Pediatric Chilaiditi Syndrome: A Case Report

Ahmed Ben Ayed[1], Hèla Ben Jmaà[2], Mohamed Rebei[3], Rim Karray[4], Malek Abbes[3], Ayman Ben Ayed[5], Zied Chaari[3], Abdessalem Hentati[3]

1. ***Department of cardiovascular and thoracic surgery***
2. ***Cardiovascular Surgery Department, Habib Bourguiba University Hospital, University of Sfax, Tunisia***
3. ***Thoracic Surgery Department, Habib Bourguiba University Hospital, University of Sfax, Tunisia***
4. ***Emergency medicine department Habib Bourguiba University Hospital, University of Sfax, Tunisia***
5. ***Surgery Department, Tataouine University Hospital, University of Sfax, Tunisia***

Corresponding author: Hèla Ben Jmaà; Cardiovascular Surgery Department, Habib Bourguiba University Hospital, University of Sfax, Tunisia; email: benjemaa_hela@medecinesfax.org

Abstract

Chilaiditi syndrome, rare in children, is characterized by the interposition of the colon between the liver and the diaphragm.

We report the case of a 14-year-old teenager, followed for intellectual disability, admitted to the emergency room for respiratory discomfort and vomiting without occlusive syndrome. The chest X-ray showed the right colonic angle in the chest, suggesting a strangulated diaphragmatic hernia. The thoraco-abdominal CT scan corrected the diagnosis by objectifying Chilaiditi syndrome. The course was favorable under conservative treatment (left lateral decubitus).

The objective of this case report is to highlight the importance of discussing this diagnosis to avoid unnecessary exploratory surgery.

Key words: Chilaiditi syndrome, children, management

Introduction

The architecture of the human abdomen is based on a delicate balance between ligament attachments, visceral volumes, and compartmental pressures. When this balance is disrupted, atypical anatomical transpositions can occur, causing profound diagnostic challenges. One of the most enigmatic abnormalities is the hepato-diaphragmatic interposition of the intestine, first documented in 1865 by Cantini. It was then formally characterized in 1910 by the Greek radiologist Demetrius Chilaiditi (1).

By studying patients with free intra-abdominal air on X-ray, he demonstrated that this clarity was not due to visceral perforation, but to the abnormal positioning of the intestine (most often the colon) between the upper surface of the liver and the lower edge of the right hemidiaphragm.

In contemporary clinical practice, a rigorous semantic distinction is maintained between two related but distinct entities: the "Chilaiditi sign" and the "Chilaiditi syndrome".

The sign strictly refers to the fortuitous and asymptomatic radiological discovery of this colonic interposition, a variant that most often remains silent throughout the patient's life. Chilaiditi syndrome refers to the situation where this anatomical alteration is accompanied by clinical symptoms (2).

Case report

A 14-year-old teenager, who was being treated for mental retardation, consulted the emergency room. He was admitted to our department for sudden respiratory discomfort, associated with bilious nausea and vomiting. On clinical examination, the patient was hemodynamically stable and apyretic. The abdomen was supple, though slightly distended. Palpation of the right hypochondrium was sensitive. Percussion revealed a localized tympanism with a disappearance of physiological hepatic dullness. There was no occlusive syndrome or signs of peritoneal irritation. The standard laboratory work-up did not show an inflammatory syndrome.

A chest X-ray was performed. It objectified an elevation of the right diaphragmatic dome associated with a voluminous airy clarity [Figure 1].

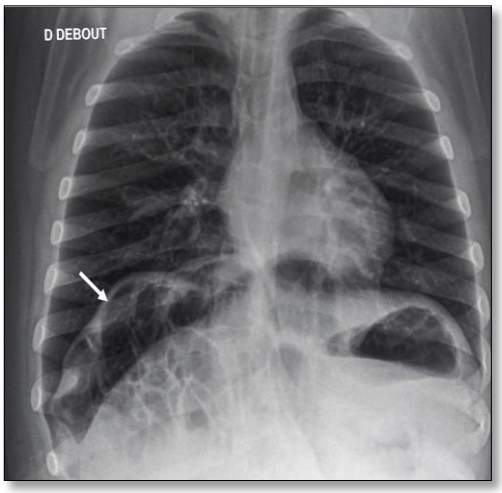

Figure 1: Standard chest X-ray showing digestive contents in the base of the right thoracic hemifield (arrow).

This clarity, interposed between the liver and the diaphragm, presented clear colonic haustrations, without abnormality of the overlying pulmonary parenchyma. This radiological appearance immediately led to the suspicion of a diaphragmatic congenital anomaly (such as Morgagni's or Bochdalek's hernia) complicated by strangulation.

Faced with this suspicion of surgical emergency, a thoraco-abdominal CT scan was requested. During the imaging attempt, the patient was very agitated. In the absence of an anesthesia team immediately available to carry out the sedation examination, strict clinical monitoring was instituted for the next day. This temporizing decision was intended to avoid hasty exploratory surgery in the face of an otherwise stable patient.

The CT imaging could finally be performed under general anesthesia. Analysis of the sections in [Figure 2] made it possible to correct the diagnosis.

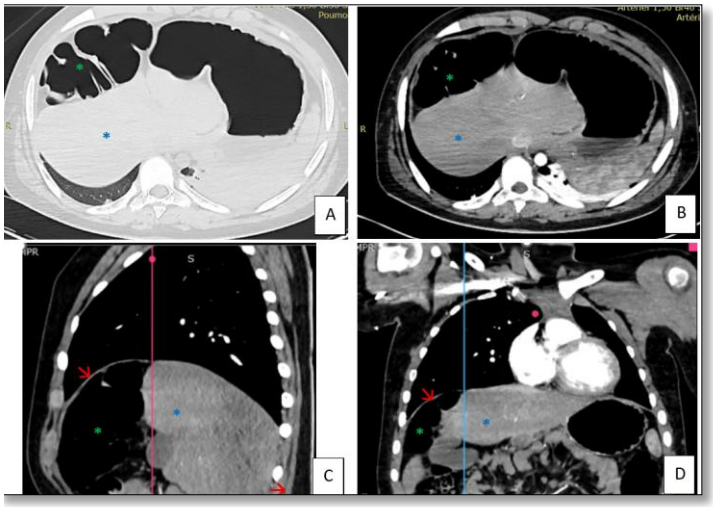

Figure 2: CT scan of Chilaiditi syndrome in this patient: A. Axial section in parenchymal window, B. Axial section in mediastinal window, C. Sagittal section, D. Frontal section

*(→ : Right diaphragmatic cupola, * : liver, * : Right colonic angle)*

The CT scan revealed an interposition of the right colonic angle between the anterior superior aspect of the liver and the diaphragmatic dome. The diaphragm was perfectly continuous and intact, formally excluding a hernia breach. The interposed colon showed no parietal thickening or signs of pneumatosis, ruling out any ischemic suffering. These elements confirmed Chilaiditi syndrome.

The treatment was exclusively conservative. Strict left lateral decubitus treatment was initiated to promote colonic decompression. The clinical course was quickly favorable. The respiratory discomfort improved, and the digestive tolerance returned to normal, allowing the patient to be discharged after 24 hours of observation.

Discussion

Chilaiditi syndrome is a clinical-radiological entity of extreme rarity in the pediatric population (3). Unlike geriatric patients, in whom the anomaly often results from degeneration and laxity of the suspensory ligaments of the liver and colon, interposition in children and adolescents is most often secondary to extreme stercoral or gas distension (4). The terrain of our patient, followed for mental retardation, is also a comorbidity that is classically a source of psychogenic aerophagia or chronic gastrointestinal dysmotility, mechanical factors pushing the colon into the subphrenic space (5).

Pathophysiology involves a loss or laxity of the normal suspensory mechanisms that keep the bowel in place. This allows the colon or the small bowel to slip into the potential space between the right lobe of the liver and the right hemidiaphragm. When the intestine becomes trapped, it can cause intermittent cramping, abdominal pain, nausea, vomiting, or constipation. In some pediatric cases, the upward displacement irritates the diaphragm, leading to respiratory symptoms like shortness of breath. The most common predisposing factors in children are aerophagia and constipation (6).

The main clinical risk of Chilaiditi syndrome lies in its radiological mimicry. The visualization of an airy clarity under the right hemicupola often triggers protocols for the management of surgical emergencies (4). In our observation, the radiological image initially suggested a complicated congenital diaphragmatic hernia. From an anatomical point of view, the difference is strict: in Chilaiditi syndrome, the colon is interposed under a perfectly continuous right hemi-diaphragm, whereas in a hernia, the colon passes through a muscular gap to sit in the thorax (7).

Ignorance of this diagnosis trap or misinterpretation of a simple X-ray can lead to unwarranted exploratory laparotomies or thoracotomies, exposing sometimes stable patients to heavy surgical and iatrogenic morbidity (8). To avoid this pitfall, the thoraco-abdominal CT scan is the reference examination. Its three-dimensional spatial resolution makes it possible to confirm the integrity of the diaphragm and to correct the diagnosis (9).

As soon as the diagnosis is confirmed and in the absence of complications such as volvulus or ischemia, which are extremely rare but possible, management should remain exclusively conservative (10). This medical treatment is based on bed rest, left lateral decubitus, colonic decompression, and hydration. These measures allowed for quick symptom resolution in our patient.

When conservative treatment fails, surgical treatment could be an option. Colopexy under general anesthesia prevents the colon from ascending again by attaching it to the abdominal wall (11).

Conclusion

Chilaiditi syndrome is a diagnostic trap, particularly in adolescents, where its rarity contrasts with the relative frequency of suspicions of complicated congenital diaphragmatic hernias. Our observation underlines a fundamental clinical attitude that must be adopted by emergency physicians: faced with a picture associating respiratory discomfort with an atypical hepato-diaphragmatic aeric image without an occlusive syndrome, it is imperative to evoke this benign interposition. Clinical delay, when permitted by the patient's hemodynamic stability, coupled with imaging in reference sections such as a thoraco-abdominal CT scan, is the only prudent approach. It makes it possible to establish the diagnosis with certainty, to establish a simple conservative treatment, and to avoid a deleterious rush towards unnecessary exploratory surgery.

References

1. Kumar A, Mehta D. Chilaiditi Syndrome. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2026. Available from: http://www.ncbi.nlm.nih.gov/books/NBK554565/ PubMed PMID: 32119452.

2. Vessal K, Borhanmanesh F. Hepatodiaphragmatic interposition of the intestine (Chilaiditi's syndrome). Clinical Radiology. 1976;27(1):113–6. doi:10.1016/S0009-9260(76)80031-1.

3. Adu Y, Nesiama EA, Siddiqui A, Prakash S, Obokhare I. Chilaiditi Syndrome: A Case Report, Literature Review, and Proposition of a Novel Management Staging System. Cureus 2023; 15(10): e46688. doi:10.7759/cureus.46688 PubMed PMID: 37942369; PubMed Central PMCID: PMC10629610.

4. Mistry KA, Bhoil R, Kumar N, Chopra R, Thapar N. Significance of Chilaiditi sign and Chilaiditi syndrome. Emerg Nurse. 2017;25(3):26–31. doi:10.7748/en.2017.e1682 PubMed PMID: 28617114.

5. Saha B, Verma A, Coelho-Prabhu N, Kelm ZS, Cabrera D. Chilaiditi Syndrome Masquerading as Acute Cholecystitis. ACG Case Rep J. 2024;11(7):e01448. doi:10.14309/crj.0000000000001448 PubMed PMID: 39035204; PubMed Central PMCID: PMC11259379.

6. Caicedo L, Wasuwanich P, Rivera A, Lopez MS, Karnsakul W. Chilaiditi syndrome in pediatric patients - Symptomatic hepatodiaphragmatic interposition of colon: A case report and review of literature. World J Clin Pediatr 2021; 10(3): 40-47.

7. Ramspott JP, Jäger T, Lechner M, Schredl P, Gabersek A, Mayer F, et al. A systematic review on diagnostics and surgical treatment of adult right-sided Bochdalek hernias and presentation of the current management pathway. Hernia. 2022;26(1):47–59. doi:10.1007/s10029-021-02445-1 PubMed PMID: 34216313; PubMed Central PMCID: PMC8881253.

8. Teoh S, Mimi O, Poonggothai S, Liew S, Kumar G. Pneumoperitoneum or Chilaiditi's sign. Malays Fam Physician. 2016;11(1):22–4. PubMed PMID: 28461845; PubMed Central PMCID: PMC5405329.

9. Moaven O, Hodin RA. Chilaiditi Syndrome. Gastroenterol Hepatol (N Y). 2012;8(4):276–8. PubMed PMID: 22723763; PubMed Central PMCID: PMC3380266.

10. Sawsan A. Omer, Wad-Medani, (2024). Chilaiditi Syndrome: A Comprehensive Review, J Clinical Case Studies and Review Reports. 1(2):8, DOI: CCSRR/RW/008.

11. Takahashi K, Ito H, Katsube T, Tsuboi A, Hashimoto M, Ota E, et al. Treatment of Chilaiditi syndrome using laparoscopic surgery. Asian J Endosc Surg. 2017;10(1):63-5.