



Case report

Hybrid method using laparoscopy and Lichtenstein's technique for incarcerated inguinal hernia in a patient with liver cirrhosis and severe varicose veins: A case report

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ABSTRACT

Introduction: Cirrhosis is a significant determinant of postoperative morbidity and mortality. Patients with severe liver cirrhosis are substantially contraindicated for surgical treatment of inguinal hernia because of the substantial recurrence rate and high postoperative morbidity and mortality. However, hernia with incarceration and strangulation, which could become life-threatening, should be repaired urgently even for patients with severe liver cirrhosis. No clear surgical guidelines have been established regarding the treatment strategy for inguinal hernia in patients with cirrhosis.

Presentation of case: A 62-year-old man with a history of chronic C-type liver cirrhosis (Child-Pugh classification C) and hepatocellular carcinoma was referred to us for surgical treatment of an irreducible right inguinal hernia. An abdominal computed tomography (CT) scan revealed that the small intestine had herniated into the scrotum and severe abdominal wall varicose veins due to liver cirrhosis. We performed a hybrid method that combines examination laparoscopy and Lichtenstein's technique to observe the abdominal cavity and to avoid the risks due to severe varicosities of the inferior epigastric vein.

Discussion: There have been some reports of inguinal hernia with cirrhosis and ascites, but no reports of incarcerated inguinal hernia with abdominal wall varicose veins. In the present case, we chose a laparoscopic approach to observe the abdominal cavity to confirm intestinal necrosis. Hybrid surgery using laparoscopy and Lichtenstein's technique for incarcerated inguinal hernia could be performed safely.

Conclusion: Hybrid surgery using laparoscopy and Lichtenstein's technique may be an effective method for patients with incarcerated inguinal hernia with end-stage cirrhosis and severe abdominal varicosis.

1. Introduction

Cirrhosis is a significant determinant of postoperative morbidity and mortality. Patients with cirrhosis are likely to have many factors that can make surgical treatment difficult, such as thrombocytopenia, coagulopathy, and collateral circulation. Because of these risks, abdominal surgery is discouraged for patients with cirrhosis.

Portal hypertension associated with liver cirrhosis leads to refractory ascites, which causes elevated intra-abdominal pressure with peritoneal distension and increases the prevalence of abdominal wall hernias [1,2]. In addition, malnutrition associated with liver cirrhosis may contribute

to herniation by muscle weakening and fascia [3].

Patients with severe liver cirrhosis are substantially contraindicated for surgical treatment of inguinal hernia because of the substantial recurrence rate and high postoperative morbidity and mortality [4]. Postoperative mortality, both in elective and emergent surgeries, was found to increase with the severity of the patients, stratified by the Child-Pugh criteria [5]. However, hernia with incarceration and strangulation, which could become life-threatening, should be repaired urgently even for patients with severe liver cirrhosis.

No clear surgical guidelines have been established regarding the treatment strategy for inguinal hernia in patients with cirrhosis. Thus,

Abbreviations: CT, computed tomography; ER, emergency room; TAPP, transabdominal preperitoneal approach; TEP, totally extraperitoneal approach; QOL, quality of life; UPP, Ultrapro Plug.

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the treatment method and timing for inguinal hernia repair in patients with liver cirrhosis remains an issue to be discussed in the future.

This report describes a hybrid method using laparoscopy and Lichtenstein's technique for an incarcerated inguinal hernia in a patient with end-stage liver cirrhosis and severe abdominal wall varicose veins. This work has been reported in accordance with the SCARE criteria [6].

2. Case presentation

A 62-year-old man with a history of chronic C-type liver cirrhosis (Child-Pugh classification C) and hepatocellular carcinoma visited the emergency room (ER) due to deteriorated abdominal pain and scrotal swelling. The symptoms disappeared before reaching the ER; however, he was hospitalized because of a large amount of pleural effusion observed using CT.

Four days after admission, he was referred to the department of surgery because of swelling in the right inguinal region with severe irreversible pain. At this point, approximately 24 h had passed since the onset of incarceration. Physical examination revealed that his vital signs were stable. The right-sided fist-sized inguinal mass was irreversible, and the pain was severe.

Laboratory data are shown in Table 1. The data indicated Child-Pugh classification C. Other routine blood examination findings showed no significant abnormalities.

An abdominal CT scan revealed that the small intestine had herniated into the scrotum (Fig. 1a). Moreover, severe abdominal wall varicose veins due to liver cirrhosis were observed (Fig. 1b). However, intra-abdominal free air was not observed. These CT findings suggested an incarcerated small intestine with right inguinal hernia; however, the blood flow in the intestine could not be evaluated using contrast-enhanced CT due to renal failure.

Although the risk for surgery was very high due to end-stage

Table 1
Laboratory data before the operation.

Clinical test item	Result	Unit
CBC		
WBC	10.65 (H)	$\times 10^3/\mu\text{L}$
RBC	3.27 (L)	$\times 10^6/\mu\text{L}$
Hemoglobin	11.6 (L)	g/dL
Hematocrit	34.7 (L)	%
Platelet	17.1	$\times 10^4/\mu\text{L}$
Biochemical test		
Sodium	139	mmol/L
Potassium	3.8	mmol/L
Chloride	104	mmol/L
Calcium	8.9	mg/dL
Urea nitrogen	31 (H)	mg/dL
Creatinine	1.36 (H)	mg/dL
Glucose	152 (H)	mg/dL
Alkaline phosphatase	509 (H)	U/L
Alanine aminotransferase	43 (H)	U/L
Aspartate aminotransferase	98 (H)	U/L
Total bilirubin	2.9 (H)	mg/dL
Direct bilirubin	1.7 (H)	mg/dL
Whole protine	6.6	g/dL
Albumin	1.4 (L)	g/dL
Lactase dehydrogenase	204	U/L
Creatine phosphokinase	52 (L)	U/L
C-reactive protein	1.11 (H)	mg/dL
Coagulation studies		
Fibrinogen	189 (L)	mg/dL
Prothrombin time activity	64.6 (L)	%
PT-INR	1.23	
APTT	41.7 (H)	s
Fibrin D-Dimer	3.3 (H)	$\mu\text{g/mL}$

Key: CBC – Complete Blood Culture; WBC – White Blood Cell; RBC – Red Blood Cell; PT-INR – International Normalized Ratio of Prothrombin Time; APTT – Activated Partial Thromboplastin Time.

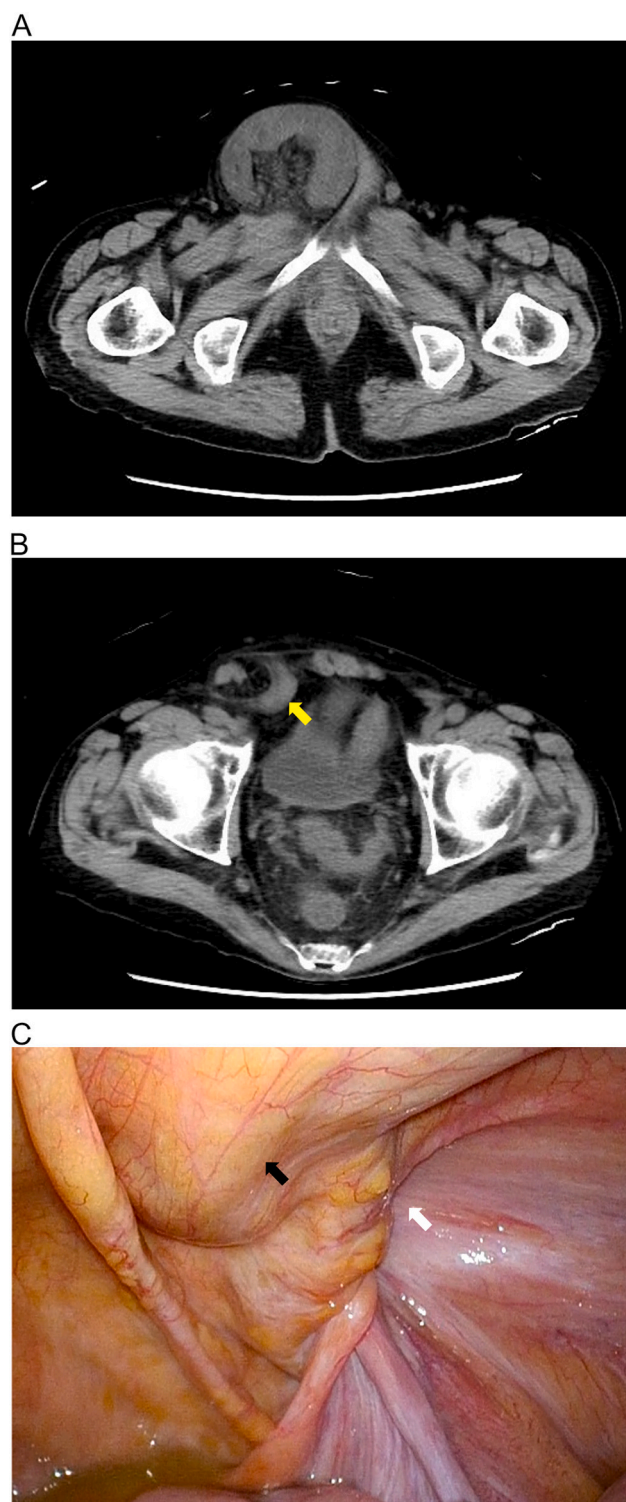


Fig. 1. a: An abdominal CT scan revealed the small intestine was stuck into the scrotum.

b: The right inferior epigastric vein was remarkably varicosis at an abdominal CT (yellow arrow).

c: When observing the abdominal cavity by laparoscopic surgery, the right inferior epigastric vein was remarkably varicotic (black allow), and the hernia sac protruded through the inner ring of the inguinal canal on the lateral side of the inferior epigastric artery (white allow). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

cirrhosis, conservative treatment was ineffective in alleviating the patient's condition. With much discussion of options and weighing of risks and benefits, we decided to perform an emergency surgery. We planned a laparoscopic approach to reverse the incarcerated small intestine and to observe bowel conditions.

Under general anesthesia, we first performed an experimental laparoscopic exploration. The herniation of the small intestine spontaneously recovered, and apparent bowel necrosis was not observed. The right inferior epigastric vein was remarkably varicotic, and the hernia sac protruded through the inner ring of the inguinal canal on the lateral side of the inferior epigastric artery (Fig. 1c). Ascites was well controlled in the abdominal cavity. We decided to repair the hernia with mesh. However, it was considered difficult and hazardous to detach the anterior peritoneal cavity using the transabdominal preperitoneal approach (TAPP) or the totally extraperitoneal approach (TEP) because the right inferior epigastric vein was severely varicotic. Therefore, we decided to perform the hybrid method with laparoscopy followed by an anterior open approach. Considering the risk of blood vessel injury and delayed bleeding due to plug insertion, we utilized the Lichtenstein's method with an Ultrapro Plug (UPP®; Ethicon, Norderstedt, Germany).

His intra- and postoperative conditions were uneventful. However, he died two months after the operation because of end-stage cirrhosis.

3. Discussion

Our case report has two points of great clinical significance. First, hybrid surgery using laparoscopy and Lichtenstein's technique for incarcerated inguinal hernia in a patient with end-stage cirrhosis and severe abdominal varicosis could be performed safely. Second, emergency surgery could save the patient's life and prevent quality of life (QOL) deterioration caused by the inguinal hernia for two months, after which patient died of cirrhosis.

Although the patient had been aware of pain in the groin before, no preventive surgery was performed. In our case, the possibility of intestinal necrosis was considered because the time interval between the onset of symptoms of incarceration to treatment initiation was too long. Therefore, we decided to perform emergent surgery. We considered that the TAPP and TEP methods could pose significant risks due to severe varicosis of the inferior epigastric vein, indicating that an anterior open approach should be preferable. We chose a laparoscopic approach to observe the abdominal cavity to confirm intestinal necrosis. Therefore, we performed a hybrid method that combines examination laparoscopy and Lichtenstein's technique.

Liver cirrhosis is an important factor related to postoperative complications and mortality. Postoperative morbidity and mortality after abdominal surgery are higher in patients with cirrhosis than in those without cirrhosis [7,8]. The increase in postoperative risk varies widely depending on the severity of liver dysfunction and the presence of complications of cirrhosis, such as ascites, encephalopathy, and gastroesophageal varices [9,10]. Patients with cirrhosis who underwent abdominal surgery were reported to have more than 4-fold higher risks of 30-day postoperative mortality than patients without cirrhosis, and postoperative mortality in patients with cirrhosis was 5.8 times higher after emergent compared with elective surgery [11].

Intractable ascites, increased intra-abdominal pressure with abdominal distension, and malnutrition associated with cirrhosis may contribute to hernia formation [3]. The incidence of inguinal hernia seems to be higher in patients with liver cirrhosis whose intra-abdominal pressure is elevated. However, the incidence and natural history of inguinal hernia in patients with cirrhosis have not been clearly shown [12].

Generally, surgery is performed for inguinal hernia to prevent incarceration and strangulation and relieve symptoms. Patients with symptomatic inguinal hernia may have poor QOL because of inguinal pain or discomfort. In addition, there is a possibility that movement is restricted in daily life and work. Patients with an already poor quality of

life due to cirrhosis, inguinal hernia only worsens the same. Patti et al. [13] reported that hernioplasty is itself capable of improving QOL. So far, there has been no clear view of the need and timing of treatment for inguinal hernia with cirrhosis. However, it has been reported that patients who underwent elective surgery showed similar mortality between non-cirrhotic and cirrhotic patients [14]. Elective surgery for inguinal hernia in patients with cirrhosis has appeared to be successful and has a lower incidence of postoperative complications than emergency surgery; therefore, elective surgery may be recommended to prevent life-threatening complications. On the other hand, if inguinal hernia incarceration occurs in patients with end-stage cirrhosis, it is necessary to carefully determine the surgical procedure. To date, there have been some reports of inguinal hernia with cirrhosis and ascites, but no reports of incarcerated inguinal hernia with abdominal wall varicose veins.

4. Conclusion

Hybrid surgery using laparoscopy and Lichtenstein's technique may be an effective method for patients with incarcerated inguinal hernia with end-stage cirrhosis and severe abdominal varicosis. In future, it will be necessary to continue research on the treatment methods for inguinal hernia with liver cirrhosis.

CRedit authorship contribution statement

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by YY (first author). The first draft of the manuscript was written by YY (first author). JK, HU, YY (co-author), HK and KU commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Declaration of competing interest

The authors have no conflicts of interest to disclose.

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Consent to participate

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 request.

Ethics approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Registration of research studies

None.

Guarantor

Kazuki Ueda.

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