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## Surgical management of Chilaiditi syndrome with da Vinci® robotic system

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## ABSTRACT

**INTRODUCTION:** Chilaiditi's syndrome is a combination of radiographic finding of hepato-diaphragmatic interposition of intestine with gastrointestinal symptoms which sometimes requires operative intervention. This is, to our knowledge, the first report of robotic-assisted technique for surgical management of this rare condition.

**PRESENTATION OF CASE:** We report a case of 85-year-old woman with persistent pain and diarrhea from Chilaiditi's syndrome who underwent robotic-assisted colopexy with good outcome.

**DISCUSSION:** Robotic-assisted surgery offers great visualization and high degree of instrument maneuverability, thus shortening operative time and provides patient with other benefits of minimally-invasive surgery such as minimal pain and excellent cosmesis.

**CONCLUSION:** Robotic-assisted surgical technique allowed quick recovery and return to baseline function for a frustrated elderly patient.

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## 1. Introduction

Chilaiditi's sign, also known as pseudoperitoneum, refers to the radiographic finding of hepato-diaphragmatic interposition of small or large intestine first described in 1910 by a Greek radiologist Demetrius Chilaiditi [1]. Presence of haustra helps distinguish air-filled bowel from free intra-abdominal air under the diaphragm [2]. Further, Chilaiditi's syndrome is presence of Chilaiditi's sign in a patient with gastrointestinal symptoms such as abdominal pain, nausea, vomiting, bloating, and constipation, and occasionally dyspnea with males being affected four times as frequently as females. Pre-disposing factors are significant weight loss, redundant colon, high diaphragm, small liver, or absence of suspensory ligaments, all of which can be congenital or acquired [3]. Chilaiditi's syndrome is typically treated conservatively with bowel rest, laxatives, and nasogastric decompression. With failure of non-operative management or development of acute abdomen surgery may be necessary [4]. Complications can include volvulus, ischemia, and perforation. Subdiaphragmatic abscess secondary to ruptured appendicitis has also been reported [5]. Laparoscopic colopexy has been previously described in adult as well as pediatric patients [6,7]. This is the first known report of robotic-assisted surgical management of this

rare condition. In the developed world as technology advances surgeons continue to have increasingly effective tools at our disposal and robotic-assisted surgery is becoming more commonplace.

This work has been reported in line with the SCARE criteria [8].

## 2. Presentation

Our patient is a thin (BMI 20), non-smoking, 85-years-old woman with no medical problems and good functional status who presented to our office complaining of 4 months of daily RUQ cramping abdominal and back pain, moderate in severity and typically occurring 30 min after eating, as well as intermittent diarrhea. One year prior she was experiencing similar symptoms and underwent a laparoscopic cholecystectomy for presumed symptomatic cholelithiasis after abdominal ultrasound and CT revealed gallstones and no other findings. Subsequent EGD was negative and colonoscopy identified collagenous pancolitis and patient was treated with a course of oral steroids without resolution of pain. Repeat CT of the abdomen and pelvis demonstrated classic Chilaiditi sign (Fig. 1). Patient was offered a minimally invasive colopexy and chose to proceed. We selected robotic-assisted approach due to the amount of suturing required to pex the large intestine over a wide area of the abdominal cavity.

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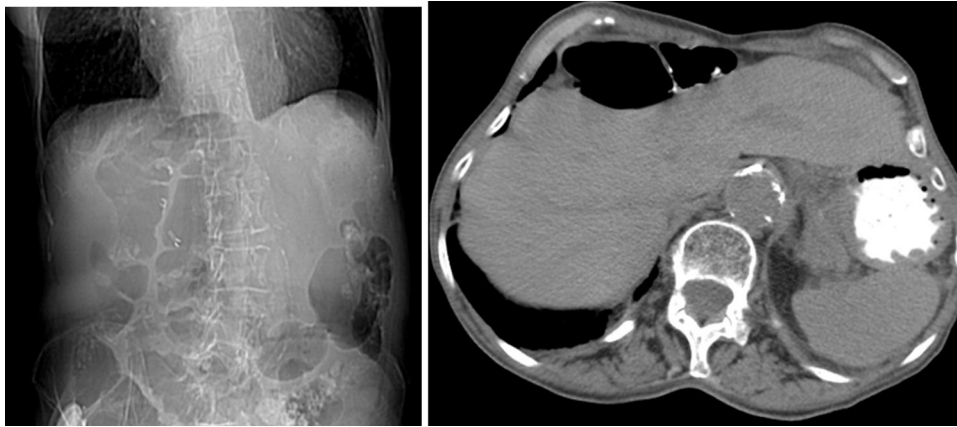


Fig. 1. CT abdomen and pelvis with IV and oral contrast: scout film and axial view of transverse colon wedged under the right hemidiaphragm.

### 3. Operation

Patient underwent elective robotic-assisted colopexy using da Vinci<sup>®</sup> Si (Intuitive Surgical<sup>®</sup>) with multi-port technique. The operation was performed by experienced robotic surgeon with the patient under general anesthesia. Intra-operative colopexy planning was performed by aligning the colon to the anticipated points of attachment. We secured the transverse colon to the falciform ligament using prolene suture. Using electrocautery we scored the parietal peritoneum in the right gutter to raise a peritoneal flap. We continued to bisect the loose segments and used figure-of-eight sutures to tack colon to the lateral abdominal wall until it was aligned with no redundancy. The operation took approximately 2 h door-to-door. Estimated blood loss was 10 ml.

### 4. Post-operative course

Patient was started on clear liquids and was advanced to soft diet. She was discharged home from the hospital on post-operative day 2 after passing flatus and achieving adequate pain control with oral medication. At 2 week follow-up appointment patient reported complete resolution of pain, normal bowel function, and return to her usual activities. At 4 months she remains highly satisfied with the outcome of her surgery and has experienced no post-operative complications.

### 5. Conclusion

Our patient had persistent symptoms including pain and diarrhea with all other possible etiologies ruled out. She achieved excellent results with short recovery and minimal post-operative pain with robotic-assisted surgery. da Vinci<sup>®</sup> system provides magnified three-dimensional image and offers the advantage of highly-maneuverable wristed instruments that were particularly useful in this case as opposed to standard laparoscopic approach.

### Disclosures

Publication of this case was consented to by the patient and has been approved by the Institutional Review Board.

All authors approve the final version of submitted article.

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No conflict of interest to report. The authors of this paper receive no compensation from or own stock in Intuitive Surgical<sup>®</sup>.

### Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

### Author contribution

Olga Garcia, DO is responsible for writing the manuscript and providing the References Constanze Rayhrer, MD is responsible for providing patient data and editing.

### Please state any sources of funding for your research

No sources of funding to disclose.

### Ethical approval

Institutional Review Board for Community Memorial Hospital approved publication of this case report. Review was not required for this activity as it does not meet Department of Health and Human Services definition of “research”.

### Registration of research studies

N/A.

### Guarantor

Constanze Rayhrer, MD.

### Please state any conflicts of interest

No conflicts of interest to report.

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