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A siphon-like retrogastric transverse colon: A case report

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ABSTRACT

INTRODUCTION: Intestinal interposition is a term that describes rare anatomic variations where parts of the colon deviate from their normal intraabdominal position, attaching between two organs. Most patients with colonic interpositions are asymptomatic and diagnosed incidentally by computed tomography or ultrasound. Here we present a case of a symptomatic retrogastric colon, interposing kinked between stomach and pancreas.

PRESENTATION OF CASE: A 66-year old female patient presented with an eight-year history of intermittent spastic bowel movements, epigastralgia and nausea. Consecutively, the patient lost 12 kg. Physical examination was unremarkable and routine blood tests were within normal limits. Subsequently performed colonoscopy and cross-sectional imaging diagnosed a retrogastric colon. Finally, the patient underwent surgical treatment. The intraoperative findings were consistent with the computed tomography images and showed a kinked retrogastric protrusion of the transverse colon into the lesser sac, adhering to both, the posterior wall of the stomach, and the anterior surface of the pancreas. After adhesiolysis and mobilization, the transverse colon slipped back to the normal position within the abdominal cavity. The patient recovered well after surgery and was discharged on the sixth postoperative day. Six-month follow-up revealed cured bowel function, weight regain and no signs of recurrence.

DISCUSSION & CONCLUSION: These rare cases of intestinal interpositions are very often difficult to diagnose, as symptoms are misleading. In case of diagnosis adequate surgical treatment strategies should be considered.

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1. Introduction

The transverse colon is the longest part of the colon, crossing the abdominal cavity from the hepatic to the splenic flexure. Compared to the retroperitoneally-fixed ascending and descending colon, it is the most mobile part of the colon. Three major structures are involved in the fixation of the transverse colon: the transverse mesocolon surrounding the organ and running on the ventral length of the pancreas, thereby fixating the transverse colon to the posterior abdominal wall; the gastrocolic ligament connecting the greater curvature of the stomach and the transverse colon, continuing into the greater omentum; and the phrenicocolic ligament, acting as a suspensory ligament for the splenic flexure [1].

Congenital anatomic variations as well as spatial and/or pressure alterations within the abdominal cavity may cause variations in the location of the colon [2–4]. Current data describe various types of colonic interpositions (between the liver and diaphragm,

spleen and diaphragm, stomach and pancreas), which were categorized into Chilaiditi (hepato-diaphragmatic interposition) and non-Chilaiditi forms [5]. Nevertheless, patients with a retrogastric transverse colon are barely found in the literature [6]. To the best of our knowledge, we are the first to report on a case of a symptomatic retrogastric colon successfully treated with laparoscopic adhesiolysis. Considering the rarity of the case and the absence of comparable case reports, we attempt a detailed description of the case, including the diagnostic approach and the major features in the patient's long medical history, finally leading to successful surgical treatment. The present case is reported in line with the SCARE criteria [7].

2. Case report

A 66-year-old woman was referred by her general practitioner to a gastroenterologist due to an eight-year history of recurrent abdominal pain. The pain was aggravated typically several hours after meals, most frequent during the night at 4 a.m. followed by a slow relief after defecation with multiple bowel movements between 6 and 10 a.m. Initially, she was mistakenly treated for

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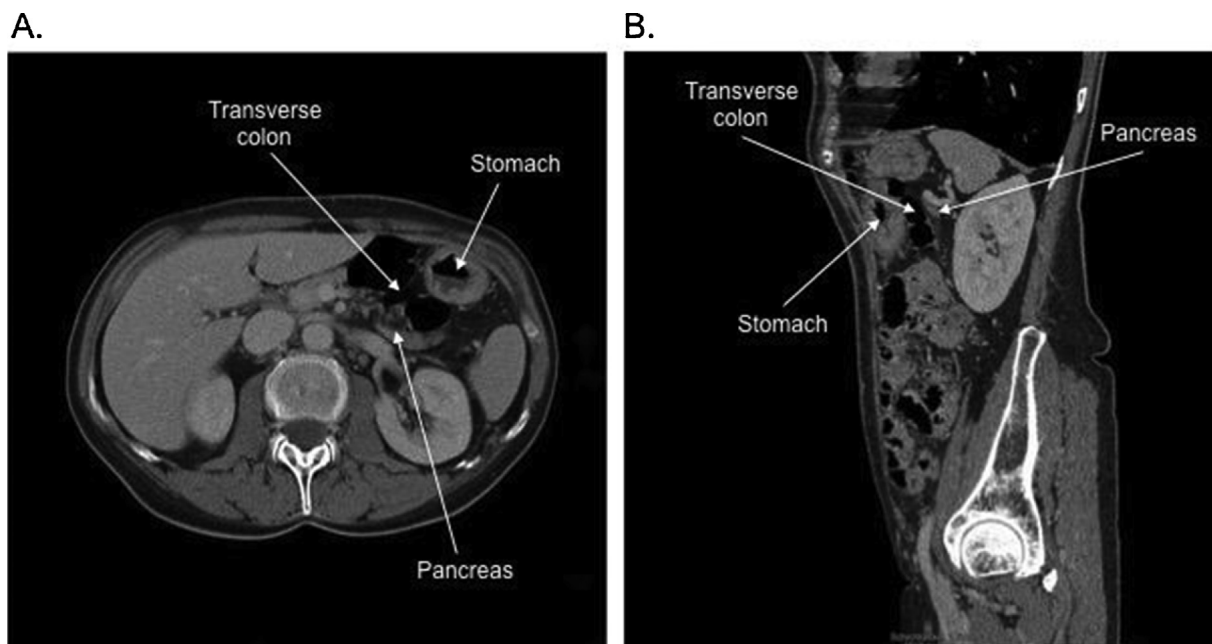


Fig. 1. Abdominal computed tomography, before surgery.

(A) Axial section showing the transverse colon within the lesser sac causing lateral displacement of the stomach.

(B) Sagittal section of the same Patient depicting the transverse colon, protruded into the lesser sac and adhering to both, the posterior wall of the stomach and the anterior wall of the pancreas.

irritable bowel syndrome (IBS) with analgetics and laxatives, with little improvement. Within six months before her visit, the patient's medical condition worsened. The patient reported unintentional weight loss of 12 kg over a period of 6 months with an increased intensity and frequency of convulsive abdominal pain.

During the initial transabdominal bowel sonography, parts of the transverse colon appeared positioned cranially to the stomach. An esophagogastroduodenoscopy revealed no pathologic findings, although during the subsequent colonoscopy the examiner could confirm the unusual epigastric position of the colonoscope's tip with diaphanoscopy while moving the instrument through the transverse colon. He referred the patient to our institution for further management.

On physical examination at the hospital, she was afebrile with a heart rate of 80–90 beats/min, a respiratory rate of 16–20 breaths/min, blood pressure of 129/83 mmHg and an oxygen saturation of 94% on room air. The abdomen was non-distended, mild to moderately tender over the epigastric region with normal bowel sounds present in all four quadrants without any findings suggestive of peritonitis, such as rigidity, rebound tenderness or Murphy's sign. The Electrocardiogram revealed a sinus rhythm. The patient had neither past surgical nor medical history.

Blood tests were within normal limits and revealed neither increased heart enzymes (creatinine kinase, Troponin T), leukocytosis, nor increased C-reactive protein or raised liver or pancreatic enzymes.

A subsequently-performed abdominal computed tomography (CT) scan revealed a kinked transverse colon positioned between stomach and pancreas, protruding into the lesser sac from caudally (Fig. 1).

The patient underwent laparoscopy using a 12 mm infraumbilical optical port, two 5 mm working ports in the right lumbar and epigastric region, and another 12 mm port in the left lumbar region. Initially, the greater omentum was mobilized from the transverse colon from the right to the left side to gain access to the bursa omentalis. Subsequently, the lesser omentum was dissected to enter the lesser sac. The transverse colon was tortuous. A segment of it was

kinked up and adherent to the pancreatic head/corpus at the posterior wall of the lesser sac and the dorsal wall of the stomach. After dissecting these adhesions and after extensive mobilization from the right to the left curvature, the transverse colon flipped back into its regular anatomic position in the peritoneal cavity.

The postoperative course was uneventful and proved to be without any complications. The patient tolerated full oral intake on postoperative day 1 and was discharged on day 6 asymptotically. At six-month follow-up, the patient did not show any suggestive signs or symptoms of recurrence or complications. She reported complete resolution of her abdominal pain, improved regularity of bowel movements and weight regain of more than 10 kg. A CT scan one year after surgery revealed a normal anatomical position of the transverse colon within the abdominal cavity. The lesser sac is free of any small or large intestine (Fig. 2)

3. Discussion

The term intestinal interposition describes anatomical variations in which parts of the intestine temporarily or permanently deviate from their anatomic intraabdominal position, interposing between two organs [8]. Despite the rarity of these events, they were already described over 100 years ago.

In 1899, Antoine Béclère was first to describe a hepatodiaphragmatic interposition [9]. Eleven years later, in 1910, the Greek radiologist Dimitrios Chilaidditi outlined his findings on three cases of a colonic interposition between the diaphragm and the liver [10]. In 1960, Poppel described a left-sided colonic interposition [11].

In 1993, Oldfield and Wilbur analyzed 9,400 CT scans and found 21 (0.2%) cases of a “retrogastric colon” located within the lesser sac. The transverse colon was found either between the stomach and pancreas (types I and II) or posterior to the stomach and spleen (type III). [12] These results were similar to a study of Bredolo et al. in 2012, who found 12 patients with a retrogastric colon in 4,338 abdominal CT scans (0.3%) [5].

The genesis of these anatomic variations seem to be multifactorial. Congenital as well as acquired etiologies of the intestine,

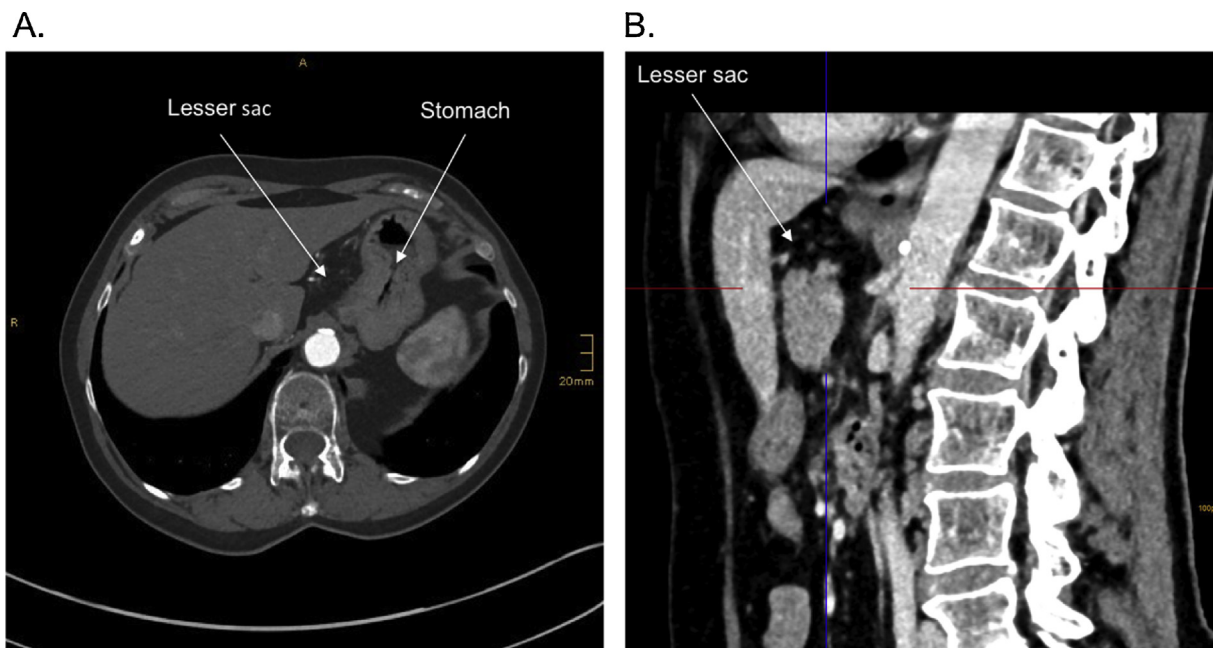


Fig. 2. Abdominal computed tomography, one year after surgery.

(A) Axial section showing the transverse colon in a normal intraabdominal position in front of the stomach.

(B) Sagittal section. Normal lesser sac without any herniated intestine.

liver, diaphragm and surrounding intraabdominal fat tissue may contribute to a deviating position of the colon [4,8,13].

Under physiologic conditions, the mesocolon as well as suspensory ligaments impede an interposition of the transverse colon. Nevertheless, variations in anatomy can lead to the translocation of the transverse colon between the stomach and pancreas. These anatomic variations may include congenital malposition, pathological peritoneal attachments, a short transverse mesocolon, reduced as well as increased retroperitoneal fat tissue, or an innate increased laxity, elongation or absence of the suspensory ligaments [2,14].

On the other hand, several diseases such as liver atrophy (liver cirrhosis, right lobe agenesis), enlargement of the thoracic cavity (chronic obstructive lung disease), distension (aerophagia) or elongation (chronic constipation) of the large intestine, can influence the anatomical position of the colon [4,15,16].

In addition, multiple pregnancies, ascites and obesity as well as dramatic weight loss (e.g. internal herniation after bariatric surgery) may also cause anatomical changes within the abdominal cavity [4,13].

Mental retardation, schizophrenia, depression and congenital hypothyroidism have also been found to be associated with colonic interposition [13,15,17,18].

Furthermore, adhesions occurring after extensive surgery, peritoneal metastasis or serious intraabdominal infections can also result in the displacement of intraabdominal organs [8,19].

In this case, we assume a multifactorial genesis of the pathologic fixation of the transverse colon in the lesser sac: a congenital mobile transverse colon and adhesions.

Patients with colonic interpositions are usually asymptomatic [3,4,12,18,19]. If symptomatic, patients with right-sided colonic interposition have been found to suffer from common gastrointestinal symptoms such as nausea, vomiting, abdominal pain and/or constipation (Chilaiditis syndrome). Similar symptoms have been found in patients with left-sided colonic interpositions [4,8,13]. Symptomatic patients with a retrogastric transverse colon have not yet been described in the literature. Our patient presented with recurring nightly convulsive pain, nausea and irregular bowel

movements, which may be due to partial colonic obstruction. Mistakenly, the patient's symptoms might easily have been diagnosed as irritable bowel syndrome (IBS). Nevertheless it as clearly pointed out that this patient does not fulfill the Rome 4 criteria [20], as IBS never presents with nightly convulsive pain. Both the initial bowel sonography and the epigastric diaphanoscopy during colonoscopy directed this patient to proper diagnosis and treatment.

4. Conclusion

The retrogastric colon is a rare anatomic entity mostly seen as an incidental finding in an asymptomatic patient's radiograph. Nevertheless, this anatomic abnormality might be responsible for unclear gastrointestinal symptoms. In such cases, surgery should be considered for therapy, we recommend a laparoscopic approach.

Conflicts of interest

There are no conflicts of interest, sources of financial support, corporate involvement, patent holdings, etc. involved in the research and preparation of this manuscript.

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Ethical approval

The Ethics Committee of the Medical University of Vienna confirms that the research described in this manuscript does not require the formal vote of its Ethics Committee.

Consent

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

Author contribution

Felix Harpain, Christoph Gasché, Gerhard Prager and Gerd Silberhumer equally contributed to conception, design, acquisition and interpretation of data. All authors have revised the article and have approved of its final version.

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Guarantor

Gerd Silberhumer is the guarantor of this paper.

References

- [1] H. Gray, W.H. Lewis, *Gray's Anatomy of the Human Body*, Vol. 20, Bartleby, Philadelphia, 2000.
- [2] S.D. Walsh, J.G. Cruikshank, Chilaiditi syndrome, *Age Ageing* 6 (1) (1977) 51–57.
- [3] D. Sorrentino, et al., Heart-touching Chilaiditi's syndrome, *World J. Gastroenterol.* 11 (29) (2005) 4607–4609.
- [4] O. Moaven, R.A. Hodin, Chilaiditi syndrome: a rare entity with important differential diagnoses, *Gastroenterol. Hepatol. (N Y)* 8 (4) (2012) 276–278.
- [5] F. Bredolo, et al., Intestinal interposition: the prevalence and clinical relevance of non-hepatodiaphragmatic conditions (non-Chilaiditi forms) documented by CT and review of the literature, *Radiol. Med.* 116 (4) (2011) 607–619.
- [6] T. Jose, et al., Retrogastric interposition of colon: differential diagnosis for gastric pseudo-tumor, *Indian J. Gastroenterol.* 26 (3) (2007) 141.
- [7] R.A. Agha, et al., The SCARE statement: consensus-based surgical case report guidelines, *Int. J. Surg.* 34 (2016) 180–186.
- [8] W.H. Weng, et al., Colonic interposition between the liver and left diaphragm – management of Chilaiditi syndrome: a case report and literature review, *Oncol. Lett.* 7 (5) (2014) 1657–1660.
- [9] A. Beclere, Rectification d'une erreur de diagnostic: ectopie du colon transverse prise a l'examen radioscopique pour un abscès gazeux sousphrenique, *Bulletin et Memoires de la Societe de Medecine de Paris* 16 (1899) 506–507.
- [10] D. Chilaiditi, Zur frage der hepatoptose und pose im allgemeinen im anschluss an drei fällevon temporärer, partieller leberverlagerung, Fortschritte auf dem Gebiet der Röntgenstrahlen 16 (1910) 173–208.
- [11] M.H. Poppel, Duodenocolic apposition, *Am. J. Roentgenol. Radium Ther. Nucl. Med* 83 (1960) 851–856.
- [12] A.L. Oldfield, A.C. Wilbur, Retrogastric colon: CT demonstration of anatomic variations, *Radiology* 186 (2) (1993) 557–561.
- [13] A.X. Yin, et al., Chilaiditi syndrome precipitated by colonoscopy: a case report and review of the literature, *Hawaii J. Med. Pub. Health* 71 (6) (2012) 158–162.
- [14] J.M. Murphy, et al., Chilaiditi's syndrome and obesity, *Clin. Anat* 13 (3) (2000) 181–184.
- [15] G.E. Gurvits, et al., Air under the right diaphragm: colonoscopy in the setting of Chilaiditi syndrome, *Gastrointest. Endosc.* 69 (3 Pt 2) (2009) 758–759, discussion 759.
- [16] F.et al. Ji, Hypogenesis of the right hepatic lobe and associated Chilaiditi sign, *ANZ J. Surg.* 84 (5) (2014) 394.
- [17] C.N. Lekkas, W. Lentino, Symptom-producing interposition of the colon. Clinical syndrome in mentally deficient adults, *JAMA* 240 (8) (1978) 747–750.
- [18] R. Farkas, J. Moalem, J. Hammond, Chilaiditi's sign in a blunt trauma patient: a case report and review of the literature, *J. Trauma* 65 (6) (2008) 1540–1542.
- [19] I.T. Aldoss, et al., Chilaiditi syndrome complicated by cecal perforation, *South Med. J.* 102 (8) (2009) 841–843.
- [20] O.S. Palsson, et al., Rome IV diagnostic questionnaires and tables for investigators and clinicians, *Gastroenterology* (2016).

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