



Case Report

Intestinal Obstruction in Chilaiditi Syndrome: Laparoscopic Approach of an Hepatophrenic Ileal Interposition

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Abstract

Chilaiditi syndrome is a rare condition defined by the presence of gastrointestinal symptoms associated to a radiological finding of segmental interposition of the large bowel between the liver and the diaphragm. Rarely identified as a cause of chronic abdominal pain, Chilaiditi syndrome presents a clinical significance as it can lead to a number of serious complications including intestinal obstruction, perforation, and ischemia [1]. In this report we described a case of Chilaiditi Syndrome due to hepatophrenic interposition of the ileal bowel complicated by an adhesive small bowel obstruction (ASBO). Mininvasive surgery allowed the diagnostic confirmation of a band adhesion entangling an intestinal loop and the treatment of the obstructive syndrome without complications with good outcomes in terms of reduced pain, quick post-operative recovery and short length of hospital stay.

Keywords: Chilaiditi's sign; Chilaiditi syndrome; Hepatophrenic adhesions; Hepatophrenic interposition; laparoscopy.

Introduction

Chilaiditi's sign, or the incidental radiographic finding of bowel positioned between the liver and the right diaphragm, was first documented in 1865[2]. This sign was named in 1910 when Demetrius Chilaiditi reported three cases of asymptomatic patients presenting intra-abdominal free air on routine abdominal or chest x-ray due to the interposition of the bowel between the liver and the right hemidiaphragm [2,3]. Chilaiditi sign is found incidentally in 0.025%–0.28% of chest and abdominal plain films [4] and 1.18%–2.4% of abdominal Computed Tomography (CT) scans with a

male predominance (male to female, 4:1) [1,5]. It is more common in the elderly population where the incidence is approximately 1%. [2]. This report describes a case of a 65 years old female with repeated abdominal pain and acute intestinal obstruction. Chilaiditi Syndrome was diagnosed through radiological finding of interposition of ileal bowel between liver and right diaphragm and treated by a laparoscopic approach.

Case Presentation

A 65-year-old female was admitted to the Emergency Department of the San Leonardo Hospital (Castellammare di Stabia, Napoli) in January 2023 for intermittent upper abdominal pain for more than ten days and inability to pass gas from three days. The symptoms were associated with abdominal distension, nausea and

vomiting. Past medical history was significant for hypertension, hypothyroidism and colonic diverticula; past surgical history for one caesarean section and hysterectomy. Patient denied alcohol and illicit drug use or drug allergies. Family history was noncontributory. At the time of clinical evaluation, vital signs were normal: temperature was 36.7°C, blood pressure 145/80 mmHg, pulse 89 beats/minute, respiratory rate 18 beats/minute and oxygen saturation 98% on room air.

Physical examination revealed rebound abdominal tenderness with muscle guarding and hypoactive bowel sounds.

Basic laboratory investigations were ordered. A basic metabolic panel showed that the electrolyte levels were within normal limits except for a low potassium (3.40 mmol/L). Complete blood count and kidney function tests were within normal limits.

Anteroposterior abdominal and chest X-ray showed an air collection under the right diaphragmatic dome (Figure 1). Abdominal contrast enhanced CT scan showed an ileal loop located between the diaphragm and liver corresponding to the subdiaphragmatic air collection detected by X-ray, with normal mural enhancement of the involved intestinal segment, several

distended jejunal loops with air-fluid levels and a fair amount of ascitic fluid in the pelvic excavation. An emergency surgery was indicated for suspected acute small bowel obstruction after failure of a conservative management with bowel decompression by a nasogastric tube placement and IV fluid hydration. (Figure 2).



Figure 1. Abdominal-chest X-ray: air collection under the diaphragm.

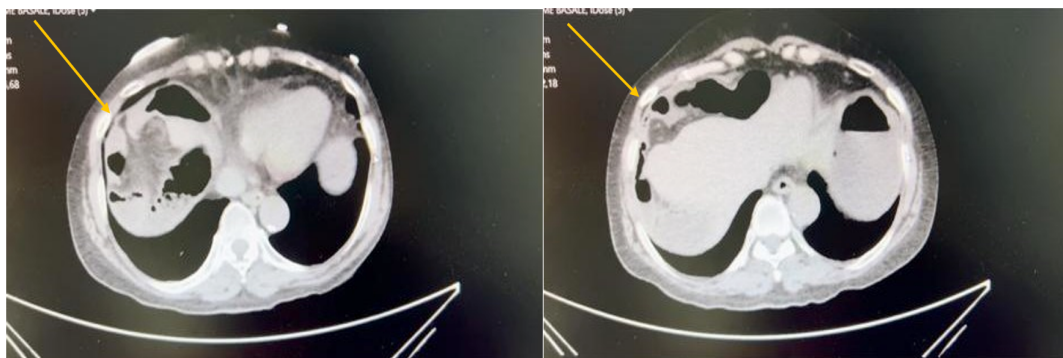


Figure 2. Abdominal CT scan: Ileal loop beneath the right diaphragmatic dome

Emergency surgery was performed with a laparoscopic approach. The patient was placed in the supine position with the lower limbs spread apart and the left arm abducted, with the first operator between patient's legs and second operator to his left. An 12-mm Hasson port was inserted through the periumbilical region using the open technique and pneumoperitoneum was established using dioxide insufflation. Two additional 5-mm trocars were positioned under laparoscopic observation through the right and left upper quadrants. Surgical exploration confirmed the presence of several distended bowel loops, a fair amount of ascitic fluid and a closed bowel loop incarcerated by a tick band of scar tissue. Section of the hepatofrenic tick band adhesion constricting the ileal loop was performed with resolution of the adhesive small bowel obstruction (ASBO). No sign of bowel injury were noted. Repositioning of bowel loop, aspiration of the ascitic fluid and drain pelvic placement completed the surgical operation (Figure 3). Laparoscopic procedure and postoperative period were uneventful. The drain was removed on the second post-operative day and the patient was discharged on the fourth post-operative day with no complications.

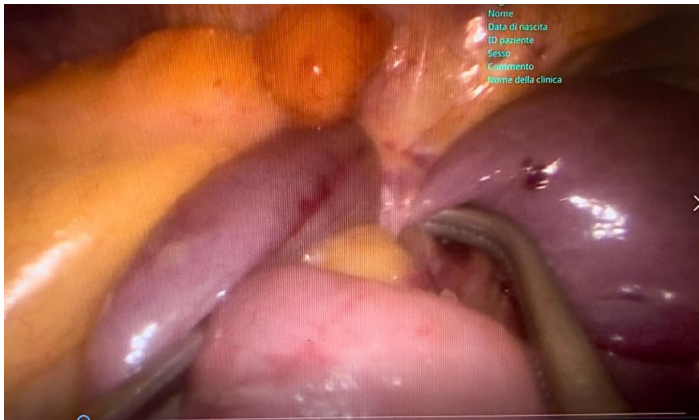


Figure 3. Entangled ileal bowel from hepatophrenic tick band adhesion.

Discussion

A first case of Chilaiditi syndrome due to ileal bowel interposition was described from a retrospective analysis of works since 1976, where four instances of Chilaiditi syndrome have been found (three males and one female). Interposition of the proximal transverse colon was found in three patients and the small intestine was involved in one patient. [6]. In Chilaiditi's syndrome, the hepatic flexure is the most common portion of the colon entangled between the diaphragm and the liver, the second most common being the ascending or transverse colon. Only a few cases of small intestine involvement have been reported (3%-5% of cases) [7].

The etiology can be either congenital or acquired. Congenital factors may be an elongated, redundant and hypermobile colon, laxity or absence of suspensory ligaments. Acquired causes may include a small liver due to atrophy in cirrhosis or hepatectomy, presence of ascites, substantial weight loss in obese patients, and an abnormally high diaphragm in conditions such as diaphragmatic muscular degeneration or phrenic nerve injury and, rarely, excessive aerophagia [8,9]. Other factors include enlargement of the lower thoracic cavity (chronic obstructive pulmonary disease), increased intra-abdominal pressure (obesity, multiple pregnancies and ascites), mental retardation and schizophrenia, which are also associated with anatomic abnormalities that result in Chilaiditi sign [10]. Intraperitoneal adhesion caused by previous surgery or widespread tumor local metastasis are also encountered [11]. In addition, psychotropic medication [12] and iatrogenic factors [13], such as endoscopic procedures, have been reported as causative factors.

A characteristic radiological marker of Chilaiditi sign is the observation of air below the diaphragm, with visible haustral folds or valvulae conniventes between the liver and the diaphragmatic surface. In addition, the location of the air is not changed by

altering the posture of the patient.

In patients presenting with Chilaiditi syndrome the most common symptoms are gastrointestinal such as abdominal pain, anorexia, nausea, vomiting and constipation followed, less frequently, by respiratory distress or cardiac angina [10].

Interventions are not required for asymptomatic patients with Chilaiditi sign and the treatment is usually conservative. Management of non complicated Chilaiditi syndrome in most cases is conservative.

The complications of Chilaiditi syndrome may include intestinal obstruction, volvulus and ischemia/perforation. In rare cases perforated subdiaphragmatic appendicitis may occur as a complication of Chilaiditi syndrome [14,15].

In cases with obstructive complications, the treatment is modulated according to Guidelines for treatment of adhesive small bowel obstruction [16]: non-operative management should be tried in absence of signs of peritonitis, strangulation or bowel ischemia using *nil per os*, bowel decompression by a naso-gastric tube or long intestinal tube and intravenous fluid. Water-soluble contrast studies are encouraged because have been shown to reduce the need of surgery as is attributed an active therapeutic role to the contrast.

In case of failure of initial conservative management and either the obstruction fails to resolve or there is evidence of bowel ischemia or other complications, emergency surgical intervention is indicated.

The potential benefits of a laparoscopic approach in the treatment of ASBO include less extensive adhesion formation, earlier post-operative recovery, reduced post-operative pain and short length of hospital stay. In an abdomen with very distended loops of bowel and multiple complex adhesions, the risk of severe complications such as enterotomies and delayed diagnosis of perforations could increase [17].

Regarding this issue, Farinella et al. [18] reported that predictor factors for a successful laparoscopic approach to ASBO with reduced complication rate are: ≤ 2 laparotomies, no previous median laparotomy and the presence of a single adhesive band.

In the case reported, the patient was affected by a Chilaiditi syndrome complicated by an intestinal obstruction which has required surgical management. The laparoscopic approach was used in view of the moderate distension of bowel loops and the poor extent of adhesions in the upper abdomen.

Minimally invasive surgery allowed the diagnostic confirmation of a band adhesion entangling a small bowel loop and the treatment of the obstructive syndrome without complications, with good outcomes in terms of reduced pain, quick post-operative recovery

and short duration of hospital stay.

Conclusions

Chilaiditi sign and Chilaiditi syndrome are rare entities and are therefore often misdiagnosed in clinical practice.

Conservative management is adequate in uncomplicated patients. In complicated cases by volvulus, obstruction and ischemia/perforation, emergency surgery is mandatory. In the case reported, the patient was affected by a Chilaiditi syndrome complicated by an adhesive small bowel obstruction (ASBO) which has required surgical management. The laparoscopic approach allowed the diagnostic confirmation of a band adhesion entangling a small bowel loop and the treatment of the obstructive syndrome without complications with good outcomes in terms of reduced pain, quick post-operative recovery and short length of hospital stay.

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