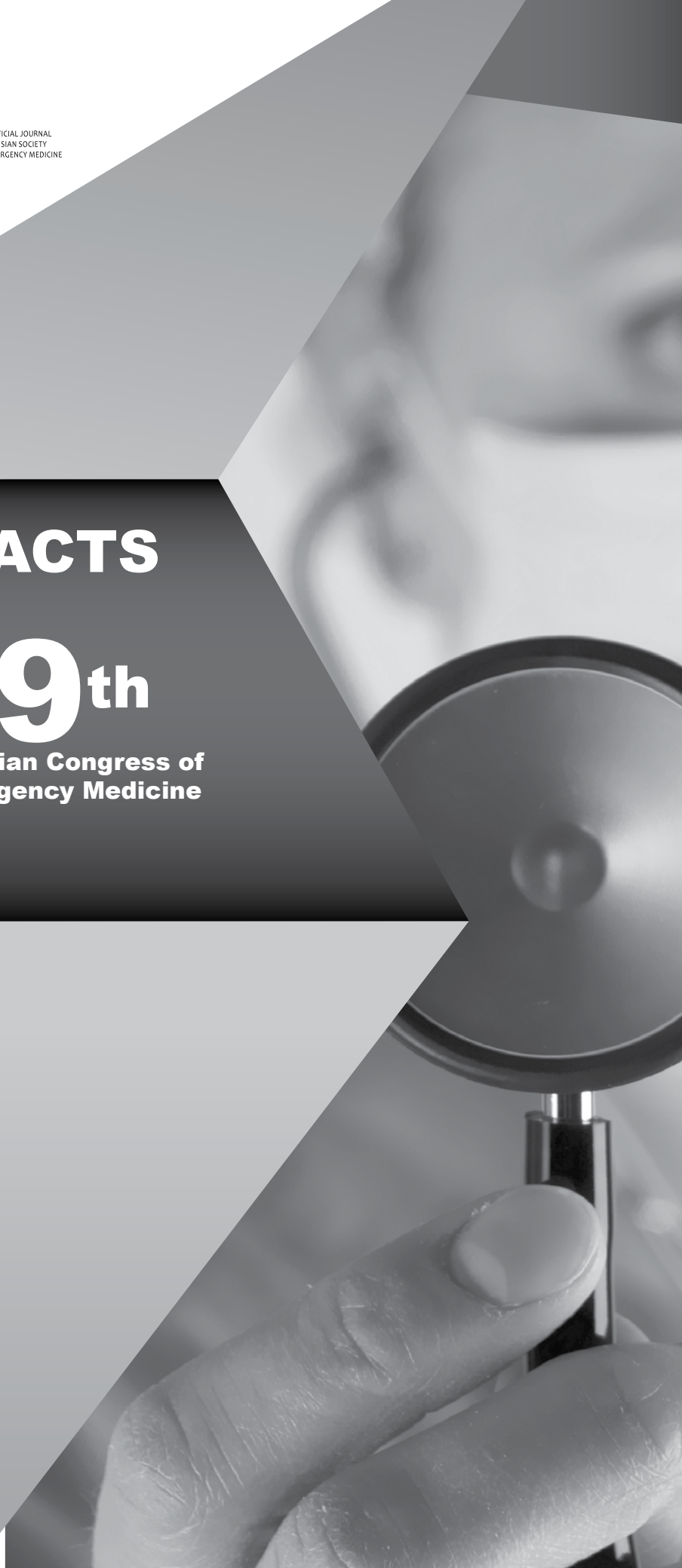
# ABSTRACTS

## 19th Tunisian Congress of Emergency Medicine



## 1

### DUAL CYCLE AND STEMI : A PROSPECTIVE STUDY

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INTRODUCTION : the STEMI is a life threatening condition and a public health problem in the world.
Their prognosis is tightly correlated to the delay of management. The objective of this study was to describe the changes in the different delays with the dual cycle.

METHODS : this was a prospective observational study, realized in the cardiology department of the university hospital hedi chaker in sfax. We included all the patients admitted in this department dor confirmed STEMI. The inclusion was for 4 months (September- December 2018).

RESULTATS : we enrolled 80 patients with a mean age at 62 ± 12,6 years ([33 – 92] years) and a predominantly male proportion(75,3%). The chest pain has begun within 06 to 18 o'clock in 45% (n=36); and within 18 to 23 o'clock in 25%. In 30%, the chest pain began from midnight to 06 o'clock.
During waking hours, the mean delay between the beginning of the chest pain and the first medical contact was 3.2 hours. The longest delay chest pain –first medical contact was among STEMI occurring within 18 to 23 o'clock (5.8 hours). Concerning the patients with a STEMI occurring within the midnight to 06 o'clock, this delay was shorter (4.9 hours).

CONCLUSION: the cornerstone in the management of STEMI is the accurate management of 'times'. The awareness of the population about the particular importance of early presentation to the emergency department would help to reduce the high mortality of STEMI and to improve the outcome.

## 2

### ELECTROCARDIOGRAPH IN GENERAL PRACTICE, NATIONAL TUNISIAN EPIDEMIOLOGICAL STUDY, INCLUDING 100 GENERAL PRACTITIONERS IN 2018

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INTRODUCTION : Electrocardiography is not subject to any legal requirement in Tunisian medical practice, only an obligation of means is dependent on the responsibility of the practitioner. With the advent of many recommendations, the use of the electrocardiograph is growing because of the increased incidence of cardiovascular disease.

AIMS : The aims of this work were: - to determine the equipment rate of electrocardiograph medical offices - And to define factors limiting the electrocardiography provision in General Practice.

MATERIALS AND METHODS : This work was a descriptive epidemiological study including Tunisian General Practitioners who filled in the on-line survey (https://www.askabox.fr/), between 29 June 2018 and 31 August 2018. Different variables were studied such as demographics Practitioners criteria's, the rate of ownership electrocardiograph, the factors limiting its ownership.

RESULTS : 100 general practitioners were included in this study. 76% were equipped. The main limiting factor for 50% of non-equipped doctors was a financial cause and profitability. Then, training, with a doubt in their ability to interpret an electrocardiogram and the fear of legal proceedings for wrongful interpretation (42%, n=10). Factors associated with the no possession of an electrocardiograph was rural practices ($p < 0.001$), and the existence of nearby cardiologist ($p < 0.001$).

CONCLUSION : The main factors limiting the provision of electrocardiograph in Tunisian General Practices are financial causes and the lack of training in the interpretation of the electrocardiogram that begets fear of legal proceedings for wrongful interpretation.

## 3

### DECOMPENSATION FACTORS OF ACUTE HEART FAILURE.

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INTRODUCTION : Acute heart failure (AHF) is a common reason for admission to emergency departments and cardiology. With the aging of the population, this pathology represents a public health problem and a financial burden. Our work aims to study the epidemiological and clinical characteristics and the main factors of decompensation of patients admitted for AHF in the cardiology department via emergencies.

PATIENTS AND METHODS : This was a retrospective descriptive and observational study carried out in the cardiology department of the university hospital of Bizerte during a period of 18 months from January 1st 2016 to June 30th, 2017. We identified clinical, paraclinical and therapeutic data.

RESULTS : During the study period, 104 acute heart failure consultants were included. The mean age was 69 ± 12 years with a sex ratio of 1.08. Hypertensive heart disease (66,3%) and diabetes (41,4%) were the dominant comorbidities. The main reason for the consultation was dyspnea. The precipitating factors were iatrogenic in 44.2%; rhythm disorders in 29.8%; a hypertensive crisis in 24%; respiratory infection in 22.1%; myocardial ischemia in 20.2%; anemia in 19.2% and pulmonary embolism and valvulopathy in 8.5% of cases. The main electrical abnormalities were atrial fibrillation (40,4%), LBBB (20,2%) and LVH (17,3%). Cardiomegaly was present in 95% of cases and LVEF <40% in 52.4% of cases. The average length of stay was 8 ± 5 days.

CONCLUSION : Acute heart failure is frequently associated with precipitating factors. The search for these factors is important to minimize the decompensation episode while envisaging a therapeutic education of the patient and his family.

## 4

### IN-HOSPITAL PROGNOSIS OF ACUTE HEART FAILURE

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INTRODUCTION : Acute heart failure (AHF) is a common reason for admission to emergency departments and cardiology. With the aging of the population, this pathology represents a public health problem and a financial burden. The aim of our work is to study the epidemiological and clinicalcharacteristics of patients admitted for AHF in the cardiology department via emergencies as well as to evaluate the prognostic factors of morbidity and mortality.

PATIENTS AND METHODS : This was a retrospective descriptive and observational study carried out in the cardiology department of the university hospital of Bizerte during a period of 18 months from January 1st 2016 to June 30th 2017. We identified clinical, paraclinical, therapeutic and evolutionary data and analyzed by the SPSS 19.0 software.

RESULTS : During the study period, 104 acute heart failure consultants were included. The mean age was 69 ± 12 years with a sex ratio of 1.08. Hypertensive heart disease (66,3%) and diabetes (41,4%) were the dominant comorbidities. The main reason for consultation was dyspnea. Rhythm disorders, found in 29,8% of cases, were the main precipitating factor. The main electrical abnormalities were AF (40,4%), LBBB (20,2%) and LVH (17,3%). Cardiomegaly was present in 95% of cases and LVEF <40% in 52.4% of cases. The average length of stay was 8 ± 5 days.
In-hospital mortality and 90-day mortality were 5,8% and 7,7% respectively. The readmission rate at 3 and 6 months was 31% and 24%, respectively. Predictors of mortality were a stay in the ICU superior to 3 days and decompensation by valvulopathy. An NT proBNP> 8000 pg / ml and a hematocrit> 37% predicted a recurrence at 3 months. While renal failure, atrial fibrillation, pulmonary hypertension, hepatomegaly and nitrate use were predictive of recurrence at 6 months.

CONCLUSIONS : Our study identified several intra-hospital mortality and rehospitalization factors (at 3 and 6 months) that

must be considered in order to optimize the management of these patients.

## 5

## BEDSIDE LUNG ULTRASONOGRAPHY BY EMERGENCY DEPARTMENT RESIDENTS AS AN AID FOR RAPID SCREENING HEART FAILURE IN PATIENTS WITH ACUTE DYSPNEA

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BACKGROUND : Lung ultrasound (LUS) has recently emerged as a bedside imaging tool for the differential diagnosis of acute dyspnea in the Emergency Department (ED). However, despite its simplicity, it is still a procedure confined to experts.

AIM OF THE STUDY : To assess the accuracy and reproducibility of LUS performed by emergency medicine (EM) residents for the diagnosis of congestive heart failure (CHF) in patients admitted to ED for acute dyspnea.

PATIENTS AND METHODS : This is a cross sectional prospective study conducted between January 2016 and October 2018 including all patients aged over 18 years admitted to ED for acute dyspnea. At admission, two consecutive bedside LUS were performed by a pair of EM residents who received a 2-hours course in LUS examination to determine independently ultrasound lung comets (ULC) score and B-profile pattern. All participating sonographers were blinded to patients' clinical data. An ULC score ≥15 or a B-profile pattern were considered as suggestive of CHF. The final leading diagnosis was assessed by two expert sonographers based on clinical findings, chest X-ray, brain natriuretic peptide, and cardiac ultrasound. Accuracy and agreement of ULC score and B-profile pattern were calculated.

RESULTS : We included 700 patients with a mean age of 68±12.6 years and a sex ratio (M/F) of 1.43. The diagnosis of CHF was recorded in 371 patients (53%). The diagnostic performance of ULC score at a cut-off 15 and B-profile pattern was respectively 88% and 82.5% for sensitivity, 75% and 84% for specificity, 80% and 85% for positive predictive value, 84% and 81% for negative predictive value. The area under receiver operating characteristic curve was 0.86[0.83-0.89] and 0.83[0.80-0.86] respectively for ULC score and B-profile pattern. There was an excellent agreement between residents for the diagnosis of CHF using both scores (kappa=0.81 and 0.85 respectively for ordinal scale ULC score and B-profile pattern).

CONCLUSION : LUS has a good accuracy and an excellent reproducibility in the diagnosis of CHF in the hand of EM residents following a short training program.

## 6

## PREDICTORS OF EARLY MORTALITY IN HYPERTENSIVE URGENCY: A PROSPECTIVE STUDY IN THE EMERGENCY ROOM

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Service des urgences et samu04; chu habib Bourguiba Sfax

INTRODUCTION : The hypertensive urgency is associated with a high mortality rate. The prognosis of these patients is tightly correlated to the management of the vital signs during the acute phase.
The objective of this study was to identify predictors of death of patients admitted for hypertensive urgency during the first 24 hours of hospitalization.

PATIENTS AND METHODS : This prospective descriptive study was carried out in the emergency room of the university hospital habib Bourguiba in sfax during 6 months (July–December). Were included all the patients hospitalized in the emergency room and for whom the diagnosis was a hypertensive urgency. The patients with non-complicated elevated blood pressure were excluded.

RESULTS : We enrolled 44 patients, with a mean age of 65.3 ± 12.6 years (32 to 90 years) and a male predominance (sex ratio = 1.2). Eleven (25%) deaths were recorded during the first day of hospitalization.
In univariate analysis, the predictors that were statistically associated with a high risk of death were: a history of hospitalization the last year for uncontrolled hypertension (p=0.013); an acute complication of the diabetes (p = 0.013), a high BMI (p = 0.016), a low level of GCS on admission (p <0.001), seizures within the first 24 hours of admission (p

<0.001), hyperglycemia (p = 0.013), a high respiratory rate on admission (p = 0.03), a low pulse oximetry level on admission (p = 0.013), and hyperthermia (p=0.02). Blood sample analyses were performed for all the patients. The biological abnormalities that were associated with death were: a high level of CRP(p=0.026). When performed, the brain CT-scan showing a cerebral hemorrhage was statistically associated with a higher rate of death (p <0.001). Therapeutic factors predictive of mortality were the use of mechanical ventilation (p = 0.004) and the needing for anticonvulsants.

CONCLUSION : According to our results, the hypertensive urgency requires early and appropriate management. Some prognostic factors are modifiable; formalized management could reduce mortality in the acute phase.

## 7

## EPIDEMIOLOGY OF PATIENTS ADMITTED TO THE EMERGENCY DEPARTMENT FOR CHEST PAIN: SEVEN YEARS' EXPERIENCE

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INTRODUCTION : Acute Coronary Syndrome (ACS) is a major public health issue all over the world including developing countries such as Tunisia. In this study, we aimed to determine the prevalence of ACS in a sample of Tunisian patients admitted to the emergency department with chest pain as well as evaluating the relationship between ACS and cardiovascular risk factors (CVRF) in this population.

METHODS : We included patients consulting the ED for non-traumatic chest pain from January 2012 to December 2018. A standardized case report form was used to collect patients' data. Univariate logistic regression analysis was performed to identify the age and gender-related CVRF in ACS.

RESULTS : We included 4448 patients. Among the patients studied, 772 patients (17.4%) were classified as ACS out of which 71.7% were male. Diabetes was found in 3.88% of patients classified as ACS, hypertension in 5.9% and smoking in 18.7%. Out of all patients included, 816 patients had no CVRF, of which 51 patients (6.3%) were classified as ACS; 3067 patients admitted with chest pain had no history of cardiovascular disease, among which 430 patients (14%) had ACS. Concerning ECG findings, 830 patients had an abnormal ECG of which 374 (45%) were classified as ACS. On the other hand, 2207 patients had a normal ECG of which 164 patients (7.47%) had ACS. The characteristics of STEMI and NSTEMI patients were very similar.

CONCLUSION : Our database about the incidence of ACS in acute chest pain and the characteristics of those who have been diagnosed as ACS is the largest in Tunisia; it should be supported by further national studies.

## 8

## ACUTE HEMODYNAMIC EFFECTS OF DIGOXIN IN PATIENTS WITH CONGESTIVE HEART FAILURE

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INTRODUCTION : Digoxin was the cornerstone of heart failure therapy for decades due to its positive inotropic and neurohormonal modulation properties until the change of paradigm in heart failure pathophysiology. Our study evaluates outcomes stratified by heart function status in patients with heart failure treated with digoxin.

PATIENTS AND METHODS : This is a prospective randomized, double-blind, placebo-controlled parallel-group clinical trial. We randomly assigned patients with acute heart failure to treatment with digoxin or placebo (median dose of digoxin is 0.25 mg per day). The effects of each one on hemodynamic parameters (systolic time interval, cardiac output, left ventricular ejection fraction and BNP level were compared within a period of 48hours). We also aimed to compare the risk of mortality and hospital length of stay with digoxin use versus no digoxin. The diagnosis of heart failure was based on current or previous symptoms such as dyspnea, radiologic or echographic evidence of pulmonary congestion, BNP level > 350 pg/ml or NTproBNP>1400 pg/ml. Participants were excluded if they already received digoxin as a background treatment. Those who had a pacemaker or suffered from severe renal impairment (creatinine clearance of less than 30 ml/min) were also excluded.

RESULTS : We included 438 patients: 104 of them have received digoxin while 229 of them did not. Both groups had comparable demographic characteristics. In the following table, we aimed to show the variation in hemodynamic parameters within 48 hours as well as the clinical outcomes in both participants. Hemodynamic changes from baseline and clinical outcomes are summarized in the table.

| | Digoxin (n=104) | No Digoxin (n=229) | P |
|---|---|---|---|
| **Hemodynamic changes** | | | |
| Cardiac output (%) | +11.3 | +7.75 | NS |
| Left ventricular ejection fraction (%) | +7.3 | +2 | 0.05 |
| **Systolic time intervals (ms)** | | | |
| Pre-ejection period | -1.26 | -1.01 | 0.02 |
| Left ventricle ejection time | +0.8 | +0.2 | 0.03 |
| **Brain natriuretic peptide (pg/ml)** | -0.02 | -0.012 | NS |
| **Clinical outcomes** | | | |
| Hospital admission rate(% ) | 57 | 72 | NS |
| Hospital length of stay (days) | 6.6±2.6 | 10±7.2 | 0.02 |
| Mortality rate (%) | 1 | 0 | 0.78 |

CONCLUSION : In patients with heart failure, digoxin use is associated with an improvement in the systolic function of the left ventricle. Cardiac glycosides should not be discarded from heart failure armamentarium.

## 9

## KNOWLEDGE ASSESSMENT OF RECOMMENDED GUIDELINES OF BASIC LIFE SUPPORT IN NURSE STUDENT

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INTRODUCTION : Cardiac arrest reanimation is an area where scientific data is often limited. Recommendations for cardiopulmonary resuscitation (CPR) of European Council for Resuscitation from are well established since the last update. In this project, we have tried to assess the knowledge of 1st year nurse students about correct procedures of CPR.

PATIENTS AND METHODS : This is a cross-sectional, descriptive and epidemiological study performed by self-questionnaire. The questionnaire was distributed to nurse students (started on September 2018 at the University of Sfax) including demographic data and questions related to experts' recommendations about basic cardio-pulmonary resuscitation.

RESULTS : Forty-four students have answered our questionnaire with an average age of 20 ± 2 years old with a female predominance (sex ratio = 0.13). Only one of those students have already attended first aid training. In 40% of cases, participants have reported that they can manage cardiac arrest in case they were alone. No participant answered all the questions. All participants didn't possess sufficient knowledge about the chain of survival; the mean of the correct answer was 36%. Questions about techniques and the sequence of basic cardiopulmonary resuscitation have already been asked. The question that had the greatest number of false answers was the measurement of steal depression in cardiac massage (93% of cases). The average rate of correct answers to all questions was 41± 14%. Only 21% of students answered on more than half of questions correctly and only one a student had answered more than ¾ of questions correctly.

CONCLUSION : Anyone could be in front of cardiac arrest outside healthcare facilities. Early warning and basic cardiac resuscitation are the first two links in the chain of survival that everyone especially medical and paramedic students should have sufficient knowledge and skills to save people's life. This study showed that 1st-year nurse students need further training in basic cardio-pulmonary reanimation.

## 10

## VISITORS' SATISFACTION IN THE EMERGENCY DEPARTMENT: A SURVEY OF 160 PATIENTS

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INTRODUCTION : The assessment of the patients' satisfaction is quite difficult. This study aimed to describe the patient's satisfaction by focusing on the waiting time, the medical management and the outcome.

PATIENTS AND METHODS : this was a cross-sectional observational survey, conducted in the non-vital area of the

emergency department (ED) of the university hospital Habib Bourguiba Sfax. The survey was realized during one week (17 to 23 December 2018) Were included all the communicating patients, aged 18 or over, and presenting to the ED during the study period, whatever the complaint and the medical decision were. Oral consent was obtained before the interview.

RESULTS : We enrolled 160 patients, aged between 50 and 64 years in 26.9% of cases and with a M/F sex-ratio at 1.1. it was the first visit to the ED in 28.1%. The waiting time was considered short or reasonable in 72.5% and long in 27.5% of cases. The waiting room was the main cause of dissatisfaction. Occupancy possibilities during the waiting time were not satisfactory at 70%.
The overall satisfaction was 89.4%. The explanations given by the doctor concerning the diagnosis were considered good in 95.6% of the cases. The management of pain during the waiting time, especially non-traumatic pain, was estimated sufficient in 79.3%. the prescription of pain killers was considered improving the satisfaction. Regarding the outcome, 80.6% of the participants were discharged and the guidance they were given was perceived as clear and satisfactory (75.6%). For the patients who were hospitalized (19.6%), the waiting time for a bed was unsatisfactory in 48.4%. This delay was 4 hours +/- 2.5 hours.

CONCLUSION : To improve the patients' satisfaction in the ED, several suggestions are possible, namely improving the perceived expectation by announcing the approximate waiting time and the early management of pain.

## 11

## DEHYDRATION IN ELDERLY PATIENTS ADMITTED IN THE EMERGENCY DEPARTMENT: A PROSPECTIVE STUDY OF 86 CASES

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OBJECTIVES : To analyse the demographic, etiological, clinical and therapeutic characteristics of patients admitted to the emergency room (ER) for dehydration

PATIENTS AND METHODS : A prospective study including all the subject aged over 65 years and presenting a clinical or biological dehydration and hospitalized in the ER. This study was conducted in the ER of the university hospital habib Bourguiba sfax during two months (July – August 2018).

RESULTS : We included 86 patients of elderly patients hospitalized during the study period. The average age of the patients was 79.9 +/- 7.8 years with a sex ratio of 1.05. Medical history was noted in most patients (82.3%) and was dominated by hypertension and diabetes. The ISAR score averaged 3.24 +/- 1.6. It was greater than 2 in 82.35% of cases. The ADL score showed a loss of autonomy in 49.4% of cases. Nearly one-third of the patients were bedridden and the cognitive functions and the thirst communication were altered respectively in 12.8% and 47.7%. The functional disturbances were noted for 4.6 +/- 8 days. The signs of dehydration were present in all our patients, namely eye circles (88.4%), dryness (77.9%), dryness of the tongue (61.6%) and persistent skin folds (47.7%). case. The Glasgow coma scale was under 8 points in 15.29% of the cases. Respiratory distress was noted in 33.7% of cases. The systolic blood pressure was less than 90mmHg in 18 patients. The osmolality averaged 337.4 +/- 24 mosmol / l. The median value was 339 mosmol / l. It was associated with hypertonicity in 42 patients. Acute renal failure was noted in 52 cases (60.5%). The most common acid-labial disorder was acidosis in 38 cases. The most common etiology was infections (n = 44) followed by decompensation of diabetes (n = 30). Intravenous rehydration was indicated immediately after the admission in 96.5% of cases. The 0.9% saline solute was administered in 93% of cases. The length of stay in the ER was 1.63 +/- 0.78 years. Mortality averaged 26.7%.

CONCLUSION : Dehydration is still associated with high mortality. The improvement of the prognosis could be ensured by the early diagnosis and accurate management. The education of relatives is crucial to prevent this pathology.

## 12

## PRE-HOSPITAL MANAGEMENT OF PATIENTS UNDER EIGHTEEN YEARS

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INTRODUCTION : Studies describing emergency medical systems are lacking in our country and especially if it's

about patients under eighteen. This sub-group had specific characteristics and needs such as specialized physicians, algorithms or equipment. Young and adult patients are managed by medical mobile units called SMUR for «service mobile d'urgence et de réanimation». Our study aimed to describe the activity of the SMUR units managing patients under eighteen.

METHODS : Prospective and descriptive study over one year (January 2017-December 2017). Inclusion of all SMUR interventions on patients aged 18 or less. Collection of demographic and clinical data, times and medical and paramedical procedures performed with SMUR intervention. The activity was evaluated with the Codage Activité SMUR score or CAS.

RESULTS : Inclusion of 109 patients. Mean age=11±5 years. Sex ratio= 1,48. Type of interventions n(%): primary 27(25) and transfers 82 (75). Age distribution [interval] n(%):[12-18years] 40 (37); [2- 12years]32 (30); [0-28days]20 (18) and [29 days-2 years]16 (15). Seven interventions (6%) were canceled. Eighty interventions (73%) were needed in hospitals and only 13% (n=14) at the patient's home. Reasons for interventions (%): respiratory (28), traumatology (24) and toxic (19). Median CAS= 5 [IQR 4-14]. Median delay between ambulance dispatch and arrival at the patient location was 10 minutes [IQR 0.05-0.20]; between arrival at the patient location to receiving hospital, registration was 57 minutes [IQR 0.57-1.21], between arrival at and departure from the patient location was 15 minutes [IQR 0.08-0.25]. Procedures within SMUR n(%): oxygen therapy 9(8), intubation 4(4), sticking 10(9), intravenous drug 49(45), bronchodilators 3(3), point-of-care blood level 22(20), monitoring of vital signs 89(82) and electrocardiogram 2(2).

CONCLUSION : The pre-hospital management of young patients is specific. We reported more secondary interventions and respiratory diseases. The CAS score was mild.

## 13

## POSTTRAUMATIC STRESS DISORDER IN PATIENTS ADMITTED IN THE EMERGENCY DEPARTMENT FOR ACUTE CORONARY SYNDROME: A PROSPECTIVE ASSESSMENT OF 61 PATIENTS

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OBJECTIVE : Many patients who present to the emergency department (ED) with acute coronary syndromes (ACS) develop posttraumatic stress disorder (PTSD). Less is known about the risk for PTSD in patients who rule out for ACS. Our objective was to assess the risk of developing PTSD among patients who were diagnosed having an ACS, and to determine predictors of PTSD in this population.

METHODS : We enrolled a consecutive sample of all patients presenting to the ED of the university hospital habib Bourguiba sfax with a confirmed ACS; during seven days. We assessed PTSD by telephone 1 month after discharge using the PTSD Checklist specific for the suspected ACS event (PCL-S). We analyzed the correlation between the PCL-S score and the medication observance. A PTSD screen is positive when PCL-S32.

RESULTS : We included 61 patients aged 65 years or over in 40% and a 1.2 M/F sex-ratio. In our sample TIMI risk score was over 3 in 40% and GRACE score was a high-risk class in 49%. Six patients had a STEMI. Using PCL-S, our patients have developed PTSD by 60%. A high PCLS score at one month after discharge was statistically correlated with a high PCL-S score on admission ($p<0.001$) and poor therapeutic compliance ($p<0.001$).

CONCLUSIONS : ED presentation with ACS was sufficient to trigger a positive PTSD screen. Patients who present with ACS symptoms should be considered for interventions to prevent PTSD after hospitalization, and improve their therapeutic compliance.

## 14

### PENETRATING ATHEROSCLEROTIC ULCER OF THE AORTA: ABOUT A CASE

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INTRODUCTION : Penetrating atherosclerotic ulcers (PAU) are a pathology that involves the aortic wall and along with aortic dissection and aortic intramural hematoma form the spectrum known as a cute aortic syndrome. This pathologic condition is distinct from classic aortic dissection and aortic rupture; however, care should be taken in making the diagnosis, particularly if the disease is discovered incidentally.

METHODS : A 56-year-old male presented to the emergency department of Farhat Hached hospital on 6/11/2018 complaining of one week of lumbar pain radiating to the external genitalia. He has medical history of hypertension and pulmonary disease chronic obstructive. He did not present any complications. He was afebrile, didn't show any urinary signs. He was not complaining of chest pain.

RESULTS : Kidney infarction or thrombosis of the renal veins were suspected in this patient with risk factors for atherosclerosis. A computed tomography (CT) abdominal angiogram was obtained to rule out these two diagnoses which were negative. An incidental finding of a penetrating atherosclerotic ulcer (PAU) of the descending aorta without rupture was reported (figure 1,2). So he had been transferred to the Cardiovascular Surgery Department.

CONCLUSION : PAU is typically seen in elderly individuals with hypertension and atherosclerosis and usually involves the descending thoracic aorta. Differentiation of PAU from other causes of Acute Aortic Syndrome such as intramural haematoma, aortic dissection, aortic aneurysm, and spontaneous aortic rupture is difficult or impossible in some cases.

## 15

### ELDERLY PATIENTS' OUTCOMES IN A TUNISIAN EMERGENCY DEPARTMENT: UNIVERSITY MEDICAL EMERGENCY DEPARTMENT OF FARHAT HACHED SOUSSE

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INTRODUCTION : elderly patients consulting the Tunisian EDs is in constant increase, it is becoming more challenging for the emergency provider Staff to meet this population's needs due to their disease complexity, comorbidities, and severity. Thus, the first step toward addressing this issue is a better understanding of the nature of ED's visits particularly of those older than 65 years.

METHODS : A prospective observational study was conducted in a University Medical ED of Farhat Hached in Sousse, including ED visitors aged more than 65 years during 6 months from 01/03/2018 to 01/09/2018.

RESULTS : We studied the data of 600 patients that have visited the ED during the study's period; data of 120 patients were incomplete and inadequate for the study. The median age of the elderly patients was 73 years with a maximum age of 95 years, 317of them were women.61% of the studied patients had a preserved autonomy. Regarding patient's outcomes, 69.2% were discharged from ED while 10.5% died during their ED stay. Only 17% were admitted to the hospital, among which 12% were admitted to a medical ward. 20 patients were discharged against medical advice.

CONCLUSION : Complete geriatric assessments are time-consuming and beyond the scope of most EDs because of atypical clinical presentation of illness, a high prevalence of cognitive disorders, and the presence of multiple comorbidities complicate their evaluation and management. That's why more attention and data analysis should be considered to provide high-quality care to this increasing population.

## 16

## MENINGITIS OF THE ADULT: EPIDEMIOLOGICAL AND EVOLUTIONARY ASPECTS

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INTRODUCTION : Meningitis or meningoencephalitis is a serious infectious disease that can be bacterial, parasitic or viral. Management of suspected meningitis in emergencies should not be delayed. It assumes the practitioner's clinical knowledge, but also good knowledge of the interpretation of complementary examinations, their respective indications, and close collaboration with the bacteriology laboratory. Public health concerns, initially focused on the bacteria Neisseria meningitides responsible for large-scale epidemics have been changed since the West Nile virus re-emerged this year.

MATERIALS AND METHODS : This is a retrospective study, involving 80 patients, performed at the emergency unit of Farhat Hached hospital in Sousse over a period of 2 years (2017-2018).

RESULTS : We collected 80 cases of meningitis. A peak case was recorded in 2018 with 55 cases (69%). The average age was 42 years [15-83] of which 28.7% were <30 years old. There was a male predominance (n = 42) corresponding to a sex ratio of 0.52. Most cases of meningitis were observed in autumn ( n=38). The most-reported chronic pathologies were hypertension (17.5%) and diabetes (3.8%). Neurological antecedents were predominated by meningitis in 11.3% of cases (n = 9), followed by head trauma in 8.8% of cases (n = 7), 4 of them were complicated by a meningeal breach resulting in repeated episodes of meningitis in 3 patients. In 16 patients, the portal of entry was detected. It is predominantly an ENT seat (n = 7) including 1 case of otitis (n = 1) and 6 cases of sinusitis (n = 6). The delays to admission in the emergency unit were variable. Most patients were hospitalized within 72 hours (38,75 %, n = 31), while only 9 patients were hospitalized within 24 hours. 11 patients received antibiotics before admission which was amoxicillin in 18% of cases. The initial diagnosis was bacterial meningitis in 26, 25 % of cases (n = 21), viral meningitis in 73, 75% of cases (n = 59). The nature of the germ could only be identified in 35 cases. The isolated germs were West Nile virus in 57% of cases (n = 20), mumps in 6.6 % of cases (n = 2), pneumococcus in 22.8% of cases (n = 8) and herpes in 17.1% of cases (n = 6). The Pneumococcus was the predominant germ found in bacterial meningitis with 25% of patients having a meningeal breach causing recurrent meningitis. The evolution was marked by the hospitalization in intensive care in 25% of cases (n = 20), in infectious diseases in 75% of cases (n = 60) with a good evolution in 88.7% of cases, the death in 5% of cases and the persistence of sequelae in 6% of cases..In the univariate analysis, progression to death or persistence of sequelae was correlated with a history of COPD (P = 0.012), immunosuppression (P = 0.036), disturbance of consciousness (P = 0.008). ), respiratory distress (P = 0.013), herpes (P = 0.002), hospitalization in intensive care (P = 0.002), duration of resuscitation (P = 0.000), and duration of ventilation ( P = 0.000). Finally, the effect of corticosteroid therapy and antibiotic therapy on the occurrence of a complication does not appear significant in a statistically way. In multivariate analysis, the hospitalization in intensive care is correlated with the disorder of consciousness. In multivariate analysis, the occurrence of a complication (progression to death or the persistence of sequelae) is correlated with the history of COPD, herpes, and hospitalization in intensive care with an ODDS ratio of 12.7, 9.4, and 5 respectively.

CONCLUSION : In spite of the therapeutic progress, the refinement of the procedures of bacteriological diagnosis and the improvement of the conditions of medical care, the meningitis of the adult remains a worrying affection through mortality and morbidity which did not significantly change during the last decades.

## 17

## SEPSIS AMONG THE ELDERLY OVER 65 IN THE EMERGENCY DEPARTMENT: ED OF FARHAT HACHED

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INTRODUCTION : The population over 65 years represents a significant percentage of emergency room visits, most often the clinical symptoms are not specific and especially tables of sepsis making prompt diagnosis and treatment initiation

challenging. The prognosis is often unfortunate because of the multiple medical comorbidities and the delay of consultation. Our objective was to determine the epidemiological profile of older adults aged 65 years with infection admitted in the emergency department.

METHODS : We conducted a descriptive prospective study in the Farhat Hached Emergency Department of Sousse over a period of 6 months. We included patients over 65 years old who were admitted to the emergency department for a suspected or confirmed infectious disease.

RESULTS : we included 184 patients in our study. The mean age was 72.3 ± 5.1 years with a female predominance. 65% of the patients had medical antecedents such as hypertension (48%) and diabetes (38%). Fever was reported by only 17% of patients and was only fully quantified among 3% of cases. The infectious sources of sepsis were identified in 92% of cases: mainly respiratory tract infections (46%) but also urinary tract infections (18%) and neuro-meningeal (9%).
We found tachypnea (RR> 22 cycles/min) in 62% of cases, systemic blood pressure at 100 mmHg in 18% of patients and neurological symptoms in 12% of cases. In our study, 34 patients died. The use of mechanical ventilation was required for 4% of patients and only 2.7% (out of 31% of patients who needed a transfer to the ICU) were admitted into the intensive care unit.

CONCLUSION : The prognosis of the infectious pathology requiring the hospitalization of the elderly is severe. One out of two patients would have organ failure. We noticed a high rate of mortality and very few are transferred to the intensive care unit.

## 18

## PREDICTORS OF MORTALITY IN PATIENTS ADMITTED IN THE EMERGENCY ROOM FOR A STATUS EPILEPTICUS: A RETROSPECTIVE STUDY

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The objective of this study was to determine the predictors of mortality in patients admitted in the emergency room for a status epilepticus.

METHODS : this was a retrospective study conducted during 18 months (January 2017 to June 2018). Were included all the patients, known to have epilepsy in their medical history, and admitted in the emergency room for a status epilepticus. The clinical, biological, imaging abnormalities were compared in the groups of deaths and survivors.

RESULTS : We enrolled 105 patients, aged 38+/- 18 years and with a M/F sex-ratio at 1.6. The patients were transported to the hospital by the SMUR medical team at 38%. The epilepsy was known for 11 years in 50%. The seizures have occurred at home at 86%. The mean delay between the first seizure and the arrival to the hospital was 215 mn. The relatives reported 4 episodes of seizures in 50% of cases. The median duration of seizures at home was 13 minutes. The cause of decompensation of the epilepsy was undetermined in 20%. It the other cases, it was poor treatment adherence (40%), infection (31%) and fatigue (15%).
In univariate analysis, the predictive factors of mortality in the emergency room were: a medical history of diabetes (p=0.001) or hypertension (p=0.007), a low GCS on admission (p=0.018) and the needing for tracheal intubation (p<0.001). The causes of decompensations that were statistically associated with death were the poor treatment adherence (p=0.005) and stroke (p=0.007).
In multivariate analysis, the independent factors of death in these patients were the diabetes (p=0.037), stroke (p=0.03) and the needing of intubation (p<0.001).

CONCLUSION : the status epilepticus is a life-threatening condition. Our results highlight the importance of good management of comorbidities and the early management of seizures to avoid invasive treatments.

## 19

## PREDICTORS OF THE LENGTH OF STAY IN THE EMERGENCY ROOM IN ADMITTED PATIENTS FOR A STATUS EPILEPTICUS: A MULTIVARIATE ANALYSIS

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INTRODUCTION : The objective of this study was to determine the predictors of a prolonged length of stay (LOS) in the emergency room (ER)

METHODS : we realized a retrospective study, conducted during 18 months (January, 2017 to June 2018). Were included all the epileptic patients, and admitted in the emergency room for a status epilepticus. A length of stay longer than 72 hours in the ER was considered 'long'. We compared the two groups of patients of 'long' and 'short' LOS in the ER. We performed a univariate and a multivariate analyses.

RESULTS : We enrolled 105 patients, aged 38+/- 18 years and with a M/F sex-ratio at 1.6. The patients were transported to the hospital by the SMUR medical team at 38%. The epilepsy was known for 11 years in 50%. The decompensating factor was undetermined by 20%. It was mainly a poor treatment adherence in other cases (40%). The clinical examination on admission found a comatose patient in 28%. A brain CT-scan was performed in 61%, it was normal in 53%. The patients were discharged in 68%, transferred to another ward (25%) or died (8%). The LOS was long in 19 patients.
In univariate analysis, the predictive factors of a long LOS were: stroke (p=0,001), coma on admission (p=0,027), hypocapnia in the blood gazes on admission (p=0,04), the administration of phenobarbital (p<0,001) and the needing of tracheal intubation (p<0,001).
In multivariate analysis, the independent factors of a long LOS in the ER were the needing of tracheal intubation (p=0,002; OR=4,4) and the administration of phenobarbital (p=0,004; OR = 4).

CONCLUSION : the status epilepticus is a common pathology in our emergency departments. Their early management is the cornerstone of a good outcome. Moreover, the emergency team should emphasize the therapeutic choices to shorten their LOS in the emergency room.

## 20

## THE MILD HEAD INJURY IN THE EMERGENCY DEPARTMENT OF BIZERTA: RELEVANCE OF THE INDICATION OF XRAY COMPUTED TOMOGRAPHY

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INTRODUCTION : Mild head injury (MHI) is a common reason for consultation in the emergency department. The aim of the present study was to study the epidemiological-clinical profile of MHI in the emergency department of Bizerta and to assess the relevance of the indication of X-ray computed tomography.

METHODS : A retrospective study conducted over one year (2015). Patients who visited the Bizerta Emergency Department for MHI (Glasgow coma scale score (GCS) $^{3}$ 13) and hospitalized for surveillance were included. A record of clinical and paraclinical data collection has been completed.

RESULTS : Two hundred and forty-three patients were included. The frequency of MHI was 1,4%. The mean age was 35 ± 18 years with a sex ratio of 2,7. Road traffic accidents were the frequent mechanism of injury (52,3%). MHI was isolated in 51,8% of cases. An initial loss of consciousness was present in 77% of cases. A GCS score strictly equal to 15 was objectified in 90,1% of cases. Computed tomography of the head was performed in 70,4% of cases whereas, according to SFMU recommendations, it should have been performed in 56,8% of cases. According to these recommendations, computed tomography should have been avoided in 35,1% of cases who benefited from this exam. Computed tomography was pathological in 35,1% of cases and bone lesions were the most common lesions. A Glasgow coma scale score of less than 15, otorrhagia and associated facial trauma were more noticeable in the case of an intracranial lesion.

CONCLUSION : The frequency of mild head injury was 1,4%. A score of Glasgow strictly equal to 15 was objectified in 90,1% of the cases. Computed tomography was performed in 70,4% of cases whereas, according to SFMU recommendations, it should have been performed in 56,8% of cases. According to these recommendations, computed tomography should have been avoided in 35,1% of cases who did not benefit from this exam.

## 21

## ELECTRIFICATION ACCIDENTS: EPIDEMIOLOGY AND MANAGEMENT

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INTRODUCTION : Accidents due to electric power are the cause of lesions that can be life-threatening in the immediate future

or it can be responsible for often major functional and aesthetic sequelae.
Our work aimed to analyze the epidemiological aspects, the management and the prognosis of electric buses in our context.

METHODS : A retrospective clinical study involving 61 patients admitted for electrical bus, to the Emergency Department of Oudhref, over four years, from January 2013 to September 2018.

RESULTS : Electricity accidents represent 3% of all admissions to our department. In our series, the accident population is an active population, young, the average age was 35 years (20-50 years) with a clear male predominance (95%). These were high-voltage accidents in 2/3 of the cases and domestic accidents in 1/3 of the cases. The extent of the burned area ranged from 5 to 100% and buses were 3rd degrees in 67% of cases. Cardiac involvement was dominated by minor arrhythmias (sinus tachycardia: 83%), however, seven cases of myocardial ischemia were noted. Renal involvement was reversible in 80% (rhabdomyolysis) after alkaline hyperhydration, and four patients required hemodialysis. Initial management of our patients included electrocardiographic monitoring, cardiac enzyme assays, electro-electrolytic resuscitation, nutrition, and local care. Anti-tetanus serotherapy was routinely administered as well as low-molecular-weight heparin anticoagulation with a curative dose to limit vascular thromboses in all our patients. Antibiotic therapy was undertaken in front of local and/or general signs of infection. The evolution was favorable in 70% of the cases with a prognosis closely related to the extent of the bus, to the existence of a cardiac attack and the precocity and quality of initial care. Twenty percent of patients had disabling sequelae.

CONCLUSION : The electric bus is a serious accident with high mortality and whose prognosis has been improved by resuscitation measures. it represents a medical and surgical emergency which must be known in all aspects to envisage a proper and rapid orientation and therapy. Unfortunately, the morbidity of work-related accidents related to high voltage current and responsible for functional disability remains major, and the cost of the care of these patients is particularly high, hence the importance of efforts aimed at prevention.

## 22

## EPIDEMIOLOGICAL FEATURES OF SNAKE/VIPER ENVENOMATION ADMITTED IN THE EMERGENCY DEPARTMENT : A DESCRIPTIVE STUDY OF 44 CASES

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INTRODUCTION : and viper envenomation are still a public health problem in several tropical and subtropical regions. The objective of this study was to describe the epidemiological features of this pathology and their management in the emergency department.

METHODS: this was a cross-sectional observational study realized in two years (2017- 2018). Were included all the patients admitted in the emergency department of the university hospital habib bourguiba sfax for snake/viper envenomation. All cases in which snake/viper envenomation was not certain were excluded.

RESULTS : We included 44 patients who were mainly admitted in 2017 (n=28). The sex-ratio M/W was 1.2, and the mean age was 42 years [6 à 82 years]. The majority of the patients were from the region of bir ali, in sfax. The median delay of presentation to the emergency department was two hours after the envenomation. A tourniquet was done by the relatives in 14 cases and scarifications were done in 12 cases.
The clinical examination on admission showed local edema in 16 cases and regional edema in 9 cases. A compromised respiratory status was noted in 9 patients and 9 patients were comatose. The grade of envenomation was 0 in 12 cases, 1 in 16 cases, 2 in 8 cases and 3 in the last 8 cases.
An ultrasound of the limbs was performed for 7 patients; it showed a superficial vein thrombosis in 2 cases and subcutaneous edema in 5 cases. In the emergency room, all the patients received paracetamol and tetanus prophylaxis was realized. Fluids were administered in 11 patients, catecholamines were administered in 3 patients. Mechanical ventilation was necessary in 14 cases, among whom 6 were intubated. Viper antivenom was administered in 9 patients. The discharge was possible for 38 patients; 6 patients were transferred to the intensive care unit and 4 patients died in the emergency room.

CONCLUSION : viper and snake envenomation are a serious accident. The mortality rates are still high. The education of the population is important to prevent these accidents and to shorten the delay of arrival to the emergency department.

## 23

## MEDICATIONS-INDUCED COMPLICATIONS IN ELDERLY PATIENTS: PREDICTORS OF UNPLANNED ADMISSION IN THE EMERGENCY DEPARTMENT.

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OBJECTIVES : To describe the prevalence of medications induced complications in elderly patients admitted to the emergency department (ED). The secondary objective was to determine the predictors of Iatrogeny in this population.

PATIENTS AND METHODS : Prospective study conducted over 2 months (July – August 2018) in the non-vital area of the ED in the university hospital habib Bourguiba sfax. All patients over 65 years old and presenting to the ED were included. We recorded all the clinical, biological and therapeutic data in the medical file. We also have analyzed all the usual patients' medications. we considered there was an Iatrogeny if the hospitalization was directly or indirectly secondary to a medication's side-effect or interaction. We analyzed the predictive factors of Iatrogeny in our sample.

RESULTS : We included 86 patients with a mean age of 79.9 years +/- 7.8. Our sample consisted of 42 women and 44 men. Most patients lived in their home (n = 83 or 96.5%), among whom 14% lived alone. The ISAR score was greater than 2 in 82.4% of cases. The ADL score was less than 4 in 42 patients. The median length of stay was 1.63 days [1 to 6 days]. Chronic renal failure was reported in 37.2% (n = 32). In 80.23% of cases, the patients had regular medications. The average number of treatments taken per patient was 4.47 +/- 2.33. The prescriber was a specialist doctor (72.9%) or a general practitioner (27.1%). This physician was in a public health facility at 70% and a free practice doctor in 30%. The antihypertensive drugs were the most common (n=57), antidiabetics (n=31) and diuretics (n=31). KVA was taken by 17 patients.

The hospitalization was directly or indirectly secondary to usual drug interactions or side effects in 34.9% (n=30). The most associated medications classes with Iatrogeny were CEI, KVA, beta-blockers, statins, and beta2 mimetic. The most common drug-induced complications were hydro-electrolyte disturbances (n=19), acute renal failure (n=13), A-V blocks (n=9), hemorrhage (n=9), and hypotension (n=7). We recorded 9 deaths in our sample. In univariate analysis the predictors of Iatrogeny were: female sex (p = 0.09), history of diabetes (p <0.001), dyslipidemia (p = 0.009), coronary artery disease (p = 0.007), high number of treatments (p=0.02), the number of antihypertensive drugs (p = 0.027).

CONCLUSION : Medications induced complications in elderly patients can be life-threatening. These complications are leading to preventable unplanned hospitalizations. Patients and also physicians' education is crucial to prevent them.

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## PREDICTIVE FACTORS OF MORTALITY IN PATIENTS ADMITTED TO THE EMERGENCY DEPARTMENT WITH VITAMIN K ANTAGONISTS OVERDOSE

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INTRODUCTION : Prescription of vitamin k antagonist(AVK) is very common actually, VKA overdose is frequently noticed in patients admitted to the emergency department (ED). The most common adverse reaction from this therapy is bleeding which had a life-threatening impact.
Our study aimed to identify predictive factors of mortality in patients admitted to the ED with VKA overdose.

METHODS : A prospective observational study for three years. We included adult patients admitted to the ED for VKA overdose ((International Normalized Ratio (INR) over the therapeutic range) and patients who experienced VKA overdose during their hospitalization in the ED. Collected data included demographics, indications of VKA, VKA dose, comorbidities, chief complaints, physical examination, lab data including INR measurements and treatment at the ED. Patients were followed for one year. The univariate and multivariate analyses were performed.

RESULTS : Inclusion of 141 patients. Mean age= 66 ±12 years. Sex-ratio=0,9. VKA indications n(%) : Atrial fibrillation 85(60), mechanical valve replacement 29(21), thrombosis 10(7). Asymptomatic patients 69% (n=97). Mean INR: 5,5 ±3,5. the INR was unmeasurable in 29 patients. Causes of overdose were n(%): lack of monitoring 132(93), wrong dose intake 2(1.5), drug interaction 2(1.5), recent initiation of VKA 4(3). Treatment n(%): VKA one day withdrawal 130(92), change in posology 138(98), vitamin K 48(34), PTCC 3(2). Follow-up was possible in 57 patients. Recurrence of VKA overdose was observed in 20 patients (35%) patients . Mortality rate was 21% (n=12). Multivariate analysis identified two independent factors as predictors of mortality at one year: age more than 69 years (adjusted OR 5.9 ; p=0.001 ; IC 95% [2.013-17.389]) and hemoglobin less than 10,85 (adjusted OR 2.53 ; p=0.016 ; IC 95% [1.192-5.392]).

CONCLUSION : Morbidity and mortality are very important in our population. the early identifications of predictive factors of mortality in those patients lead to improve our management and to improve the prognosis of those patients.

## 25

### ADULT INTUBATION IN THE EMERGENCY DEPARTMENT: DIFFICULTIES AND ADVERSE EVENT

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INTRODUCTION : Endotracheal intubation is a technique frequently performed in emergency department (ED), but it is associated with a high rate of immediate and severe life-threatening complications. Objective: To assess the problems associated with endotracheal intubation in the emergency department, and difficulties in terms of immediate complications.

METHODS : We conducted a prospective observational, monocentric study, involving adult endotracheal intubation over two years. Variables included demographic patient information, indications of intubation, methods, devices, and drugs used, number of attempts, intubation success or failure, operator characteristics, and intubation events.

RESULTS : Inclusion of 137 patients. Mean age = 52±21years. Sex ratio = 1.49. Indications for intubation n (%): neurologic signs 71(52), respiratory disorders 38(27), hemodynamic 35(25), toxic 22(16) and cardiac arrest 17(12). Emergency physicians managed all the intubations and most 97% were physician trainees. Rapid sequence intubation was the first method attempted in 91% of patients. Hypnomidate was used in 76%, succinylcholine in 76%, ketamine in 12% and propofol in 3% of cases. The evaluation of the number of attempts for intubation was performed in 88 patients (64%). It was performed in the first attempt at 47%, the second one in 12%, the third attempt in 3% and more than three attempts in 2% of cases. The most frequent complications (18%) were hypotension 12%, bradycardia 3%, esophageal intubation 1.5% and selective intubation 1.5%. There was no death case registered.

CONCLUSION : Emergency physicians predominantly using rapid sequence intubation, and successfully manage the majority of emergency department intubation. Hypnomidate is the most common induction agent. Succinylcholine is predominantly used as a selected neuromuscular blocking agent. Reported intubation-associated adverse events occur in 18%.

## 26

### CARDIAC ARREST AMONG PATIENTS WITH NO MEDICAL HISTORY: CLINICAL EPIDEMIOLOGICAL STUDY OF 58 CASES

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INTRODUCTION : Cardiac arrest is a public health issue. Its prognosis remains dark with a survival rate less than 5%, sometimes associated with neurological sequelae. The purpose of our project is to study the epidemiological and prognostic aspects of cardiac arrest among patients without medical history that were admitted to our department.

METHODS : This is a two-year (2017 and 2018) retrospective study about patients that presented cardiac arrest prior admission to the Intensive Care Unit of the emergency department at Habib Bourguiba University hospital-Sfax.We

excluded all patients with a medical history. We collected all the clinical data, therapeutic measures and the outcome.

RESULTS : We have collected 58 cases. The average age was 40 ± 22 years old. We have noted a male predominance (sex ratio = 2,8). Patients were from urban areas in 75% of cases. The means of transport to our department were SAMU04 team in 29% of cases, type B ambulance in 10% of cases, civil protection in 19 % of cases and on their own in 36% of cases. Cardiac arrest occurred at home in 42% of cases, at the hospital in 14% of cases and in the street in 30% of cases. A witness was present at the time of the arrest in 81% of cases and he was a rescuer in 32 % of cases. The average delay between the occurrence of the arrest and the admission to our department was 28 minutes with extremes between few seconds to 3 hours. SAMU04 team was contacted in 33% of the cases. Before admission to our service, a cardiac massage was initiated in 37% of cases and artificial ventilation was practiced in 25 % of cases. Therefore, cardiac arrest was medically managed before arrival to our department in 36% of cases and 12% of patients recovered before arrival.
The etiology was almost obvious in 43% of cases (25 patients) while in 40% of cases it remained unknown. A cardiac etiology was incriminated in 14 % of cases (acute coronary syndrome), CO intoxication in 3 % of cases (2 cases) and a traumatic cause in 26% of cases (4 cases). Furthermore, 3 patients (5%) died after drowning.
The average duration of cardiopulmonary resuscitation in our department was 26 ±13 minutes after which only 31% of patients recovered. Only 3 patients (5.6%) were transferred to the intensive care department with an average duration of hospitalization of 4 days. Two of them survived with moderate to severe sequelae. The average total duration of hospitalization of these patients was 1,87 days with extremes between 0 to 80 days.

CONCLUSION : The cardio-circulatory arrest is a frequent pathology with a very poor prognosis. That's why adequate pre-hospital care is necessary.

## 27

## TIME MANAGEMENT OF ACUTE ABDOMINAL PAIN IN THE EMERGENCY DEPARTMENT EXPERIENCE OF FARHAT HACHED EMERGENCY DEPARTMENT

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INTRODUCTION : Abdominal pain is a common reason for consultation in emergency departments. early management can in many cases determine the patient´s progress and prognosis. This study aimed to evaluate the different delays in the management of acute abdominal pain in our emergencies.

METHODS : This prospective observational study enrolled 200 patients who presented with acute abdominal pain in the ED of FARHAT Hached's hospital in Sousse.

RESULTS : The average time to triage was 15 minutes with extremes ranging from 2 to 53 minutes. In 65% of cases, this time does not exceed 15 minutes. The average time between registration and the first physical examination was35 minutes + - 42 with extremes ranging from 3 minutes to 6.5 hours.
In 60% of cases, the physical examination was carried out in the first 30 minutes. The average time to treatment was 50 minutes + -31 min with extremes ranging from 20 minutes to 3 hours. In 79% of cases, the treatment was done within 60 minutes. The average recovery time of additional examinations was 114 minutes + - 44 min for lab results; and 67 minutes for radiological examinations with extremes ranging from 20 minutes to 2.5 hours. The average time to confirm the final diagnosis was 80 minutes + - 66 min; extremes ranging from 8 minutes to 6.5 hours.This time was less than 60 minutes in 49.5% of cases. 21% of patients required hospitalization and the average time between referral and hospitalization was 102 minutes + -40 min with extremes ranging from 5 minutes to 8 hours and 20 minutes.

CONCLUSION : The management of acute abdominal pain remains a challenge in emergency departments. The Appropriate diagnostic evaluation and decision for or against hospitalization within appropriate delays are crucial for better outcomes. Establishing standardized protocols of management of acute abdominal pain can help shorten these delays.

## 28

## EVALUATION OF ACUTE PAIN IN THE INTENSIVE CARE UNIT: COMPARISON OF TWO PAIN ASSESSMENT SCALES: NUMERIC RATING SCALE FOR PAIN (NRS) AND VISUAL ANALOGUE SCALE (VAS)

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INTRODUCTION : Traumatic pain is a major public health problem. Its management necessarily requires its evaluation and monitoring throughout the treatment.

OBJECTIVE : Comparison of two scales of pain assessment: Visual Analogue Scale (VAS) Numeric Rating Scale (NRS).
Methods: This is a prospective observational study of trauma patients admitted to the intensive care unit of Emergency department Habib Bourguiba Sfax. Data collection was spread over 05 months.

RESULTS : The study included a total of 150 cases. At admission, the average value of the visual analogic scale is 60.5. The value of the NRS is 6.2. The study of the correlation between the two scales at the time of admission to the intensive care unit shows a strong correlation ($p < 0.01$, Pearson coefficient: $r = 0.943$). At H4, the correlation between the two scales is still strong with ($p < 0.01$, Pearson coefficient: $r = 0.835$). At H12, the average value of the visual analog scale is 20.9 and that of the NRS is 2.7.

DISCUSSION : A good evaluation of the pain allows good management of the patient, and is particularly necessary to propose a therapy adapted to the intensity of the pain. The simplest and most commonly used system is the numerical scale (NRS) which consists of asking the patient to note his pain from 0 to 10. The VAS, with a slightly more complicated system, consists of presenting a graduated ruler and ask the patient to position a slider, the position on the left being the absence of pain and the position on the right an unbearable pain. On the practitioner side, the slider is graduated from 0 to 10 cm, however, the designated value is given in mm, so 10 mm is a slight accommodation and 100 mm is unbearable pain. According to our study, NRS and VAS are reliable and powerful measurement scales. The comparison of pain self-assessment scales demonstrates consistent and highly reproducible measurements. The correlation coefficients are quite satisfactory both at admission and after treatment. The choice between the different scales depends on the speaker, his preferences and especially his skills.

CONCLUSION : Evaluation and treatment of traumatic pain is a cornerstone in the management of traumatic patients. Our study has shown that scales of self-evaluation have a strong correlation, but this evaluation remains limited by the lack of training of the nursing staff as well as the lack of communication which remains at the origin of the various failures.

## 29

## EVALUATION OF THE SATISFACTION OF THE ROLE OF PSYCHOLOGISTS IN THE EMERGENCY DEPARTMENT: A SURVEY OF 52 PARTICIPANTS

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INTRODUCTION : The role of the psychologist in the emergency department has the first specificity to exercise its mission, as well as the team, depending on the quantitative and qualitative aspects of the incoming. Indeed, in addition to the qualitative aspect of its method, its activity varies and adjusts to the number of patients and even to the caregivers.

METHODS : We asked all the paramedics of the emergency department and SAMU 04 of Sfax to participate in the survey. We used a questionnaire composed of 17 questions. In the first part of the study, we asked about the intervention time of psychologists and their working conditions, and in the second part, the degree of satisfaction of the health care staff toward the tasks of psychologists and to patients. The answers to these questions were closed. Only one question was open-ended.

RESULTS : The participation rate was 74% (52/70). The caregivers who agreed to participate in the survey were mostly paramedics (52%). The psychologist intervenes mainly in the management of psychiatric emergencies within our service (98%). The needs and the requests for intervention are brought to the knowledge of the psychologist by the doctors in 56% of the cases and by the patients themselves in 23%

of the cases. More than 40% of the participants reported that the psychologist's attendance time was insufficient to meet the needs, and in 44% of the participants said that the psychologist is very easily accessible at the time of his work. The relationship between the psychologist and the caregiver team was considered good. The participants considered that the psychologist is a co-worker in 44% of the cases and that he is well integrated into the team (89%). According to the participants, the psychologist adds a very important value in the care of the patients (86.5%).

CONCLUSION : The psychologist designs develop and implement preventive and curative actions through an approach that takes into account the psychic life of individuals and groups to promote the autonomy of people, hence its presence in the hospital teams and especially in the emergency department is essential

## 30

## AN OBSERVATIONAL STUDY OF THE CHARACTERISTICS AND LONG-TERM OUTCOME OF PATIENTS ADMITTED TO THE EMERGENCY DEPARTMENT FOR ACUTE HEART FAILURE

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Emergency department fattouma bourguib monastir

INTRODUCTION : Heart Failure (HF) is a major public health problem that affects an estimated 26 million people worldwide with considerable economic impact. The prevalence of AHF estimates the range between 1 and 12% in the general population. An aging population and improved survival from cardiovascular diseases are expected to further increase AHF prevalence. Despite significant advances in diagnosis and therapy over the past 20years, AHF patients still have a poor long-term prognosis given the high mortality rate and the enormous cost of the frequent CHF-related hospitalizations. However, epidemiological data for AHF remain very limited in Tunisia.

THE OBJECTIVE OF THE WORK : This study aimed to clarify the characteristics of patients admitted to the emergency department of Monastir for Acute Heart Failure (AHF) and to assess their mortality and hospitalization rates at one year.

METHODS : A prospective observational study carried out in the emergency department of Fattouma Bourguiba University Hospital of Monastir over a period from June 2009 to August 2016. From the GREAT international database, 950 patients over 18 years old were admitted to the ED with a final diagnosis of AHF. All patients were followed for up to one year after their admission by phone calls to record re-hospitalizations and / or deaths.

RESULTS : Mean (SD) age was 69 (± 11.4) years, with a sex ratio of 1.08. 55% of patients are classified, as «de Novo HF. Chronic Heart failure was most commonly due to Ischemic heart disease (47%). Hypertension is the most common comorbidity (63.3% of patients). Among patients with chronic heart failure, Most patients were treated with renin-angiotensin system blockers but not beta-blockers. The combination of beta-blockers with angiotensin-converting enzyme inhibitors (ACEI)/angiotensin receptor antagonists (ARBs) ± mineralocorticoid receptor antagonist, is prescribed in only 12% of patients. Only 17% of CHF patients with a reduced ejection fraction receive this association. For 47% of patients, echocardiography showed an altered ejection fraction (<45%). The etiology of cardiac decompensation is dominated by infection (22%) ACS (21%) and rhythm disorders (17%). The most prescribed therapies are noninvasive ventilation (77% of patients), diuretics (69%) and nitrates (50.6%). Half of the patients were hospitalized exclusively in the emergency department with an average length of stay of 2.8 days. The 30-day mortality is 11.8% with a rehospitalization rate of 14.5%. Within one year, mortality reached 33.1% with a rehospitalization rate of 31.8%. At one year, 58.2% of the population is either dead and/or re-hospitalized.

CONCLUSION : Our study has highlighted a problem of follow-up of recommendations for the management of heart failure in general. Management of cardiac decompensation could be improved by using standardized protocols in the emergency department and planning follow-up.

## 31

### ACCURACY OF THE COLLAPSIBILITY INDEX (IC) OF THE INFERIOR VENA CAVA (IVC) IN THE DIAGNOSIS OF HEART FAILURE DURING DECOMPENSATED CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

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INTRODUCTION : Acute heart failure is common and underestimated in patients with COPD consulting emergencies for acute dyspnea.

AIM OF THE STUDY : To evaluate the accuracy of the Collapsibility Index (CI) to identify heart failure in COPD patients presenting to the emergency department for acute dyspnea.

METHODS : A prospective study conducted over a period of 4 years from 2014 to 2018 including COPD patients consulting the emergency department of Fattouma Bourguiba University hospital with acute non-traumatic dyspnea. Mechanically ventilated patients with recent abdominal surgery or portal hypertension were excluded. Echocardiography of the IVC was performed on admission in all patients and IC was calculated using the following formula: (ØVCImax - ØVCImin) / ØVCImax; where ØVCImax: maximum diameter of the VCI at rest, and ØVCImin: minimum diameter of the IVC at rest

RESULTS : We included 740 patients; mean age was 67 ± 12 years, sex ratio (m / f)=1.31; 53.6% of patients had hypertension; 45% diabetes and 35% had chronic heart failure. 28% of patients had COPD. The discriminating power of IC was evaluated by the area under the ROC curve which was 0.62

CONCLUSION : IC is not a reliable way to identify heart failure in COPD patients who are admitted to the emergency department with acute dyspnea.

## 32

### PREDICTORS OF CORONARY ARTERY DISEASE IN PATIENTS WITH LEFT BRANCH BLOCK ADMITTED TO THE EMERGENCY DEPARTMENT FOR SUSPICION OF ACUTE CORONARY SYNDROMES

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OBJECTIVE : To determine predictors of coronary artery disease, confirmed by coronary angiography, in patients with chest pain suggestive of an acute coronary syndrome (ACS) and left branch block (BBG).

METHODS : This is a retrospective study conducted over a period of 3 years in 78 patients who were admitted to ED for chest pain with left branch block at the ECG and who underwent coronary angiography. Patients are divided into 2 groups: a group with coronary artery disease (Coro +), and a group without coronary artery disease (no Coro +). Both groups were compared in terms of cardiovascular risk factors to determine the factors associated with the presence of coronary lesions.

RESULTS : We included 78 patients in the study. The mean age is 64.9 years. Of the patients included, 42 (53.8%) had a coronary disease with 63.5% single-vessel lesions, 23% two-vessel lesions, and 7.6% three-vessel lesions. The table summarizes the distribution of cardiovascular risk factors in both groups.

| | Coro+ Group | non Coro+ group | p |
|---|---|---|---|
| Diabetes, n(%) | 68 | 46 | <0.05 |
| Smoking, n(%) | 69.2 | 36.3 | <0.05 |
| Left Ejection fraction, n(%) | 46 | 52 | <0.05 |
| hypertension, n(%) | 66.5 | 63.8 | NS |

CONCLUSION : Diabetes, smoking and impaired ejection fraction are factors associated with coronary artery disease in ED patients with chest pain suggestive of ACS and left branch block (BBG).

## 33

## LUNG ULTRASOUND ACCURACY IN THE DIAGNOSIS OF HEART FAILURE IN DECOMPENSATED CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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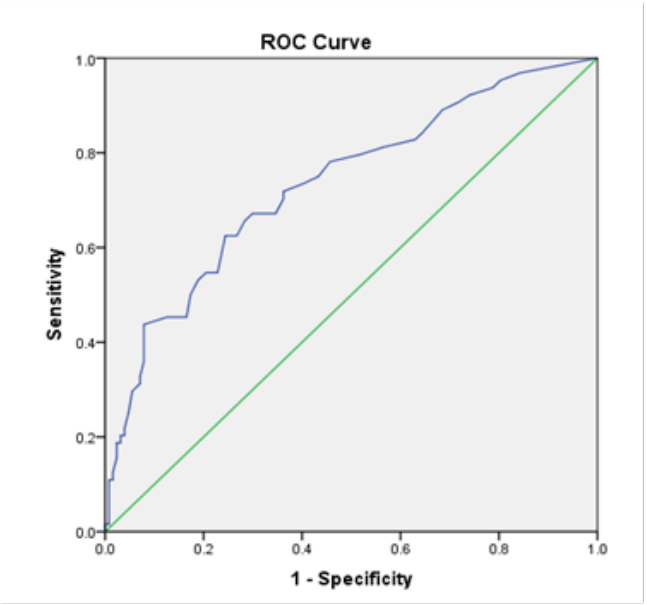
INTRODUCTION : Decompensated chronic obstructive pulmonary diseases (COPD) is a frequent clinical emergency and a leading cause of hospital admissions. The emergency physician must early identify the cardiac origin of an exacerbation of COPD to guide the therapeutic management because the delayed or misdiagnosed heart etiology can worsen the prognosis. However, diagnosing heart failure is often a challenge for ED physicians due to its non-specific and usually subtle physical presentation. Considering the importance of early and accurate diagnosis, it is important to have an easy, inexpensive, non-invasive, reliable and reproducible method for diagnosis of heart failure.

AIM OF THE STUDY : The purpose of our study is to evaluate the accuracy of lung ultrasound (LUS) performed by emergency medicine residents in the diagnosis of AHF in patients admitted to the emergency department with decompensated COPD.

METHODS : This prospective observational study was conducted in the Emergency Department of Fattouma Bourguiba Hospital University from January 2016 to December 2018. We included in our study 196 patients with the diagnosis of decompensated COPD. The diagnosis of AHF was based on the clinical exam findings, echocardiographic data including left ventricular ejection fraction (LVEF), and baseline BNP values. The opinion of two experts and possibly a third one was required to confirm the diagnosis of AHF. Lung ultrasonography was performed by emergency medicine residents. Ultrasound lung comets (ULC) score, defined by the sum of the B lines found in both lungs, was calculated. This score is suggestive of heart failure when it is equal to or greater than 15.

RESULTS : The cardiac origin of dyspnea was retained in 64 patients (32.8%) of the study population. The mean age was 69 ± 10 years, sex ratio (m / f) was 3.08. The discriminating power of ULC score was high with an area under the ROC curve of 0.73 with 80% sensitivity and 48% specificity.




CONCLUSION : Lung ultrasound seems to be a reliable diagnostic tool in decompensated COPD with acute heart failure.

## 34

## LONG-TERM PROGNOSIS OF PATIENTS WITH ACUTE EXACERBATION OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE (AECOPD) ADMITTED TO MONASTIR EMERGENCY DEPARTMENT (ED)

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INTRODUCTION : Acute exacerbation in chronic obstructive pulmonary diseases (AECOPD) is a frequent clinical emergency and a leading cause of hospital admissions. AECOPD remains of ominous prognosis, especially if requiring hospitalization. We aimed to identify the prognostic factors of death and readmission after exacerbation of COPD.

MEHTODS : This prospective observational study was conducted in the Emergency Department of Fattouma Bourguiba Hospital University from January 2013 to December 2017. All patients admitted to the ED with a diagnosis of exacerbation of COPD according to Anthonisen criteria. Relevant demographical, clinical, and biological parameters were obtained. Electrocardiogram, chest X-ray, and echocardiogram results were collected. All patients were followed for up to one year after their admission to record all-cause mortality and or rehospitalization at one year after discharge.

RESULTS : A total of 354 patients were admitted with AECOPD, with male predominance (90.8%). 60.7% of patients are over 65 years of age, 16.1% have diabetes and 10.2% have a history of cardiovascular disease. Non-invasive ventilation was required in 15.2% of patients. The readmission and death rates at 1 year are shown in Figure 1. Prognostic factors are shown in the table below.

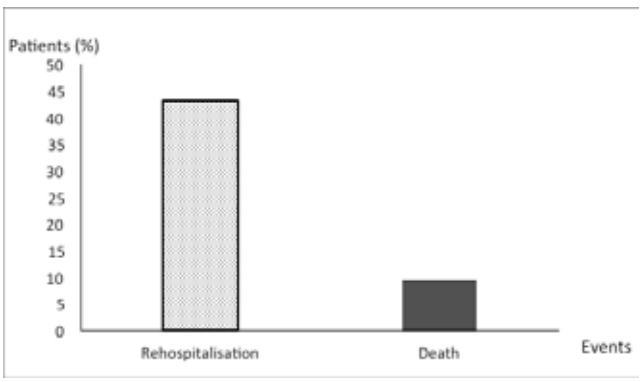


**Figure 1. Death and rehospitalization rates at one year.**

Prognostic factors are shown in the table below:

| | *rehospitalisation* | *Death* |
|---|---|---|
| | *p* | *p* |
| **Age >65 years** | **0.029** | NS |
| **Male gender** | **0.040** | NS |
| **Hypertension** | **0.039** | **0.030** |
| **Altered mental status** | NS | **0.003** |
| **Ph<7.35** | **0.03** | NS |
| **Pneumonia** | NS | **0.05** |
| **NIV requirement** | NS | **0.002** |
| **Mechanical ventilation** | NS | **0.009** |

CONCLUSION : Demographical factors, such as age, male gender and comorbidities, notably hypertension, are strong predictors of new admission. Altered mental status, NIV and mechanical ventilation at admission appear to be the most prognostic clinical parameter. A validating score, however, still required to enable the identification of patients at higher risk of death or readmission.

## 35

## INTERPRETATION OF THE ECG AND DIAGNOSIS: EMERGENCY PHYSICIAN VS CARDIOLOGIST.

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INTRODUCTION : An electrocardiogram (ECG) is a medical test that detects cardiac abnormalities by measuring the electrical activity generated by the heart as it contracts. Its realization is easy but its interpretation which is more complex requires rigor and regular practice.
The purpose of our work is to find out if there is a difference in the interpretation of ECG by an emergency physician or a cardiologist

METHODS : This is a prospective study which was done at the hospital of Habib Bourguiba Sfax for 1 month. Patients who had an ECG were included. Patients which have an ECG devoided of electrical activity were excluded.

RESULTS : 50 patients were included. The median age was 60 years [22, 90]. 32% of patients were smokers. The history was predominated by diabetes noted in 38% of cases (n = 19) followed by arterial hypertension which was present in 34% of cases (n = 17). Previous history of rhythm disorders was found in 10% of patients. The reason of consultation was chest pain in 70% , heart palpitations in 16% , lipothymia and epigastric pain in 6% of cases. In clinical terms, hemodynamic distress was found in 4% of cases where blood pressure was <90 with sign of peripheral hypoperfusion. The patients didn't have any respiratory or neurologic distress. The doctors involved were 3rd Year emergency medicine residents in 40%, 4th year emergency medicine residents and public health doctors in 16%, 2ed year residents in 14%, first year residents in 8% and finally interns in 6% of cases. Diagnoses were similar between emergency physicians and cardiologists in 86% of cases. In 14% they were not the same. In 57.1% of them emergency physicians were thinking of acute coronary syndrome considered by cardiologists as an effort angina or a parietal pain.14.2% of patients were treated by emergency physicians as NSTEMI , whereas cardiologists consider them as STEMI. In 14.2% of

the cases the ECG was interpreted by emergency physicians as a mobitz 2 heart block, whereas it was only Sinus arrhythmias. In 14,2% of cases the emergency physician interpreted the ECG as a TSV or a BBG while it was a TV. In cases where diagnoses were similar, there were some differences in the interpretation of the ECG: the regularity or not of the rhythm in 2.3% of cases, the presence or absence of atrial activity in 6.9% of cases, the presence or absence of a relationship between atrial and ventricular activity in 7.14% of cases, prolongation or not of the PR interval in 12.1% of cases, the presence or absence of Repolarization abnormalities in 4.7 % of cases. Moreover no difference in the diagnosis of the territory of an acute coronary syndrome.

CONCLUSION : The ECG poses sometimes difficulties of interpretation which is necessary to the diagnosis, the therapy, but also the orientation of the patient.

## 36

## PULMONARY ULTRASOUND (PU) IN THE DIAGNOSIS OF ACUTE DYSPNEA IN THE EMERGENCY DEPARTMENT: NURSE VERSUS DOCTOR

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INTRODUCTION : Acute dyspnea is a common reason for emergency departement consultation and the aetiological diagnosis is sometimes difficult for the emergency physician. Pulmonary ultrasonography is a simple, non-invasive procedure that can be performed at the patient's bedside, which may be useful for diagnosing heart failure.

OBJECTIVE : To evaluate the concordance of results of a PU, performed by a paramedical and a physicianwho received botha trainingon this subject, of a patient consulting for acute dyspnea.

METHODS : Prospective observational study including all patients, aged over 18 years, admitted to the emergency department for acute dyspnea between April and November 2018. The demographic characteristics of patients were collected, a PU was performed by a doctor anda nurse in all patients. The evaluation of the reproductibility of PU is based on two criteria: the pulmonary congestion score and the ultrasound diagnosis of dyspnea.

RÉSULTATS : During this period, 90 patients were included. The average age was 68 +/- 11 years old. The sex ratio was 1.8. Cohen Kappa's cohesive assessment of pulmonary congestion score was excellent with a Kappa coefficient of 0.88 and 0.84 for ultrasound diagnosis.

CONCLUSION : This study showed that PU performed by a paramedical staff and a physician has a reproductibility in the ultrasound diagnosis of dyspnea.

## 37

## EVALUATION OF THE EFFECTIVENESS OF HERBAL SUPPLEMENT IN PREVENTING POST-TRAUMATIC STRESS: A RANDOMIZED DOUBLE BLIND CONTROLLED STUDY

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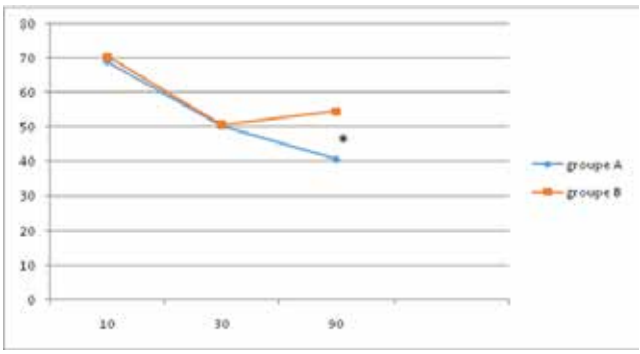
INTRODUCTION : Psycho-traumatic disorders are a disabling condition whose epidemiological data vary according to the country but also the populations studied and the measuring instruments used. The estimated prevalence of posttraumatic stress disorder (PTSD) appeared to be increasing in recent years, and this appears to be due, among other things, to the improvement of the standardized evaluation procedure.

METHODS : This is a double-blind, placebo-controlled, single-center, randomized and controlled clinical trial conducted in the Sahloul Emergency Department over a period from March 2018 to June 2018. We included patients who had been exposed to a traumatic event that could cause an acute PTSD (accident or aggression that causes intense fear, helplessness or horror) and a PDI (Peri-traumatic Distress Inventory) score and / or PDEQ (Traumatic Trauma Dissociation Experiment Questionnaire - Evaluative Form)> 15 and / or Immediate Stress Questionnaire (L. Crocq, D. Cremniter and J-M Coq)> 50 calculated between Day1 and Day3 after the traumatic event. The follow-up of the patient is carried out on the tenth day, 1 and 3 months after the randomization via a telephone consultation whose main objective is to evaluate according to the post-traumatic stress disorder checklist scale-version CAPS-5 (CAPS-5 scale).
RESULTS : We included 200 patients who were admitted to the emergency department for a traumatic event, 100 patients

in each group. There were no differences in the mean age, sex and the ISS between the study's groups. According to the PCLS-5 instructions 85 patients (2.35%) of all the population study represented PTSD: 61.2% in the placebo group versus 38.8% in the Aleozen group with a significant p. The 50% decrease in the total rate of PCLS-5 was revealed in 51% of patients in the Aleozen group versus 29% in the Placebo group




CONCLUSION : The early administration of herbal supplement prevent the occurrence of PTSD in patients with post-traumatic stress disorder.

## 38

## ROLE OF TELEMEDICINE IN ADHERENCE TO TREATMENTS PRESCRIBED IN THE EMERGENCY DEPARTEMENT

***A.Bouhoula; L. Boukadida; C. Marzougui; H. Yaakoubi; H. Ben Salah; A. Zorgati: R. Boukef***

Emergency Department CHU Sahloul. Tunisia

INTRODUCTION : Compliance with the prescribed treatments will lead to a significant decrease in expenses thanks to the decrease in the reconsultation rate in emergencies. Telemedicine is a component of telehealth. According to the Public Health Code it is «a form of remote medical practice using information and communication technologies. Thanks to telemedicine we can ensure better adherence to treatments.

OBJECTIVES : This study aimed to evaluate the impact of telemedicine on the adherence of patients to antalgic treatments prescribed in emergency departement and to note the main causes of non-adherence.

MATERIALS AND METHODS : This is a retrospective study including patients visiting the emergency departement for benign trauma for which they have or have not received emergency care (suture, plaster, splint, reduction, syndactyly) and received analgesic treatement at discharge. Patient evaluation was carried out through phone calls and SMS. Our sample = 500 patients divided into 2 groups (1st: standard and 2nd: patients receive an SMS each day). The evaluation was performed on the second and 7th day through a phone call.

RESULTS : The mean age of the population was 38 +/- 14 years with a male predominance in both groups (first sex ratio 91/58, second sex ratio 84/62). A remarkable improvement in adherence to treatement was observed by comparing the percentage of drug intake which was 32.88 % at day 2 and 93 % at day 7 in the standard group, 39.04% at day 2 and 78% at day 7 in the adherence group. It has been noted that the most common cause of change in treatment was the appearance of side effects and the most common cause of non-adherence was forgetting.

CONCLUSION : We concluded that telemedicine does not significantly improve adherence to treatment in the emergency departement.

## 39

## PROGNOSIS OF STROKE AND SOCIAL SECURITY : IS THERE A RELATIONSHIP?

***A. Baccari ; H. Yaakoubi; L. Boukadida ; M. talbi; H. Ben Salah; A. Zorgati; R. Boukef***

Emergency department University Hospital Sahloul

INTRODUCTION : Stroke is the third leading cause of death, and the leading cause of disability. After the acute phase of a stroke, multidisciplinary follow-up is essential, this follow-up is provided by a treating physician in collaboration with other health professionals: neurologist, physical rehabilitation physician, physiotherapist, and speech therapist. This represents a considerable cost and a burden for the patient and the state as well.
This study aims to assess the prognosis of stroke according to the type of social coverage of the patient.

MATERIAL AND METHODS : A retrospective study was conducted on patients treated by the Sahloul emergency team

for stroke. The study was done between 2017 and June 2018. Data was collected from the local STROKE registry. The follow-up was done at 1 month and disability was assessed through the modified Rankin score.

RESULTS : A total of 281 patients were included. 102 patients in the insured group (CNSS and CNRPS), 89 in the full fee group and 90 patients in the indigent group.
The mean age was 66.6 years old. The sex ratio was 56.2. In our population 50.7% of patients were diabetic and 57.7% were hypertensive.
The 1-month follow-up had noted a good prognosis (Rankin score of 0-2) among 8.3% of the cases in the insured group, 2.3% in the full fee group and 2% in the indigent group, with no significant difference between the three groups (p = 0.478). The one-month mortality rate was 31.3% in the insured group and 6.3% in the indigent group with a significant difference (p = 0.04).

CONCLUSION : Several factors seem to interfere in influencing the prognosis of stroke other than the type of social coverage, including socio-economic, intellectual level and accessibility to healthcare.

## 40

## CORRELATION BETWEEN INITIAL BLOOD GLUCOSE LEVEL AND MACE OCCURRENCE IN ACUTE CORONARY SYNDROMES WITHOUT ST SEGMENT ELEVATION (NSTEMI) IN EMERGENCY DEPARTEMENT

***A. Baccari ; H. Yaakoubi; L. Boukadida ; M. talbi; H. Ben Salah; A. Zorgati; R. Boukef***

Emergency Department CHU Sahloul. Tunisia

INTRODUCTION : Coronary heart disease is the leading cause of morbidity and mortality in the world. The objective of this work is to identify the prognostic value of baseline blood glucose at 1 month, 6month, and 1year in patients admitted to emergency department for acute coronary syndrome without ST segment elevation.

MATERIAL AND METHOD : Prospective study conducted in the Emergency Department between 2014 and 2017, including patients admitted for NSTEMI. Patients were classified into 2 groups according to the blood glucose level at admission: Group 1 (n = 298) : blood glucose = <1.8 g / l and group 2 (n = 202): blood glucose> = 1.8 g / l. Follow-up at 1 month, 6 months and 1 year has been done.

RESULT : 500 cases of NSTEMI were collected. Mean age = 64.3 years, 69% were men, 50.7% were diabetic, 57.7% were hypertensive. All patients were treated with Aspégic, Heparin and Plavix. The overall MACE rate at 1 month and 6 months was less for the group with blood glucose <1.8 g / l without significant difference (p = 0.3). The overall 1-year MACE rate was 23% for group 1 and 32.8% for group 2 with a statistically significant difference (p = 0.02)

CONCLUSION : In our series the blood level of glucose in patients admitted for NSTEMI appears as a prognostic factor at 1 year so a control of glycemia is highly recommended.

## 41

## INCIDENCE STUDY ON ACUTE MYOCARDIAL INFARCTION IN PATIENTS PRESENTING WITH ST-SEGMENT ELEVATION (STEMI) IN EMERGENCIES (INSYNCO-ST+ STUDY)

***F. Boukadida; L. Boukadida; Amel baccari; H. Yaakoubi; H. Ben Salah; A. Zorgati : R. Boukef***

Emergency Department CHU Sahloul. Tunisia

INTRODUCTION : ST segment elevation myocardial infarction (STEMI) is a common and potentially life-threatening condition encountered in emergency departments. The management of STEMI in our country poses increasing problems of efficiency in the public sector and it is different from international guidelines.
Therefore an assessment of our national situation is necessary. The objectives of our study were to determine the incidence of new cases of STEMI consulting emergency room and to specify the nature of treatment to relieve obstructions (primary angioplasty or thrombolysis) used in emergencies.

PATIENTS AND METHODS : A multicentric descriptive analytical study was conducted over a period of 2 months from October 17, 2018 to December 17, 2018, including all patients over 18 years of age consulting emergency departments of university hospitals or regional of Tunisia and who were diagnosed with an STEMI.
Demographic and clinical data, therapeutic management and

complications were recorded on a collection form and analyzed using SPSS 22.0 software.

RESULTS : A total of 455 patients consulting 23 emergencies in Tunisia for STEMI were included during the study period. The majority of the population was men with a sex ratio of 3.84.
41 % of patients were thrombolysed, 64% successfully and 24 % of cases underwent primary angioplasty. The rest of the patients had optimal medical treatment.
Thirty-five patients left the public hospital for medical care in a private clinic. Only 23% of the cases had a diagnostic coronary angiography in the month following the diagnosis of STEMI.
The length of stay of patients at the hospital was 8 +/- 7 days. Hospital mortality was estimated at 4.6% and mortality at 30 days at 13.6%.

CONCLUSION : The management of Acute Myocardial Infarction in patients presenting with ST-segment elevation (STEMI) in Tunisia still favors treatment with intravenous thrombolysis. Many patients still do not benefit from any curative treatment.

## 42

## SEPSIS IN EMERGENCY DEPARTEMENT: DOES THE DELAY OF ANTIBIOTICS ADMINISTRATION INFLUENCE MORTALITY ?

***K. Zaydi; H. Yaakoubi; F. Nawel; L. Boukadida; A. Bouhoula ; A. Zorgati; R. Boukef***

Emergency Department CHU Sahloul. Tunisia

INTRODUCTION : Rapid management of sepsis along with an early administration, within the first hour, of antibiotics seem essential for improving patients outcome.

OBJECTIVE : To evaluate the impact of time to antibiotic administration on survival among patients with sepsis in the emergency departement.

PATIENTS AND METHODS : Prospective observational study including patients admitted for Sepsis in Emergency departement of Sahloul. Patients characteristics are noted from the cards of the local register ReSSUS. Patients follow-up is ensured by a phone call made after one month.

RESULTS : 170 patients diagnosed with sepsis were included in our study with an average age of 65 ± 16 and a sex ratio (H/F) of 0.52.
Mortality rate was 10% during the hospitalization and 12% after one month. The majority of our patients received antibiotic therapy after 1H with a rate of 76%. The average time to antibiotic therapy in all patients was 207 mn ± 190
The average time in the dead patients was 151mn ± 129 compared to the survivors = 204mn ± 192 with a p = 0.785

| | | ATB delay | | | Total |
|---|---|---|---|---|---|
| | | <1hour | 1-3 hours | >3hours | |
| DESTINATION | BACK TO HOME | 20 | 31 | 42 | 93 |
| | DIED | 4 | 9 | 4 | 17 |
| | TRANSFER TO ANOTHER SERVICE | 18 | 26 | 16 | 60 |
| Total | | 42 | 66 | 62 | 170 |

P=0.122

| At one month | ANTBdelai | | | Total |
|---|---|---|---|---|
| | <1 hour | 1-3 hours | >3 hours | |
| STILL ALIVE | 38 | 57 | 56 | 150 |
| DIED | 5 | 9 | 6 | 20 |
| TOTAL | 43 | 66 | 62 | 170 |

CONCLUSION : The time to administration of antibiotics, among septic patients, always exceeds the recommended time. No statistically significant difference was found in our population given the size of the sample.

## 43

## IS ULTRASOUND PULMONARY CONGESTION SCORE (UPC) A PROGNOSIS FACTOR IN DECOMPENSATED HEART FAILURE?

***A. Boukadida; L. Boukadida ; H. Yaakoubi; M. Kacemi; H. Ben Salah; A.Zorgati ; R.Boukef***

Emergency Department CHU Sahloul. Tunisia

INTRODUCTION : Pulmonary ultrasonography is a simple, non-invasive procedure that can be performed at the patient's bedside. It may be useful for diagnosing heart failure.
In this study, we evaluated the prognostic value of UPC score in patients admitted to the emergency department for acute dyspnea.

MATERIALS AND METHODS : observational prospective study including all patients over 18 years old admitted to the emergency department for heart failure between April and December 2018. At admission we practised a pulmonary

ultrasound for all patients and the UPC score was calculated by the sum of the B-lines observed in the 4 quadrants (antero-superior, antero-inferior, latero-superior, latero-inferior) in both lungs. The diagnosis of heart failure was retained on a clinical basis, chest x-ray, BNP and ultrasound. The length of stay in emergency departement was calculated and follow-up at one month was done.

RESULTS : During this period, 90 patients were included. The average age was 68 + - 13 years, the sex ratio is 1.11. The average CPE score was 16.7 +/- 13. The average length of stay was 74 hours. There was no significant correlation between UPC score, length of stay and death at 1 month.

CONCLUSION : According to this study the UPC score could not be a good prognostic criterion for patients admitted to the emergency department for decompensated heart failure, a study on a larger sample seems necessary.

## 44

## PROGNOSTIC VALUE OF THE NEUTROPHIL / LYMPHOCYTE RATIO IN STROKE DISABILITY ASSESSMENT

***R. Jaballah; L. Boukadida; A. Boukadida; H. Yacoubi; H. Ben Salah; A. Zorgati; R. Boukef***

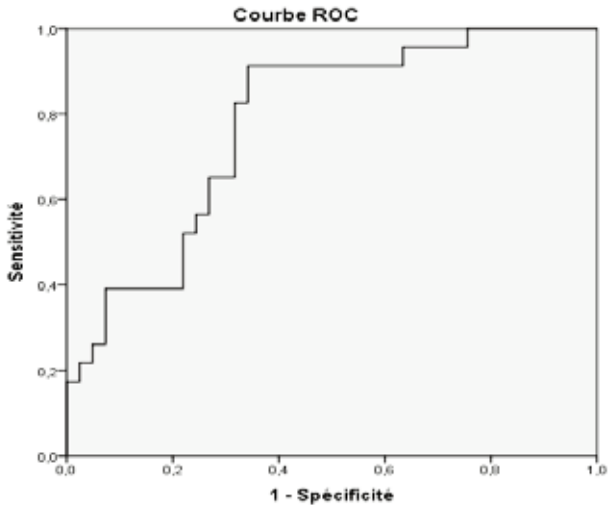
Emergency Department CHU Sahloul. Tunisia

INTRODUCTION : Stroke is a major public health problem. It is the second leading cause of death of cardiovascular diseases but also of dementia and depression in the elderly. The study of prognostic factors is interesting in order to organize the management of these patients and predict their outcome whether an intravenous thrombolysis has been performed or not.

OBJECTIVE : The objective of our study was to evaluate the prognosis of the stroke alerted to be thrombolysed patients at one year according to the neutrophil -lymphocyte ratio.

METHODS : It is a retrospective study aimed at the management of patients admitted to the emergency department for a stoke and alerted for possible thrombolysis. Data was collected from medical record. Follow-up was done at 1 year. The prognosis is considered good if the mRankin score at a 1 year was between 0 to 2 and was considered poor for a mRankin score from 3 to 6.

RESULTS : We included 124 patients. The mean age of the study population was 69 ± 11 years old. A female predominance was noticed with a Sex ratio (H / F) 42/82. It was possible to thrombolyze 64 patients. The difference in the ratio of neutrophils to lymphocytes between the two groups: G1 good prognosis at one year and the group G2 poor prognosis at 1 year was significant when considering the average of this ratio is (2.9 ± 2.15 VS 7.2 ± 7.6; = 0.001); with an area under the curve of 0.779




CONCLUSION : We concluded that a low ratio (neutrophils lymphocyte ratio) is an indicator of good prognosis in relation to disability at 1 year.

## 45

## SHOCK INDEX AND EARLY DETECTION OF SEVERE SEPSIS IN THE EMERGENCY DEPARTMENT

***M.Talbi; H.Yaakoubi; A.baccari; L.boukadida; H. Ben Salah; A.Zorgati; R.boukef***

Emergency Department CHU Sahloul. Tunisia

INTRODUCTION : Sepsis is a common pathology whose incidence has doubled during the last decade. It is burdened with significant mortality. Cause for which it is essential to quickly recognize patients whose evolution can be unpredictable. The q SOFA score is used for early detection of sepsis in emergency departement.

OBJECTIVE : The purpose of this study was to evaluate the value of the shock index (SI), defined as heart rate / systolic

blood pressure, in predicting the variation of lactatemia as an objective indicator of disease severity and mortality.

MATERIAL AND METHOD : This is a retrospective study of patients presenting to the emergency department for sepsis. The study was carried out between January 2015 and November 2018. The collection of the epidemio-clinical, biological, therapeutic and evolutionary characteristics of patients was made from our register. Follow-up was done at 1 month.

RESULT : We included 332 patients. The average age was 64.2 years old. 56% were men. 35.7% of patients were diabetic. The infectious origin was pulmonary in 35.8% of cases, urinary in 25% of cases and digestive in 3% of cases.
Hyperlactatemia above 2 mmol was observed in 55.6% of patients, in these patients the SI was calculated at 0.89 ± 0.3. Lactate levels of less than 2 were observed in 44.4% of patients, with SI calculated at 0.79 ± 0.2. A significant difference was noted between these two groups (p = 0.009). In patients with an SI at triage less than 0.7, the mortality rate at one month was 25%, whereas for those whose SI was above 0.7 the mortality rate at one month was 75%.

CONCLUSION : The SI appears to be a simple tool that can be used for better triage and to guide the management of patients with sepsis.

## 46

## A COMPARISON OF THE QUICK SOFA SCORE (Q SOFA) AND A LOCAL TRIAGE SCORE TO PREDICT MORTALITY

***R. Meddeb; L.Boukadida ; K.Mansouri; H. Yaakoubi; H. Ben Salah; A.Zorgati ; R.Boukef***

Emergency Department CHU Sahloul. Tunisia

INTRODUCTION : The new 2016 definitions of sepsis suggest using the quick SOFA score (q SOFA) for stratification of risk of patients with sepsis. The objective of this study was to compare this score to our local score of triage to predict mortality.

METHOD : This is a retrospective cohort study based on data from a sepsis registry from emergency departement of sahloul
A score consisting mainly of 8 variables (age, pulse, arterial pressure, temperature, respiratory rate, oxygen saturation, Glasgow score and pain scale). We calculated retrospectively qSOFA, our triage score for all patients admitted to our center with the diagnosis of sepsis.

RESULTS : 268 patients were included in the study. The mean age was 63.6 ± 16.8 years. The sex ratio was 1.3 (56.7% of patients were men). 42.5% are diabetic and 45.9% are hypertensive.
Overall hospital mortality was 7.5%. Based on our results, we showed that q SOFA's performance in predicting mortality was lower than our triage score. The area under curve of our local score was 0.745 vs. 0.664 for q SOFA. Our triage score was more sensitive and specific in predicting the mortality of these patients compared to the qSOFA score.

CONCLUSION : In conclusion, we found that our triage score was greater than SOFA in predicting mortality. Additional studies are needed to re-evaluate the qSOFA score.

# ABOUT THE JOURNAL

Tunisian journal of medicine (TJEM) is a national multi-disciplinary peer-reviewed journal, open access and constantly update online journal which publishes meta-analysis, systematic reviews, original articles, case reports; brief reports on clinical and laboratory observations, photograph/radiograph and ECG of the month covering all medical specialties.

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Material published early on website but not yet published in print

Narang M, Puri AS, Sachdeva S, Singh J, Kumar A, Saran RK. Celiac Disease and H. pylori infection in children: Is there any association? J Gastroenterol Hepatol. 2016;Nov 15 (Epub ahead of print).

**Chapter in a book:**

Aggarwal A, Narang M. Acute stroke in children. In: Gupte S (ed). Recent Advances in Pediatrics.15th ed. Jaypee Brothers: New Delhi; 2004. pp.145-53.

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# *Note*