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## Laparoscopic repair of acute small bowel obstruction due to left paraduodenal hernia: A case report

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## ABSTRACT

**INTRODUCTION:** Paraduodenal hernia is a rare disease but the most common internal hernia. Laparoscopic repair of paraduodenal hernia is feasible and effective because of its minimal invasiveness and aesthetic advantage.

**PRESENTATION OF CASE:** We report a case of a 79 year-old-man who was admitted with a complaint of recurrent left abdominal pain. Computed tomography revealed an encapsulated cluster of jejunum loops in the left upper quadrant, near the ligament of Treitz and at the dorsal side of the inferior mesenteric vein. Emergency laparoscopic surgery was performed. The jejunum loops incarcerated in the hernia sac was reduced. The hernia orifice was closed with interrupted suture. Postoperative period was uneventful and the patient was discharged home on the 7<sup>th</sup> postoperative day. There has been no recurrence during a follow-up.

**DISCUSSION:** If there is a working space in the abdominal cavity, laparoscopic surgery for paraduodenal hernia leads to patient's early recovery with cosmetic satisfaction.

**CONCLUSION:** Left paraduodenal hernia is a rare cause of small bowel obstruction that should be thought about patient with a history of recurrent abdominal pain. Computed tomography is the standard for a correct diagnosis. Laparoscopic repair as the first surgical option for paraduodenal hernia is feasible despite of technical difficulties.

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## 1. Introduction

Paraduodenal hernia is an internal hernia which form the peritoneal cavity near the ligament of Treitz. It sometimes causes strangulated ileus with small bowel obstruction, which is the most common of all internal hernias. Recently, the cases of laparoscopic repair for paraduodenal hernia are reported with advantages in minimally invasive surgery. Herein, we describe the case of a patient who was preoperatively diagnosed with left paraduodenal hernia and underwent successful laparoscopic repair.

The work has been reported in line with the SCARE criteria and cite the following paper in my references [1].

## 2. Presentation of case

We report a case of a 79 year-old-man who was admitted with a complaint of recurrent left abdominal pain. Computed tomography revealed an encapsulated cluster of jejunum loops in the left upper quadrant, near the ligament of Treitz and posterior to the inferior

mesenteric vein (Figs. 1 and 2). Emergency laparoscopic surgery was performed. With the patient in the spine position, four trocars were placed through the abdominal wall. The first trocar was placed into the umbilicus for the laparoscope. The next two trocars were placed into the right and left lower abdomen for the operator. The last trocar was placed into the left upper quadrant for retraction. The jejunum loops incarcerated in the hernia sac was reduced without widening of the hernia orifice, which measured 5 cm in diameter. They had ischemic changes, but after reduction bowel color improved and seemed to be viable. Thus, we made judgement the bowel resection was not needed. The hernia orifice was closed intracorporeally with 4 interrupted sutures, taking care not to injure the duodenojejunal flexure medially and the inferior mesenteric vein laterally (Figs. 3 and 4). Postoperative period was uneventful and the patient was discharged home on the 7<sup>th</sup> postoperative day. There has been no recurrence during a follow-up.

## 3. Discussion

Paraduodenal hernia is an internal hernia which form the peritoneal cavity near the ligament of Treitz, localizing into a fossa (Landzert's fossa) to the left of the fourth part of the duodenum, posterior to the inferior mesenteric vein and to left branches of the middle colic artery. The etiology may involve bowel malrota-

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**Table 1**

Reported cases of laparoscopic repair of left paraduodenal hernia.

| Case | Year | Author                 | Sex | Age   | Symptom                                     | Emergency or elective surgery | Size of hernia orifice (cm) | Bowel resection | Repair for hernia orifice (open or closure) | Operation time (min) | Blood loss (ml) | Post operative hospital stay (day) | Complications |
|------|------|------------------------|-----|-------|---------------------------------------------|-------------------------------|-----------------------------|-----------------|---------------------------------------------|----------------------|-----------------|------------------------------------|---------------|
| 1    | 1998 | Uematsu et al. [11]    | M   | 44 yo | abdominal pain, nausea                      | elective                      | 5                           | -               | closure                                     | NS                   | NS              | 8                                  | none          |
| 2    | 2000 | Finck et al.           | NS  | NS    | NS                                          | NS                            | NS                          | NS              | NS                                          | NS                   | NS              | NS                                 | NS            |
| 3    | 2004 | Fukunaga et al. [6]    | M   | 51 yo | abdominal pain                              | elective                      | 5                           | -               | closure                                     | 140                  | 5               | 7                                  | none          |
| 4    | 2004 | Rollins et al. [7]     | M   | 21 yo | abdominal pain, nausea, weight loss         | elective                      | NS                          | -               | closure                                     | NS                   | NS              | 2                                  | none          |
| 5    | 2006 | Moon et al. [2]        | M   | 18 yo | abdominal pain, nausea, vomit               | emergency                     | 2                           | -               | closure                                     | NS                   | NS              | 1                                  | none          |
| 6    | 2007 | Shoji et al.           | M   | 60 yo | abdominal pain                              | elective                      | 3                           | -               | closure                                     | 120                  | 50              | NS                                 | none          |
| 7    | 2008 | Palanivelu et al. [3]  | M   | NS    | NS                                          | elective                      | NS                          | -               | closure                                     | NS                   | NS              | 5                                  | IMV injury    |
| 8    | 2008 | Palanivelu et al. [3]  | M   | NS    | NS                                          | emergency                     | NS                          | -               | closure                                     | NS                   | NS              | 2                                  | none          |
| 9    | 2008 | Palanivelu et al. [3]  | F   | NS    | NS                                          | elective                      | NS                          | -               | closure                                     | NS                   | NS              | 1                                  | recurrence    |
| 10   | 2008 | Jeong et al.           | M   | 52 yo | NS                                          | emergency                     | NS                          | -               | closure                                     | 110                  | NS              | 5                                  | none          |
| 11   | 2008 | Jeong et al.           | F   | 58 yo | NS                                          | emergency                     | NS                          | -               | closure                                     | 90                   | NS              | 5                                  | none          |
| 12   | 2009 | Poultides et al. [8]   | F   | 67 yo | abdominal pain, bilious emesis, obstipation | emergency                     | NS                          | -               | closure                                     | NS                   | NS              | NS                                 | NS            |
| 13   | 2009 | Uchiyama et al. [12]   | F   | 80 yo | abdominal pain                              | elective                      | NS                          | -               | open                                        | NS                   | NS              | 7                                  | none          |
| 14   | 2010 | Khalailah et al.       | F   | 53 yo | abdominal pain, nausea, vomit               | emergency                     | NS                          | -               | closure                                     | NS                   | NS              | 3                                  | none          |
| 15   | 2010 | Parmar et al. [13]     | M   | 38 yo | abdominal pain                              | elective                      | NS                          | -               | open                                        | NS                   | NS              | 3                                  | none          |
| 16   | 2011 | Al-Mufarrej et al. [9] | M   | 42 yo | abdominal pain                              | elective                      | NS                          | -               | closure                                     | NS                   | NS              | NS                                 | NS            |
| 17   | 2011 | Bernshteyn et al. [14] | M   | 39 yo | abdominal pain                              | emergency                     | NS                          | -               | open                                        | NS                   | NS              | 2                                  | none          |
| 18   | 2012 | Hussein et al.         | F   | 59 yo | abdominal pain, nausea, bilious vomiting    | emergency                     | 5                           | -               | closure                                     | NS                   | NS              | 2                                  | none          |
| 19   | 2012 | Nam et al.             | F   | 12 yo | abdominal pain                              | elective                      | 5                           | -               | closure                                     | 90                   | NS              | 5                                  | none          |
| 20   | 2012 | Nam et al.             | M   | 3 mo  | severe irritability                         | elective                      | NS                          | -               | closure                                     | 180                  | NS              | 4                                  | none          |
| 21   | 2013 | Milani et al. [15]     | M   | 45 yo | abdominal pain, nausea, bilious emesis      | emergency                     | NS                          | -               | open                                        | NS                   | NS              | 10                                 | none          |
| 22   | 2013 | Siddika et al.         | M   | 35 yo | abdominal pain, nausea, loss of appetite    | elective                      | NS                          | -               | closure                                     | NS                   | NS              | 1                                  | none          |
| 23   | 2013 | Force et al.           | F   | 25 yo | abdominal pain, nausea, vomit               | emergency                     | NS                          | -               | closure                                     | less than 79         | minimal         | 1                                  | none          |
| 24   | 2014 | Lee et al.             | F   | 74 yo | abdominal pain                              | emergency                     | 3                           | -               | closure                                     | 105                  | NS              | 4                                  | none          |
| 25   | 2014 | Assenza et al. [16]    | M   | 67 yo | abdominal pain, diarrhoea, vomit            | emergency                     | NS                          | -               | open                                        | NS                   | NS              | 4                                  | none          |
| 26   | 2015 | Lim et al. [7]         | F   | 47 yo | abdominal pain                              | emergency                     | NS                          | NS              | NS                                          | NS                   | NS              | 1                                  | none          |

Table 1 (Continued)

| Case | Year | Author          | Sex | Age   | Symptom                       | Emergency or elective surgery | Size of hernia orifice (cm) | Bowel resection | Repair for hernia orifice (open or closure) | Operation time (min) | Blood loss (ml) | Post operative hospital stay (day) | Complications |
|------|------|-----------------|-----|-------|-------------------------------|-------------------------------|-----------------------------|-----------------|---------------------------------------------|----------------------|-----------------|------------------------------------|---------------|
| 27   | 2015 | Sherman et al.  | M   | 26 yo | abdominal pain                | NS                            | NS                          | -               | closure                                     | NS                   | NS              | 1                                  | none          |
| 28   | 2016 | Winder et al.   | M   | 34 yo | abdominal pain                | elective                      | 4                           | -               | closure                                     | NS                   | NS              | 1                                  | none          |
| 29   | 2016 | Zizzo et al.    | M   | 43 yo | abdominal pain, nausea, vomit | emergency                     | NS                          | -               | closure                                     | NS                   | NS              | 4                                  | none          |
| 30   | 2016 | Kulkarni et al. | M   | 36 yo | abdominal pain, distension    | emergency                     | 3 × 4                       | -               | closure                                     | 75                   | less than 10    | 3                                  | none          |
| 31   | 2016 | Kulkarni et al. | M   | 42 yo | NS                            | elective                      | NS                          | -               | closure                                     | 135                  | 60              | NS                                 | NS            |
| 32   | 2018 | our case        | M   | 79 yo | abdominal pain                | emergency                     | 5                           | -               | closure                                     | 95                   | less than 10    | 7                                  | none          |

NS: not stated, IMV: inferior mesenteric vein.

tion during the embryonal period and maladhesion between the mesocolon and retroperitoneum [2,3]. Paraduodenal hernias are the most common internal hernias, accounting for approximately 30–53% of cases [4]. There are right and left paraduodenal hernias from the difference in anatomical location and embryological origin. The left paraduodenal hernia is about three times more frequent than the right paraduodenal hernia [5].

Clinical symptoms are unspecified and clinical diagnosis is usually difficult. Some patients have vague abdominal complaints [6,7], while others present with acute abdominal pain for closed loop obstruction and intestinal ischemia.

To make the diagnosis, CT is most useful, which shows a cluster of dilated loops in the left upper quadrant and posterior to the inferior mesenteric vein. Furthermore, Valiability of the bowel can be evaluated with enhanced CT [8–10]. Small bowel contrast study also can be useful. For left paraduodenal hernia, the small bowel is usually located to the left of midline with a well-circumscribed border [11].

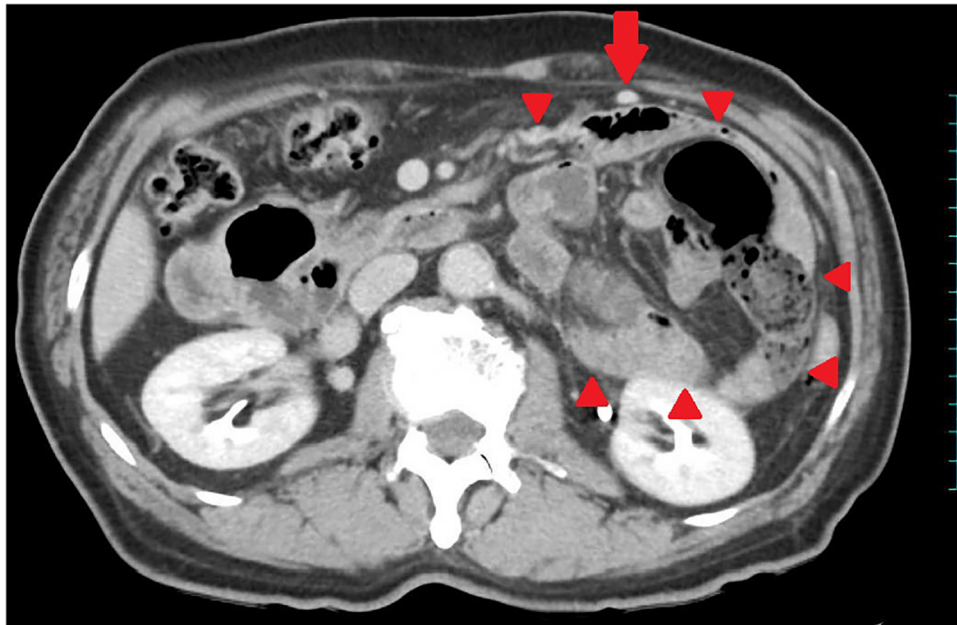
At least 50% of patients with paraduodenal hernia ultimately develop intestinal obstruction, so the surgery is recommended for all cases of paraduodenal hernia.

The basic principles of surgery for paraduodenal hernias are reduction of the hernia contents and repair of the defect by either closure or wide opening of the hernia orifice. Left paraduodenal hernias can usually be reduced manually without difficulty, as in the present case, and simple closure of the hernia orifice is sufficient, taking care to avoid vascular injury. If wide opening of the hernia orifice is chosen, the hernia ring can be divided for incising the mesentery parallel to the course of the inferior mesenteric vein. In our case, we thought that wide opening of the hernia orifice leads to the recurrence. Therefore, we chose closure of the hernia orifice.

Until 2018, we found the 31 cases of laparoscopic repair for left paraduodenal hernia described in 26 published reports based on PubMed search for all English articles (Table 1). There were 21 males and 10 females, 1 was not stated. The mean age was 45 years old. The mean size of hernia orifice was 4.1 cm in diameter. Bowel resection was not needed for all patients. Wide opening of hernia orifice was selected for 5 patients [12–16], and closure of hernia orifice was selected for 25 patients. The mean post operative hospital stay was 3.7 days. The operative complications were one case of inferior mesenteric vein injury and one case of recurrence [3]. The inferior mesenteric vein was ligated with clips and divided with ultracision shears along with the ascending branch of the inferior mesenteric artery. The recurrence case was a female patient who visited the hospital, suffering from symptoms of subacute bowel obstruction 18 months after first operation. Laparoscopic operation was performed, and a small patch of Gore-Tex™ mesh was plugged into the redundant paraduodenal fossa and sutured all around it with 2.0 polypropylene. Using non-absorbable suture for closure of hernia orifice may be adequate, but almost all surgeons selected absorbable suture as well as our case.

Our case was the most elderly male in the already published cases before. We also opted for the laparoscopic surgery with early diagnosis by CT, getting the same benefits, minimal invasiveness, aesthetic advantage and early recovery, as those described by other authors despite of elderly case.

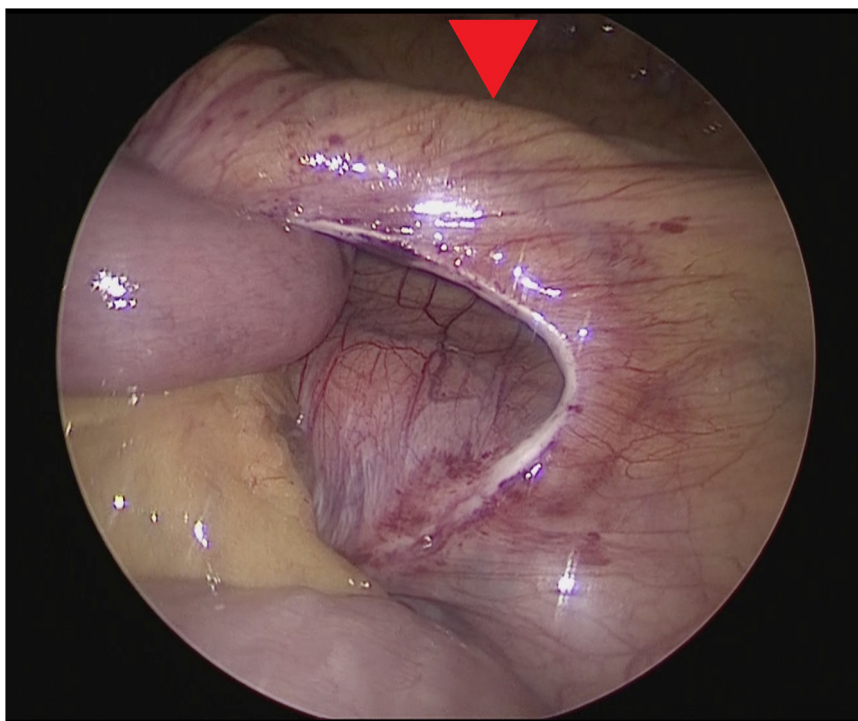
All authors indicated that the laparoscopic repair of left paraduodenal hernia resulted in less postoperative pain, earlier intake of diet, shorter hospital stay, cosmetic satisfaction. It is considered that the laparoscopic repair of left paraduodenal hernia is comparatively safe and feasible because of its minimal invasiveness and aesthetic advantage.



**Fig. 1.** Horizontal abdominal CT. Enhanced horizontal abdominal CT shows encapsulated cluster of jejunum loops in the left upper quadrant surrounded by hernia sac (arrowhead) posterior to the inferior mesenteric vein (arrow).

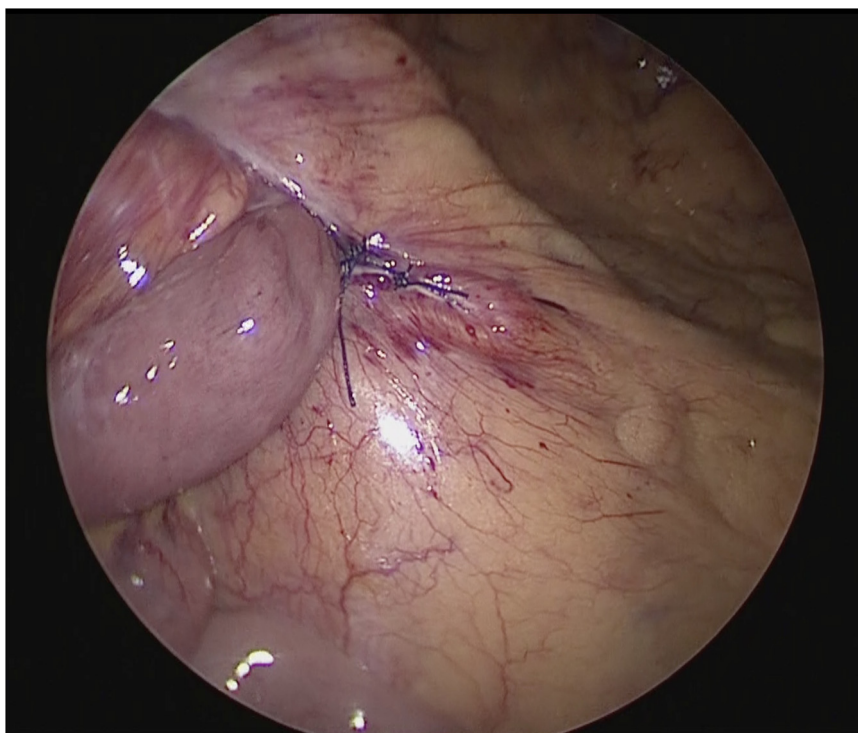


**Fig. 2.** Coronal abdominal CT. Enhanced coronal abdominal CT shows encapsulated cluster of jejunum loops in the left upper quadrant (arrowhead).



**Fig. 3.** Laparoscopic surgical findings.

The hernia orifice was found near the ligament of Treitz, posterior to the inferior mesenteric vein (arrowhead). It was 5 cm sized in diameter.



**Fig. 4.** Laparoscopic surgical findings.

The hernia orifice was closed intracorporeally with 4 interrupted suture.

#### 4. Conclusion

Laparoscopic repair of paraduodenal hernia is safe and feasible. It is recommended as the first surgical option for left paraduodenal hernia.

#### Conflicts of interest

I have no conflicts of interest.

#### Funding

I don't have any sources of funding for my research.

#### Ethical approval

No ethical approval was needed for this case study in our institution.

#### Consent

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

#### Author contribution

MW, SK and TT drafted the manuscript, contributed to patient care. All authors have read and approved the final manuscript.

#### Registration of research studies

I don't have UIN of this case report.

#### Guarantor

Satoru Kono.

#### Provenance and peer review

Not commissioned, externally peer-reviewed.

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