

CASE REPORTS

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Retroperitoneal hernia following laparoscopic living-donor nephrectomy: a case report and review of literature

Marzuki Panji Wijaya¹ and Ahmad Zulfan Hendri^{1*} 

Abstract

Background The laparoscopic approach is the standard of care for living-donor nephrectomy. A rare postoperative complication is small bowel obstruction due to a retroperitoneal hernia. We present a case of an incidental finding of a retroperitoneal hernia in a patient with a history of laparoscopic donor nephrectomy.

Case presentation An adult male presented with diffuse abdominal pain, vomiting, and obstipation for 12 h. He had undergone laparoscopic donor nephrectomy two months prior. Plain abdominal radiograph revealed a dilated small bowel with homogenous opacity in the left lumbar region. Due to worsening diffuse abdominal pain and a high clinical suspicion of intestinal strangulation and ischemia after conservative management, an exploratory laparotomy was performed. Intraoperatively, an incarcerated small bowel segment herniating through an 8 cm descending mesocolon defect into the retroperitoneal space was discovered, forming a closed-loop obstruction. The bowel segment was reduced, and the mesocolon defect was repaired. The patient was discharged five days postoperatively with good recovery.

Conclusion Retroperitoneal hernia following laparoscopic living-donor nephrectomy is a rare but significant complication. Mitigation to prevent mesenteric defect creation, routine inspection, and closure of the defect can reduce the risk of hernia. Non-specific abdominal pain in patients with a history of laparoscopic donor nephrectomy prompts rapid imaging evaluation to aid in the early diagnosis of possible retroperitoneal hernia and its intervention.

Keywords Retroperitoneal hernia, Laparoscopic living-donor nephrectomy, Renal transplantation, Complication

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1 Background

Laparoscopic living-donor nephrectomy (LLDN) has gained recognition as a reliable, reproducible, minimally invasive method leading to the timely recovery of donors [1, 2]. Early studies of LLDN by Ratner et al. have shown that the laparoscopic approach results in decreased pain, shorter hospital stays, faster recovery of oral intake, overall activity, and return to work compared to open donor nephrectomy (ODN) [3]. Furthermore, morbidity and mortality rates for patients who had LLDN or ODN are comparable [4]. Many centers, including ours, have adopted the laparoscopic approach as the standard of care for live-donor nephrectomy. LLDN has low complication rates, with major complication rate of only 2% (conversion to open surgery, reoperation, carbon dioxide embolism, blood transfusion and port-site hernia) [2].

Small bowel obstruction (SBO) is a significant clinical problem requiring emergency surgical admission. The three primary etiologies are adhesions, neoplasms, and hernias [5]. However, adhesions causing SBO are believed to be less common after laparoscopic surgery than open surgery [6].

We present a case of incidental finding of retroperitoneal hernia in a patient with a history of LLDN. This report highlights the pathology and how to minimize the risk of retroperitoneal hernia following laparoscopic donor nephrectomy and highlights the importance of clinical suspicion for a retroperitoneal hernia as a potential complication in patients who have undergone laparoscopic donor nephrectomy and present with non-specific abdominal pain. Early diagnosis and prompt intervention are crucial to prevent bowel ischemia and necrosis.

2 Case presentation

A male, 49 years old, was admitted to the emergency department with an abrupt onset of diffuse abdominal pain, vomiting, and obstipation, which persisted for 12 h. The patient had a history of left LLDN two months ago with an uneventful postoperative recovery and reported returning to normal activities afterward.

On physical examination, the patient was normotensive with a blood pressure of 135/85 mmHg, elevated heart rate of 98 bpm, and mild fever of 37.9 degrees Celsius. The patient's abdomen was distended and tender to palpation, with multiple healed trocar and infra-umbilical wounds. The bowel sounds were negative upon auscultation. A digital rectal examination revealed an empty vault.

Plain abdominal radiograph revealed dilated small bowel and homogenous opacity in the left lumbar region (Figs. 1 and 2), suggesting complete bowel obstruction. Based on the suspected adhesion-related ileus, a nasogastric tube was placed with intravenous hydration

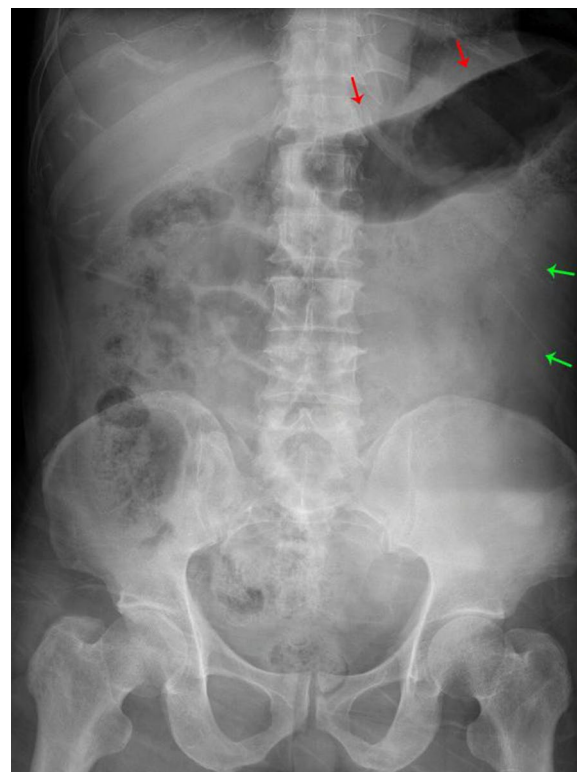


Fig. 1 A plain abdominal radiograph showed dilated small bowel and homogenous opacity in the left lumbar region

and analgetic administration. The patient was planned to undergo conservative treatment and computed tomography (CT) in the next day. After 6 h in the emergency department, the patient's abdominal pain worsened, with evidence of muscle rigidity, guarding, and rebound tenderness. The decision to perform emergency exploratory laparotomy was made based on high clinical suspicion of intestinal strangulation and ischemia after conservative management.

Intraoperatively, a dilated small bowel and mild adhesion between the ileum and abdominal wall were noted, released, and mobilized. Incarcerated small bowel segments herniated through an 8 cm descending mesocolon defect, forming a closed-loop obstruction into the retroperitoneal space was observed. After careful release, we found about 120 cm long jejunum and ileum segment, displaying a dark red color with reduced peristalsis. After observation, bowel viability was confirmed, and no resection was deemed necessary. Subsequently, the mesocolon defect was closed using absorbable sutures.

The patient had an uneventful postoperative recovery and was discharged six days after surgery. During the three-month follow-up, the patient was asymptomatic and returned to normal activities. The patient received

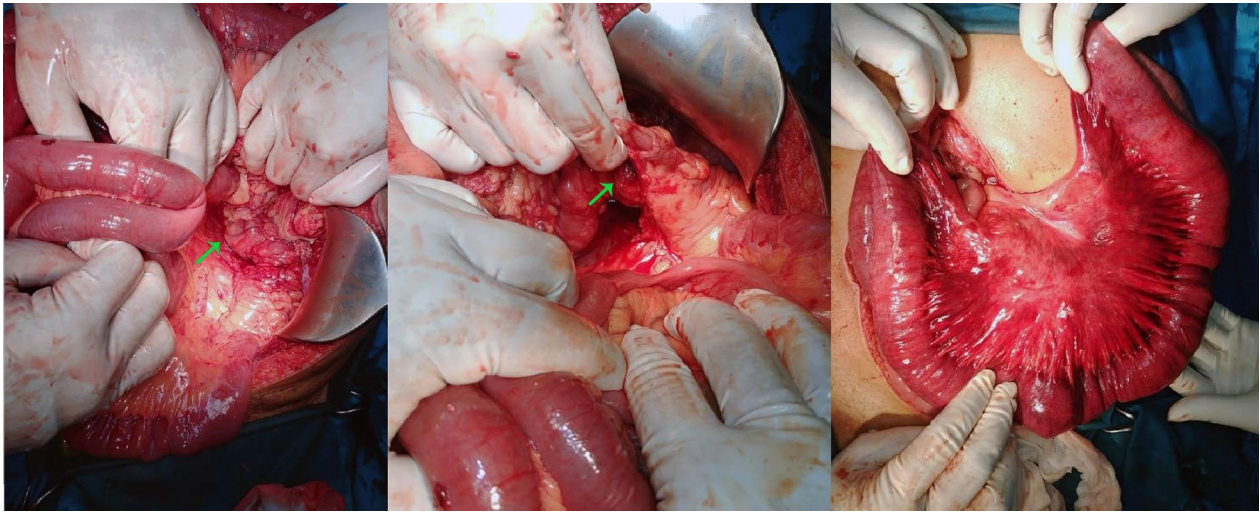


Fig. 2 Images showing intraoperative finding of the herniated small bowel, the mesocolon defect, and 120 cm long jejunum and ileum segment after reduction

advice to maintain a healthy lifestyle and seek medical attention in case of any symptoms or concerns.

3 Discussion

LLDN has gained widespread recognition as a reliable, reproducible, minimally invasive method with an excellent safety profile. Hence, it should be considered the standard of care for kidney donation [1, 2]. Performing a living-donor nephrectomy presents a unique challenge, as it involves subjecting a healthy individual to the inherent risks associated with surgery [7]. Numerous studies have demonstrated the superiority of LLDN over ODN, revealing several advantages, including reduced postoperative pain, shorter hospital stays, improved cosmetic outcomes, faster recovery of oral intake, overall activity, and return to work [3, 8]. LLDN offers a better early postoperative quality of life and donation experience, contributing to an increased number of living kidney donors [9]. The retroperitoneal approach of LLDN is an alternative method that presents several advantages, notably reduced interference and potential complications from intra-abdominal organs [10].

Although LLDN generally exhibits lower complication rates when compared to ODN, it is essential to recognize that significant complications can still arise, which may pose life-threatening risks. Notable major complications reported in LLDN include vascular injuries resulting in bleeding, laceration of intra-abdominal organs, pancreatitis, respiratory distress syndrome, pneumothorax, rhabdomyolysis, chylous ascites, and SBO [9, 11]. SBO caused by an internal hernia following LLDN is infrequent. We searched PubMed for reports of internal hernia after

LLDN, and 8 cases have been reported, including ours (Table 1).

All cases utilized the transperitoneal approach for LLDN. Most patients present with non-specific abdominal pain, distension, nausea, and vomiting. The time interval between LLDN and development of complications ranged from 5 days to 8 weeks [4, 7, 12, 13].

The non-specific clinical presentation of internal hernia after LLDN can lead to diagnostic delays and carries the risk of serious complications. Therefore, in cases where an internal hernia is suspected, it is crucial to promptly conduct imaging evaluations to facilitate early diagnosis and intervention [5, 14]. If surgical intervention is necessary, the choice between a laparoscopic approach or open laparotomy can be made to reduce the strangulated bowel segment and repair the mesenteric defect. In our case, the diagnosis of retroperitoneal hernia was established as an incidental finding during exploratory laparotomy. First, we did not consider ileus due to retroperitoneal hernia as a differential diagnosis, and the decision to proceed with exploratory laparotomy was based on clinical signs and symptoms of intestinal strangulation and ischemia after conservative management.

In retroperitoneal hernia following LLDN, the small bowel herniates through a mesenteric defect into the retroperitoneal space, leading to obstruction and strangulation, and its clinical presentation can be non-specific, with varying onset of symptoms [4, 5]. The mesenteric defect can be created accidentally during medial mobilization of the colon while incising the lateral peritoneal reflection and during the detachment of the kidney along with Gerota's fascia from the retroperitoneum. Furthermore, the nephrectomy procedure

Table 1 Summary of cases reported retroperitoneal hernia following laparoscopic living-donor nephrectomy

No	Author	Year	Patient's age	Sex	Approach	Time before complication	Operative approach	Operative procedure for reoperation
1	Knoepp	1999	25	Male	Transperitoneal	6 weeks	Open Laparotomy	Reduction and repair
2	Regan	2003	23	Male	Transperitoneal	5 days	Open Laparotomy	Reduction and repair
3	Regan	2003	46	Male	Transperitoneal	1 week	Laparoscopy	Reduction and repair
4	Regan	2003	59	Male	Transperitoneal	1 week	Open Laparotomy	Reduction and repair
5	Kocak	2006	NA	NA	Transperitoneal	NA	Laparoscopy	Reduction and repair
6	LaMattina	2017	NA	NA	Transperitoneal	NA	Laparoscopy	NA
7	LaMattina	2017	NA	NA	Transperitoneal	NA	Laparoscopy	NA
8	Our case	2023	41	Male	Transperitoneal	8 weeks	Open Laparotomy	Reduction and Repair

creates a potential space within the retroperitoneum [15].

To mitigate the risk of mesenteric defect formation, Regan et al. [4] proposed a surgical approach involving meticulous dissection close to Gerota's fascia medially while maintaining a lateral position relative to the gonadal vein. This technique aimed to minimize the likelihood of mesenteric defects. Additionally, conducting routine meticulous inspections of potential mesenteric defects and promptly closing any visible lesions can further mitigate the risk of this complication.

Following this case, the retroperitoneal approach was established as our preferred standard of care for LLDN in male donors at our center. However, it is noteworthy that Yoshida et al. [15] reported a case of internal hernia through a mesocolic defect directly created from the retroperitoneal space during retroperitoneal laparoscopic radical nephrectomy for left renal pelvic cancer [15]. We continue to utilize the transperitoneal approach only in combination with the transvaginal natural orifice specimen extraction (NOSE) procedure for female donor nephrectomy.

4 Conclusion

In summary, a retroperitoneal hernia following LLDN is a rare but significant complication. Non-specific abdominal pain in patients with a history of LLDN prompts a rapid imaging evaluation to aid an early diagnosis of possible retroperitoneal hernia and its intervention. Colonic mobilization must be done carefully to prevent mesenteric defect creation, and routine inspection and closure of mesenteric defect can reduce the risk of hernia formation. The retroperitoneal approach of LLDN is a convenient option with a lower risk of intra-abdominal complication.

Abbreviations

LLDN Laparoscopic living donor nephrectomy
SBO Small bowel obstruction
ODN Open donor nephrectomy

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None.

Author contributions

MPW contributed by writing the case report text, sourcing and editing images, drawing original diagrams, and drafting the review of the literatures. AZH contributed as the clinician in charge of the patient, supervising the report text, clinical images, literature searching and review. AZH was responsible for obtaining informed consent from the patient. All authors approved the final manuscript.

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Competing interests

All authors declare no competing interests.

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AZH is a laparoscopic urologist with extensive experience performing laparoscopic living-donor nephrectomy, including the retroperitoneal approach, and the transperitoneal approach combined with the transvaginal natural orifice specimen extraction (NOSE) procedure for female donors.