CASE REPORT
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Chilaiditi Syndrome: A Rare Surgical Condition

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ABSTRACT

Chilaiditi syndrome (CS) is a rare surgical condition where there is an interposition of the colon between the liver and the abdominal wall leading to clinical symptoms. Chilaiditi sign is an occasional radiologic finding where colonic interposition occurs between the diaphragm and the liver, but it is usually asymptomatic and discovered incidentally as pseudopneumoperitoneum. Here we report a rare case of CS. A 52 years old female patient was admitted in the department of surgery, North Bengal Medical College Hospital, Sirajganj, Bangladesh, with the complaints of abdominal pain, epigastric fullness, abdominal lump right to the umbilicus and weight loss. She was anxious but well oriented, mildly anemic and dehydrated. On abdominal examination, there is anill-defined, soft, cystic, mobile intra abdominal lump occupying right to the umbilicus. Upper border of liver dullness is obliterated but bowel sound was present. Abdominal ultrasound showed, a large hypoechoic mass measuring about 6x7 cm in size. Plain X-ray abdomen showed pseudo-pneumoperitoneum. CT scan showed interposition of transverse colon is in between right dome of the diaphragm and liver, thickening of gastric mucosa along the fundus and greater curvature. Upper G.I endoscopy and biopsy revealed chronic non specific ulcer. After adequate resuscitation, laparotomy was done. Biopsy was taken from peri-gastric lymph nodes following right hemi-colectomy and ileo-transverse anastomosis.

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INTRODUCTION

Chilaiditi syndrome (CS) is an uncommon disease where there is an interposition of the colon between the liver and the abdominal wall leading to clinical symptoms.[1] Predominantly affects older males and male: female ratio of 4:1.[2] It is a rare radiologic finding and usually asymptomatic which is discovered incidentally as pseudo-pneumoperitoneum. So, CS is the surgical condition in which a chilaiditi sign is accompanied by clinical symptoms and signs.

Demetrius chilaiditi (1883-1975) a Greek radiologist who described the radiographic findings in 1970 while working in Vienna, Austria. However, the first description of the interposition of colon between the liver and the right hemidiaphragm was published by Cantini in 1865.[3] Usually hepatic flexure of the colon interposed but portion of small intestine maybe implicated in few cases.[4] The incidence of CS is

0.025 to 0.28% and common in males with the median age of 60 years.[5]

Intestinal, hepatic, and or diaphragmatic etiologies contribute to the pathogenesis of chilaiditi sign and syndrome. It may be congenital or acquired. The congenital anatomic variations can include the absence, laxity, or elongation of the suspensory ligaments or the falciform ligament of the liver or congenital malpositions. The anatomic distortions can also result from functional disorders such as chronic constipation, cirrhosis, paralysis of the right diaphragm, chronic lung disease, multiple pregnancies, ascites and obesity.[5,6] Abdominal pain, constipation, anorexia, vomiting, chest pain and respiratory distress are common presentation which are ranging from chronic intermittent to acute severe. Intestinal obstruction, volvulus, intussusception, appendicitis and diverticulitis are common differential diagnosis. However, these intestinal disorders can also occur within the interposed colon. Though the CS isintermittent in nature relieved by conservative treatment sometimes may present with complications like volvulus of colon, caecal perforation and perforated subdiaphragmatic appendicitis. Additionally, CS has been associated with a variety of gastrointestinal malignancies involving the colon, rectum or stomach. The following criteria must be met for radiological diagnosis such as, the right hemidiaphragm must be adequately elevated above the liver by the intestine, the bowel must be distended by air to illustrate pseudo-pneumoperitoneum, and the superior margin of the liver must be depressed below the level of the left hemidiaphragm. The findings of normal plicae circulares or haustral markings of the colon under the diaphragm can rule out from pneumoperitoneum and subphrenic abscess. Moreover, changing the position of a patient with chilaiditi sign will not change the position of the radiolucency, unlike in a patient with free air. If a radiograph or ultrasound cannot clearly determine whether the sub-diaphragmatic air is free or intraluminal, a CT scan is recommended to establish an accurate diagnosis, assuming that the patient is clinically stable.[6,7]

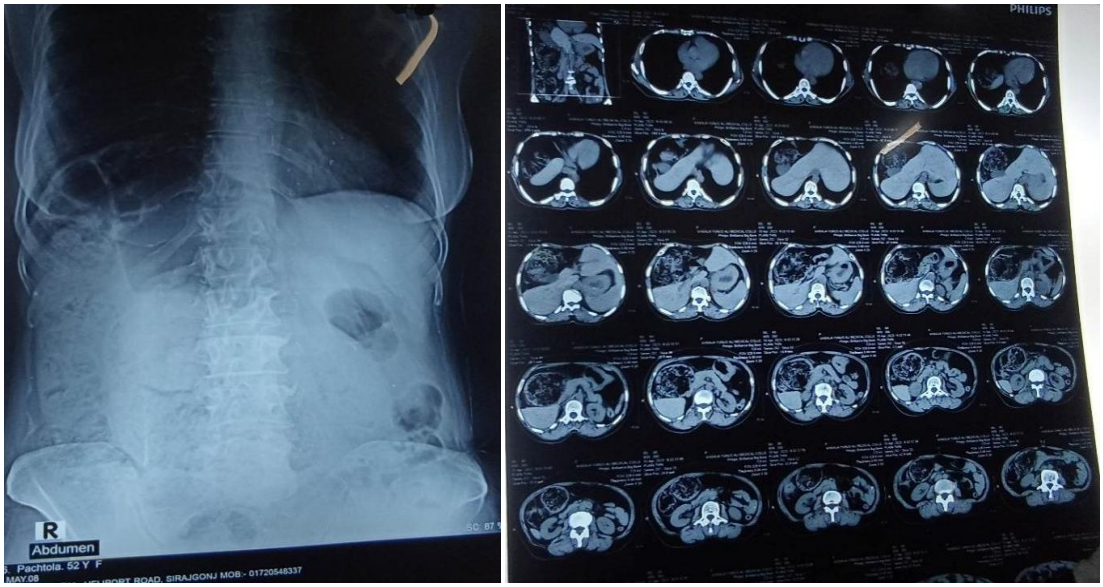
While it presents with distinct radiographic findings, the rarity of the disease, along with variations in clinical presentation often results in misdiagnosis or delayed diagnosis. Chilaiditi syndrome may lead to perforation due to progressive trapping of administered air in an actually angulated segment of bowel.[8, 9] There is more chance of perforation in this cases during liver biopsy, particularly percutaneous transhepatic procedures.[10]

We highlight the uncommon presentation of CS like abdominal lump, epigastric fullness and associated anomalies like long suspensory ligament of liver and mesocolon, interposed gall bladder between liver and diaphragm and associated diverticulum of transverse colon, perigastric lymphadenopathy.

The Case

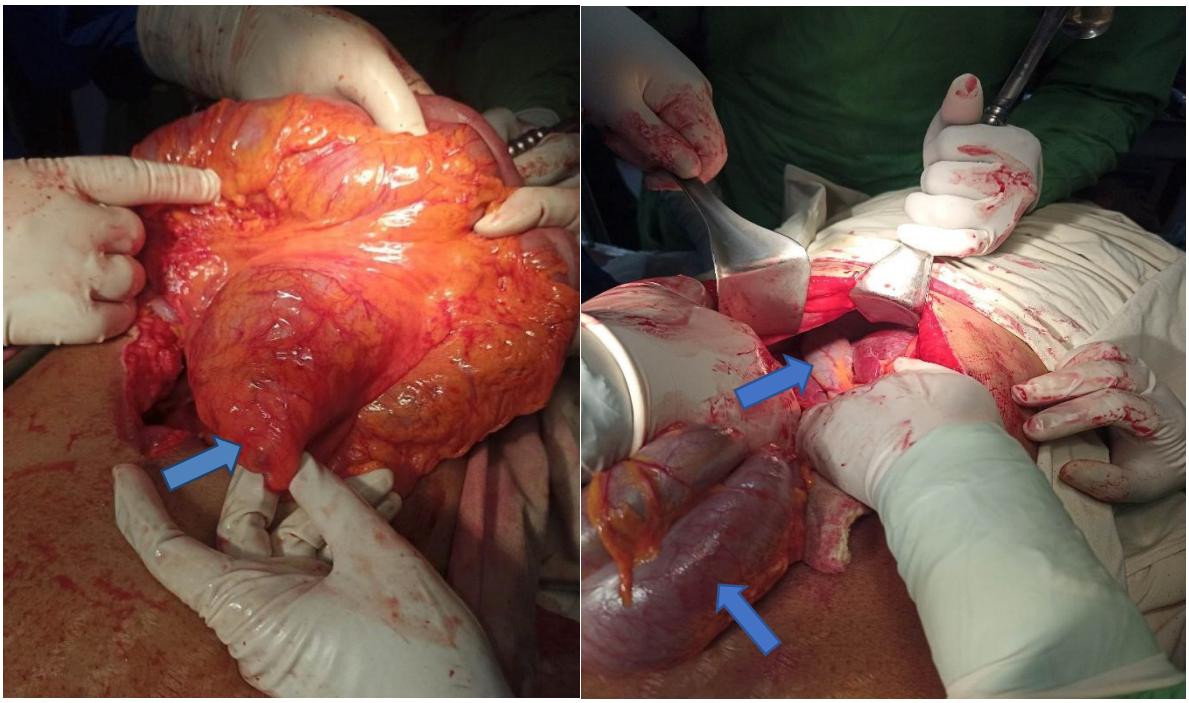
A 52 years old female patient was admitted in the department of surgery, North Bengal Medical College Hospital, Sirajganj, Bangladesh, on 08.05.2023 at 2.30 pm with the complaints of intermittent upper abdominal pain for five years, abdominal lump right to the umbilicus for three years, epigastric fullness after taking food and weight loss for six months. Initially pain and swelling was resolved spontaneously then recurs again but in the last one year lump was persistent and not resolved spontaneously. No history of fever, vomiting, haematemesis, melaena, chest pain, cough, haemoptysis and bone pain. Bowel and bladder habits are normal. No history of Hypertension, Diabetes mellitus and Bronchial asthma. On general physical examination, she was anxious but well oriented, had mild dehydration and anemia, but no jaundice or edema. Pulse rate- 76 bpm, blood pressure- 110/70 mm of Hg, respiratory rate- 18 breath/minute. On abdominal examination, localized distention of abdomen especially in umbilicus, right hypochondriac and right lumber region. There is an ill-defined, soft, cystic, mobile, intra-abdominal lump occupying right to the umbilicus but moves downwards with respiration. Upper border of liver dullness was obliterated and at 7th intercostal space at mid clavicular line but bowel sound present. Digital rectal examination reveals normal. Investigation showed Hb- 11.9 gm/dl, RBS-5.6 mmol/l, Serum creatinine-65.55 µmol/l and Ultrasonogram of whole abdomen showed- a large hypoechoic mass measuring about 6×7 cm in size in the abdominal cavity. Plain x-ray abdomen in erect posture showed right dome is elevated, interposition of bowel loop between right dome

and liver and upper border of liver depressed (Figure 1a). CT scan of abdomen showed, interposition of transverse colon is in between right dome of diaphragm and liver, thickening of gastric mucosa along the fundus and greater curvature (Figure 1b). Endoscopy of upper GIT showed on specific ulcer.



1 (a) **1 (b)**

Figure 1: (a) Plain X-ray abdomen showing chilaiditi sign (pseudo-pneumoperitoneum) (b) CT scan of abdomen showing interposition of colon between liver and right dome of diaphragm.



2 (a) **2 (b)**

Figure 2: (a) Diverticulum of transverse colon (b) Interposed gallbladder between liver and right dome of diaphragm and redundant colon with long mesocolon (arrow)

2 (c)

Figure 2: (c) Interposed colon between liver and right dome of diaphragm (arrow)

On the basis of patient's condition and investigation findings, surgical intervention was decided to manage this case. After conservative treatment, patient underwent laparotomy and assesses the peritoneal cavity. During initial exploration, it was noted that the hugely dilated, very redundant transverse colon along with mesocolon, suspensory ligament, hepatic flexure, ascending colon interposed between right hemidiaphragm and the liver. There is a large diverticulum arise from transverse colon which was clinically palpable like cystic lump, right lobe of liver is depressed and hypertrophied left lobe of liver. Another two incidental findings were found, one was gallbladder also interposed between the diaphragm and liver, second was indurated area in fundus, greater curvature, and lesser curvature of stomach and perigastric lymphadenopathy. But no ascites, no peritoneal seedling and no liver metastasis was found. After assessment, right hemicolectomy including diverticulum with ileo-transverse anastomosis and cholecystectomy was done. Then biopsy sample was taken from stomach for histopathological examination. Patient was recovered uneventfully and discharged on 7th postoperative day with no complications.

DISCUSSION

Chilaiditi syndrome (CS) is a rare surgical condition in which the colon is situated between the liver and right hemidiaphragm resulting in clinical symptoms. Its presentation differs individual to individual; many be symptomatic or asymptomatic. Asymptomatic cases are diagnosed incidentally whereas the symptomatic patients may present with abdominal pain, bloating, nausea, vomiting, and constipation.[11] Depending on the extent of colon involvement, symptoms might include difficulty in breathing and chest discomfort in more severe instances.[6] This disease can manifest itself with mild gastrointestinal symptoms for decades, but volvulus or perforations may developed in complicated cases.

This patient presented with intermittent upper abdominal pain due to incomplete or closed loop obstruction of interposed loop. Abdominal lump right to the umbilicus due to hugely enlarged

diverticulum which is the congenital anomaly of transverse colon. Epigastric fullness after taking food and weight loss were also complained. This features usually indicate underlying gastric malignancy. Incase of CS occasionally present with malignancy of colon, rectum and stomach. Initially pain and swelling was resolved spontaneously then recurs again but in the last one year lump was persistent and not resolved spontaneously probably due to release of obstruction and empty of diverticulum.

The condition is generally diagnosed by imaging, with CT scans being the preferred imaging modality.[5-7] The air below the diaphragm combined with visible haustra is the typical radiographic finding, which does not alter with patient's position. Other radiographic abnormalities include elevation of the right hemidiaphragm above the liver by the intestine and depression of the superior edge of the liver below the left hemidiaphragm.[5-7] An interposed segment of bowel can make it very difficult to perform colonoscopy due to the risk of progressive air entrapment in acutely angulated, interposed bowel, which could potentially lead to perforation. In this case, Utrasonogram of whole abdomen showed- a large hypoechoic mass measuring about 6×7 cm in the abdominal cavity, which was clinically palpable lump of underlying diverticulum of transverse colon. Plain x-ray abdomen in erect posture showed elevated right dome of the diaphragm, interposition of bowel loop between right dome and liver, pseudo-pneumoperitoneum due to haustra and plica circularis of transverse colon and depressed upper border of liver. CT scan of abdomen showed interposition of transverse colon is in between right dome of the diaphragm and liver, additional findings was thickening of gastric mucosa along fundus and greater curvature of stomach but Upper G.I endoscopy and biopsy revealed chronic nonspecific ulcer. No intervention is required for a symptomatic patient with chilaiditi sign.

Treatment for CS differs according on the severity of the symptoms. Asymptomatic patients do not require any treatment. Patients with minor or intermittent symptoms can frequently be treated conservatively at first, with colon rest, IV fluids, bowel decompression, enemas, and laxatives.[5,6] Bowel decompression documented by a follow up radiograph can confirm both the diagnosis of the condition and the success of the therapy. Surgical therapy is reserved for individuals whose symptoms do not improve with conservative care or when a complication, such as ischemia or perforation is suspected.[4]

In recent years, surgical intervention has been increasingly used in order to manage symptoms of chronic, intermittent abdominal pain. The appropriate surgical approach depends on the nature of the interposed segment of the colon. Cecopexy may be adequate to eliminate the possibility of recurrence in an uncomplicated caecal volvulus,[5] unless gangrene or perforation necessitates surgical resection. However, colonic resection is the best option for a volvulus of the transverse colon.[4] Attempts at colonoscopic reduction are not recommended due to a high frequency of gangrene in this type of volvulus. Initially she was resuscitated and treated conservatively by nothing by mouth, Nasogastric suction, Intravenous electrolytes containing fluid, broad spectrum antibiotic, analgesic and urinary catheterization to monitor urine output. After conservative treatment patient was not response. Then she underwent laparotomy and right hemicolectomy including diverticulum with ileo-transverse anastomosis and cholecystectomy was also done. Right hemicolectomy was preferred than the Cecopexy or segmental colectomy due to hugely dilated transverse colon and diverticulum. Cholecystectomy was done for the prevention of complication in future because gall bladder was in ectopic position. Then biopsy was taken from stomach for histopathological examination and unfortunately report was metastatic adenocarcinoma.

CONCLUSION

Usually chiladiti's syndrome (CS) associated with colon interposition but in this case, not only the colon but also associated with gall bladder, hugely dilated diverticulum and incidental metastatic adenocarcinoma. So, every clinician should keep in mind that, CS may be associated with various presentation due to multiple diseases. To avoid complications during minimally invasive procedures such as colonoscopy and liver biopsy, it is necessary to be aware of chiladiti's syndrome as well as chiladiti's sign.

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Conflicts of Interest: None.

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