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# Paracecal hernia with intestinal ischemia treated with laparoscopic assisted surgery

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## ABSTRACT

**INTRODUCTION:** Paracecal hernia is rare, and strangulation with ischemia has been infrequently observed in the limited number of published reports on paracecal hernias.

**PRESENTATION OF CASE:** We describe a case of an incarcerated paracecal hernia with resultant ischemic bowel that was successfully treated with laparoscopic-assisted surgery. A 54-year-old man who had not undergone any surgery previously presented to our hospital with abdominal pain and vomiting. An abdominal computed tomographic scan showed evidence of an intestinal obstruction at a paracecal site. An emergency laparoscopic surgery demonstrated incarceration of a loop of the small bowel in the paracecal fossa. We removed the incarcerated small bowel from the paracecal fossa, noted that the tissue was necrotic, and resected this segment of bowel through a mini-laparotomy incision. The patient was discharged on the 13th postoperative day.

**DISCUSSION AND CONCLUSION:** This case is unique in that the patient presented with small bowel strangulation, causing intestinal ischemia. Laparoscopic surgery is useful in the diagnosis of internal hernias and is also useful for the treatment of small bowel obstruction due to paracecal hernias complicated by ischemic bowel.

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## 1. Introduction

Internal hernias are relatively rare, and the incidence of paracecal hernia is particularly low [1]. Paracecal hernia is an uncommon type of internal hernia that is difficult to diagnose preoperatively because of its varied symptoms. In a paracecal hernia, herniation generally occurs through an orifice that develops from the peritoneal recess formed by folds of the peritoneum in the paracecal area. According to reviews of cases that describe such hernias, it is unlikely that bowel resection is necessary for treatment because of the wide hernia orifice. Laparoscopic surgery for acute bowel obstruction is less invasive than laparotomy. We report a case of a paracecal hernia complicated by ischemic bowel that was successfully treated with laparoscopic-assisted surgery. The work has been reported in line with the SCARE criteria [2].

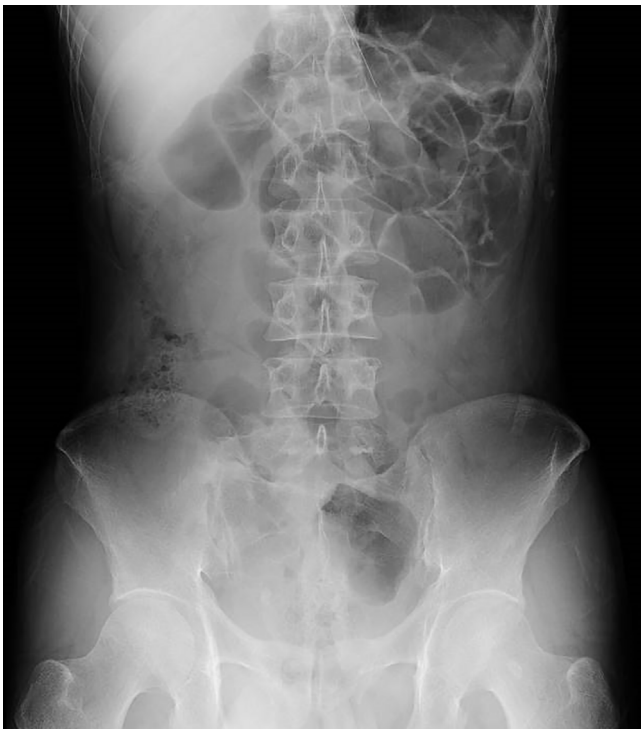
## 2. Case presentation

A 54-year-old man visited our hospital with abdominal pain and vomiting. He had not undergone any surgery previously. On physical examination, his body temperature was 36.9 °C, his blood

pressure was 101/66 mmHg, and his pulse rate was 71 bpm. He had slight tenderness to palpation in the right lower abdomen. Laboratory findings were only significant for an abnormally elevated white blood cell count of 11,100/mm<sup>3</sup>. A plain x-ray imaging of the abdomen showed bowel gas in his left upper abdomen (Fig. 1). An enhanced computed tomographic scan showed evidence of an intestinal obstruction at a paracecal site, with dilatation of the small intestine at the proximal side (Fig. 2a). A change in the small intestinal caliber was seen around the cecum (Fig. 2b). Small bowel ischemia was suspected because of the weak radiographic contrast effect. Based upon this clinical picture, the patient was diagnosed as having intestinal ileus from small bowel strangulation due to an internal hernia. An emergency laparoscopic surgery was performed.

First, a trocar was placed in the umbilical position under optical guidance, and then two additional trocars were added in the lower median region and the left lower quadrant. A segment of ileum about 15 cm in length was visibly incarcerated in the paracecal fossa (Fig. 3a). The hernia contents were difficult to reduce because of the size of the hernia defect. The infarcted segment of the small bowel was released with considerable effort, and the redundant peritoneum was resected (Fig. 3b). Through a mini-laparotomy incision, the ischemic bowel segment was resected, followed by an anastomosis. After surgery, the patient had a paralytic ileus, but conservative therapy improved his condition in a short period of

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**Fig. 1.** A plain x-ray imaging of the abdomen showed bowel gas in his left upper abdomen.

time. The patient was discharged from the hospital 17 days after the operation.

**3. Discussion**

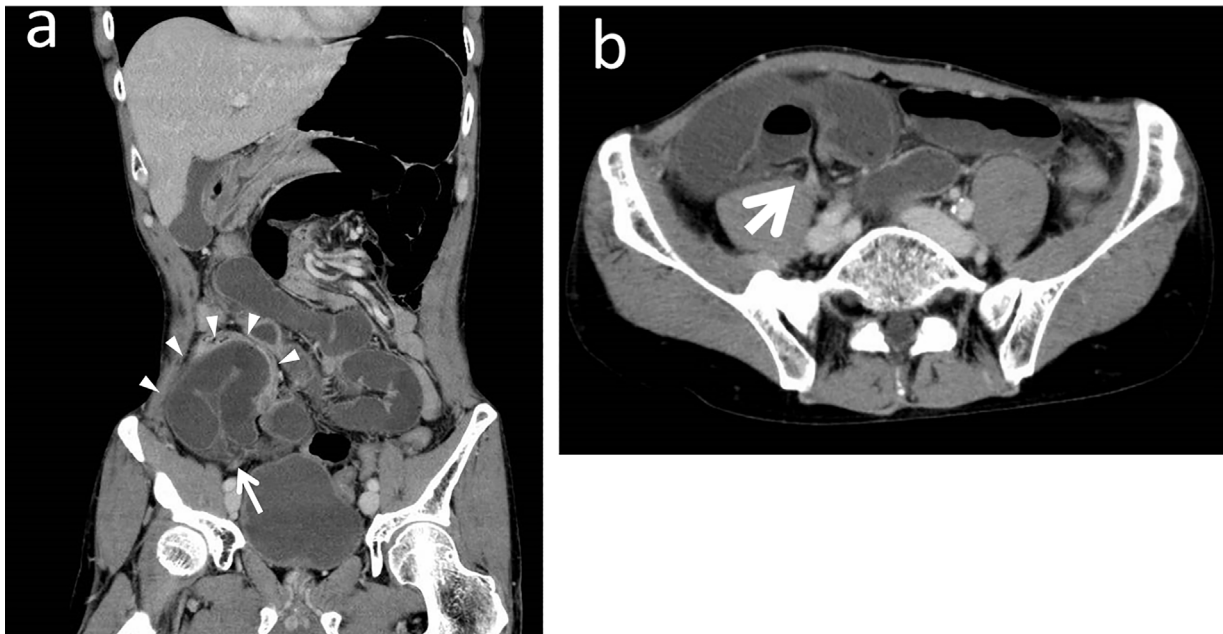
The paracecal hernia is a type of internal hernia. It is identified as the cause of 1% of all cases of intestinal ileus [1]. Internal hernias are classified into six types: paraduodenal, pericecal, foramen

of Winslow, transmesenteric, pelvic and supravesical, and intersigmoid [3]. Pericecal hernias can be sub-classified into four types: superior ileocecal recess, inferior ileocecal recess, paracolic sulcus, and retrocecal recess [4]. According to Hirokawa et al. [5], paracecal hernias are the most common type of pericecal hernia.

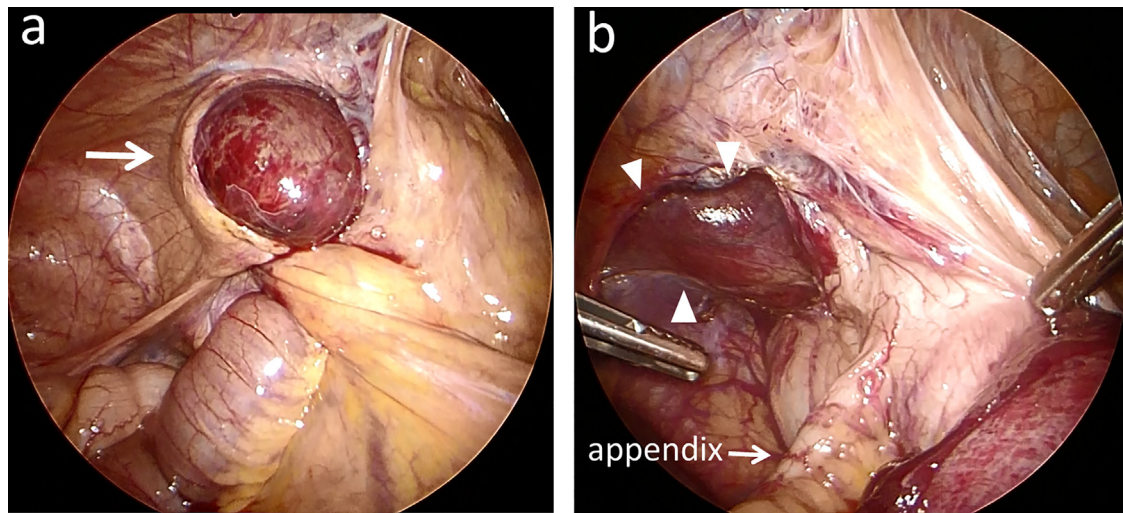
In a PubMed search of the literature published from 1980 to 2017, using the keywords “paracecal hernia,” “retrocecal hernia,” “pericecal hernia,” and “ileocecal hernia”, we found only 21 English language reports, describing 26 cases of internal hernias (Table 1). A summary of our search indicated a mean patient age of 62 years, with the patient ages ranging from 8 weeks to 92 years. There appeared to be no significant differences in the occurrence rate between men and women. Four patients had a prior history of abdominal surgery. Only five patients required bowel resection because of intestinal ischemia [6–9]. Four of those five patients had no history of abdominal surgery [7–9]. Pericecal hernia occurs primarily as a result of congestive factors. Moreover, it may be possible that pericecal hernias are acquired by fragility due to aging, increased pressure in the inner abdomen, adhesions in the retroperitoneum, and potentially other undiscovered factors [10]. We were previously inclined to believe that pericecal hernias would be unlikely to cause intestinal ischemia by strangulation. However, this case presented the possibility that the strangulation in these cases, and that the onset can be both rapid and aggressive. Therefore, whenever small bowel strangulation is suspected, surgery should be performed immediately.

Recently, laparoscopic surgery has been widely performed for small bowel obstructions [11]. Laparoscopic surgery is highly diagnostic, but is also minimally-invasive in comparison with open surgery. There have been seven prior reports of pericecal hernia treated using laparoscopy [5,10,12–16].

To our knowledge, this is the first case of pericecal hernia with a bowel resection performed via laparoscopic-assisted surgery. Laparoscopic management is currently considered to be satisfactory for both diagnosis and treatment due to faster patient recovery times. Even in cases involving bowel resection, minimally invasive laparoscopic treatment for this condition may be available.



**Fig. 2.** (a) An enhanced computed tomographic scan showed evidence of an intestinal obstruction at a paracecal site, with dilatation of the small intestine at the proximal side. The hernia sac (arrowheads) and defect (arrow) could be seen. (coronal image). (b) A change in the small intestinal caliber was seen around the cecum (axial image, arrowhead).



**Fig. 3.** (a) Laparoscopic surgery shows an ischemic segment of ileum about 15 cm in length was visibly incarcerated in the paracecal fossa (arrow). (b) Hernia sac after small bowel reduced (arrowheads).

**Table 1**  
Literature review of pericecal hernia cases from 1980 to 2017.

No	Authors	Year	Age	Sex	History of abdominal surgery	Classification of pericecal hernia	Operation	Resection of bowel
1	Rosen L, et al.	1982	80	Female	None	Retrocecal	Laparotomy	–
2	Rivkind AI, et al.	1986	0	Female	NA	Paracecal	Laparotomy	–
3	Rivkind AI, et al.	1986	8	Male	NA	Paracecal	Laparotomy	–
4	Rivkind AI, et al.	1986	25	Male	NA	Paracecal	Laparotomy	–
5	Rivkind AI, et al.	1986	77	Female	NA	Paracecal	Laparotomy	–
6	Rivkind AI, et al.	1986	83	Female	NA	Paracecal	Laparotomy	–
7	Linsey I, et al.	1997	86	Female	NA	Retrocecal	Laparoscopy	–
8	Patterson R, et al.	2000	59	Male	None	Paracecal	Laparotomy	–
9	Lu HC, et al.	2002	69	Male	None	NA	Laparotomy	–
10	Lu HC, et al.	2002	67	Female	Appendectomy	NA	Laparotomy	+
11	Omori H, et al.	2003	90	Female	None	Paracecal	Laparoscopy	–
12	Osadchy A, et al.	2005	76	Male	None	Paracecal	Laparotomy	–
13	Fu CY, et al.	2006	34	Male	None	Ileocecal	Laparotomy	–
14	Molto Aguado M, et al.	2007	59	Female	None	Paracecal	Laparotomy	+
15	Hirokawa T, et al.	2007	74	Male	Appendectomy	Retrocecal	Laparoscopic-assist	–
16	Kabashima A, et al.	2010	43	Female	Invagination	Paracecal	Laparoscopy	–
17	Shibuya H, et al.	2010	63	male	NA	Retrocecal	Laparotomy	–
18	Choh NA, et al.	2010	65	Female	None	NA	Laparotomy	+
19	Jang EJ, et al.	2011	84	Female	None	Paracecal	Laparotomy	–
20	Nishi T, et al.	2011	70	Female	None	NA	Laparotomy	–
21	Kleyman S, et al.	2013	34	Male	None	NA	Laparotomy	–
22	Sygin H, et al.	2015	50	Female	None	Paracecal	Laparoscopy	–
23	Kumar S, et al.	2015	88	Female	None	Ileocecal	Laparotomy	+
24	Sasaki K, et al.	2016	65	Male	None	Retrocecal	Laparoscopy	–
25	Ogami, et al.	2016	92	Male	Cholecystectomy	Retrocecal	Laparoscopy	–
26	Ito S, et al.	2017	83	Male	None	Retrocecal	Laparotomy	–
27	Our case	2017	54	Male	None	Paracecal	Laparoscopic-assist	+

NA, not available.

**4. Conclusion**

We presented a unique case of paracecal hernia that the patient presented with small bowel strangulation, causing intestinal ischemia. Laparoscopic surgery is useful in the diagnosis of internal hernias and is also useful for the treatment of small bowel obstruction due to paracecal hernias complicated by ischemic bowel.

**Conflicts of interest**

The authors declare that there is no conflict of interest regarding the publication of this article. The authors have no conflicts of interests.

**Funding**

None.

**Ethical approval**

Ethical approval has been exempted by our institution.

**Consent**

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

**Author contribution**

All authors have approved the final version of this manuscript.

**Guarantor**

The corresponding author accepts the full responsibility for the article.

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