



Case report

Successful treatment of intractable chylous ascites after laparoscopic low anterior resection using lymphangiography and embolization with lipiodol: A case report

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ABSTRACT

Introduction and importance: Chylous ascites (CA) is an infrequent, intractable complication that may arise after abdominal surgery. Although various attempts at treatment have been adopted, to date, none of them have been consistently effective. We describe the successful treatment of CA using lymphangiography and embolization with lipiodol.

Case presentation: A 79-year-old woman underwent laparoscopic surgery for rectum cancer at another hospital. She was discharged on postoperative day (POD) 9; however, she had to be treated and hospitalized for CA three times until POD 76. She visited our hospital to undergo treatment for CA on POD 90 because the previous conservative treatment had not improved her condition. The computed tomography (CT) scans revealed ascites effusion. We performed lymphangiography and embolization with lipiodol two times. Repeated CT on POD 134 showed that the ascites had not increased.

Clinical discussion: Lymphangiography and embolization with lipiodol effectively resolved chylous leakage that occurred after abdominal surgery. Additionally, we compare the features of two groups of cases of CA: one group in which patients were treated by lymphatic intervention and the second in which patients were treated through surgical procedures.

Conclusion: We were thus able to demonstrate the clinical effectiveness of lipiodol lymphangiography in treating CA.

1. Introduction and importance

Chylous ascites (CA) is defined as the accumulation of milky peritoneal fluid rich in.

triglycerides [1]. It usually occurs in cases of disruption of the lymphatic system as a result of traumatic injury or obstruction [2]. The etiologies of CA can be classified as traumatic, congenital, infectious, neoplastic, postoperative, cirrhotic, or cardiogenic. In Western countries, malignancy and cirrhosis account for approximately two-thirds of all the cases of CA [3].

Postoperative CA is caused by direct surgical trauma to the major lymphatic tributaries [4]. It rarely occurs after abdominal surgery and is also observed after gynecologic, urologic, and pancreatic surgeries [5]. Previous studies show that the incidence of CA after colorectal surgery is

low (1.0–6.6%); only a few reports have described the occurrence of CA after colorectal surgery [4].

A variety of attempts have been made to treat CA; however, none have been consistently effective or optimal so far [6]. We report a case of CA that developed after surgery for colorectal cancer in a 79-year-old woman. After previous conservative treatment for CA proved unsuccessful, her condition was effectively resolved by lymphangiography and embolization with lipiodol. There are surgical and lymphatic interventions for CA that do not improve with conservative treatment. Further, we compare and discuss two sets of cases: one in which treatment was through lymphatic intervention and the second in which surgical methods were adopted.

This work has been reported in line with the SCARE criteria and the related guidelines have been cited in the reference [7].

Abbreviations: CA, chylous ascites; CT, computed tomography; POD, postoperative day; MCTD, medium-chain triglycerides; LL, lipiodol lymphangiography.

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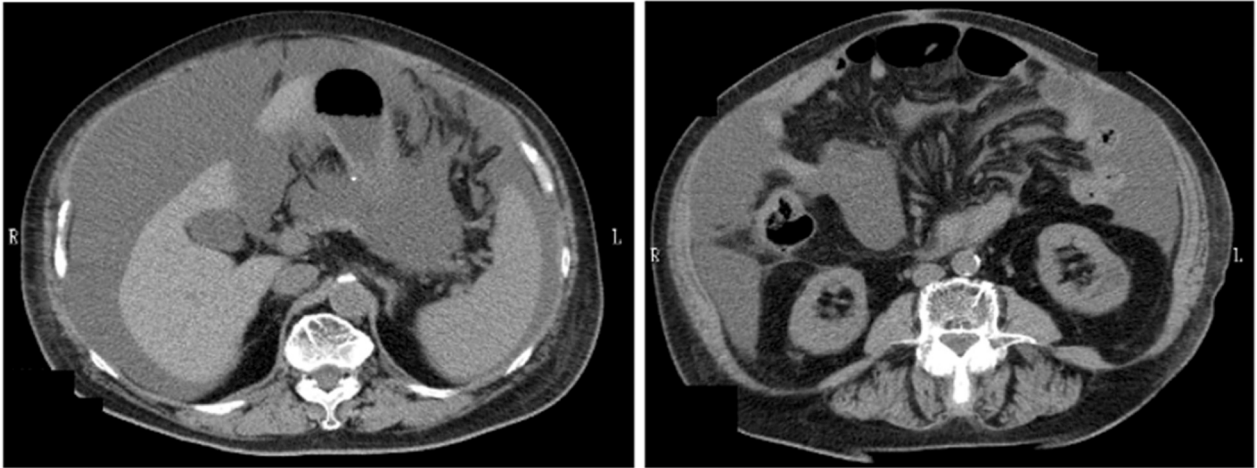


Fig. 1. Abdominal CT of the patient on admission shows chylous ascites.

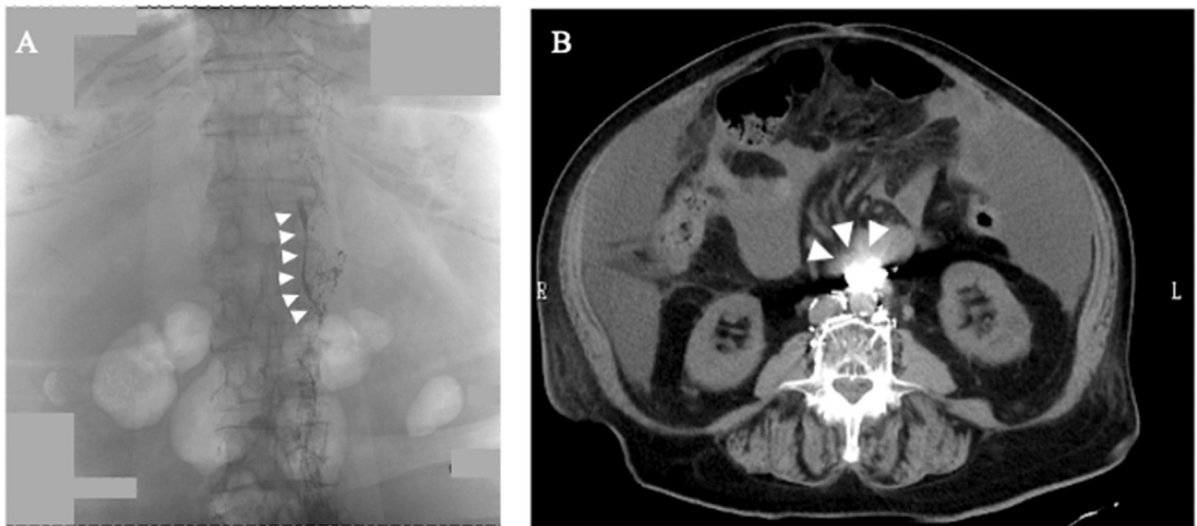


Fig. 2. A: After injection of lipiodol into bilateral inguinal lymph nodes, lipiodol is draining from the para-aorta. B: Computed tomography shows lipiodol as outflow from the para-aorta.

2. Case presentation

A 79-year-old female patient underwent laparoscopic low anterior

resection for rectum cancer at another hospital. D3 lymph node dissection was performed, and the operating time was 210 min. There were no complications. The estimated blood loss was 15 ml. The pathological

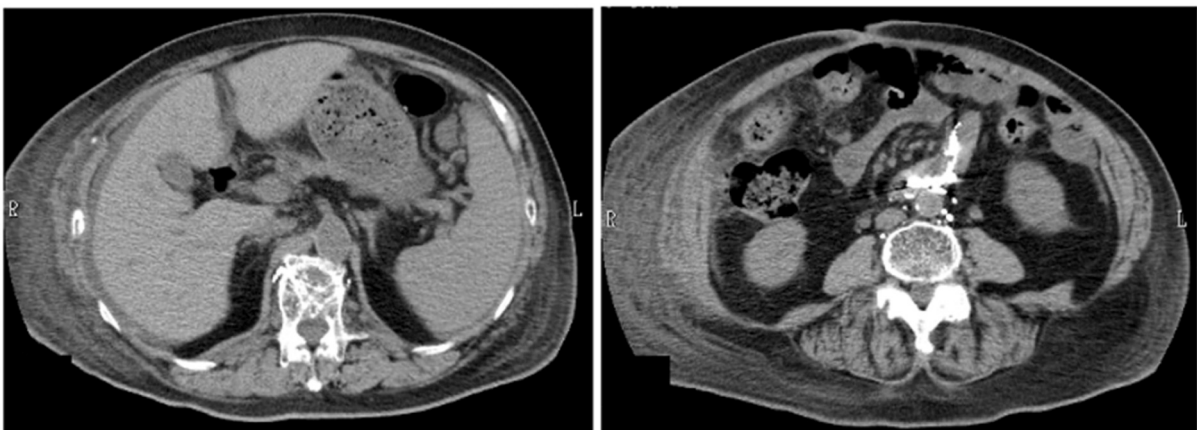


Fig. 3. Abdominal computed tomography shows reduction of chylous ascites on POD 134.

Table 1
Cases that utilized lipiodol lymphangiography after conservative treatment for chylous ascites.

No.	Author/year	Age/sex	comorbidities	Disease/stage	Operation/operation time/blood loss	Complication (without chylous ascites)	Conservative therapy	Number of times LL was performed	Number of days from LL to cure
1	Goa et al. [18]/2020	55/F	None	Mature cystic teratoma/not mentioned	Retroperitoneal tumor resection/not mentioned/not mentioned	None	MCTD	1	21
2	Nakamura et al. [19]/2018	33/F	None	Ovarian cancer/IC1	Abdominal hysterectomy/not mentioned/not mentioned	None	Octreotide, TPN	1	28
3	Tamura et al. [20]/2017	70/M	None	Esophageal cancer/II	Subtotal esophagectomy/not mentioned/not mentioned	None	Octreotide	1	14
4	Hirata et al. [21]/2017	71/F	None	Bile duct cancer/II	Pancreaticoduodenectomy/not mentioned/not mentioned	None	MCTD	1	16
5	Kitagawa et al. [22]/2016	70/M	None	Cholangiocarcinoma/not mentioned	Not mentioned/not mentioned	None	Octreotide, TPN	1	3
6	Our case	79/F	None	Rectum cancer/IIIb	Laparoscopic low anterior resection/210/None	None	Octreotide, MCTD	2	41

LL: lipiodol angiography, MCTD: medium-chain triglyceride, TPN: total parenteral nutrition.

stage was pT3, N1a, M0, pStageIIIb. She had been taking antihypertensive drug for high blood pressure.

The drain tube was removed on postoperative day (POD) 5 because the drainage fluid was less, and she was discharged on POD 9. However, because of abdominal distension caused by CA, she underwent treatment and hospitalization three times until POD 76.

Octreotide (Sandostatin®) and diuretics (Furosemide® and Spironolactone®) were administered subcutaneously and orally, respectively. Chylous fluid drainage was performed twice. During the patient's hospitalization, her diet consisted of high-protein and low-fat foods with medium-chain triglycerides (MCTD). However, these therapies failed.

On POD 90, the patient visited our hospital to undergo treatment for CA. On admission, she exhibited subjective symptoms of abdominal distension, and the computed tomography (CT) scans showed ascites effusion (Fig. 1).

After consulting with an in-house radiologist, the first lipiodol lymphangiography (LL) was conducted on POD 93. Bilateral ultrasound-guided access to the inguinal lymph nodes was achieved using a 26G needle, and lipiodol was slowly administered to the lymph nodes under fluoroscopic guidance to ensure proper access. After injecting lipiodol, fluoroscopic imaging demonstrated accumulation of lipiodol at the para-aorta (Fig. 2).

Nevertheless, the amount of chylous fluid gradually increased, and she was admitted for drainage of ascites on POD 99, which was carried out for nine days, from POD 99 to POD 107; a total of 5460 ml fluid was drained.

The second LL was conducted on POD 108, after which, she was discharged from our hospital on POD 119 on account of no sign of abdominal distension or increased ascites. CT performed on POD 134 showed no increase in ascites (Fig. 3). And CT at postoperative 1 year 6 months showed no CA.

3. Clinical discussion

CA is a rare condition caused by the leakage of lipid-rich fluid into the peritoneal cavity [3], as a result of trauma and rupture of the lymphatic vessels or increased peritoneal lymphatic pressure secondary to obstruction of the lymphatic system or one of its tributaries producing ascites with a turbid or milky appearance because of the high triglyceride content [3]. Although several attempts at treating CA have been made, none have been consistently effective [6]. However, we were able to successfully resolve CA in a 79-year-old woman without surgical intervention through LL.

Shukan et al. suggested that there are three possible causes for the chylous ascites; 1) direct leakage of chyle duct; 2) retroperitoneal

lymphatic leakage without fistula; 3) obstructed lymphatic vessels then rupture [8]. In our case, CA was related to the exudation or leakage of chyle after the rupture of the dilated lymphatic vessel of the bowel wall due to the obstruction of the lymphatic vessel at the base of the mesentery after surgery. The incidence rate of postoperative CA after different types of surgeries has been analyzed, including gynecological surgery with pelvic and/or para-aortic lymph node dissection (0.17%) [9], laparoscopic donor nephrectomy (2%), open donor nephrectomy (0.6%) [9], and pancreatic resection (2.6%) [11]. The incidence of CA associated with colorectal surgery is low (1.0–6.6%); there are only a few studies that have reported the occurrence of CA after colorectal surgery [4].

Right colectomies are associated with a significantly higher incidence rate of chyle leakage (9.6%) than left colectomies (2.6%) and anterior resections (2.8%) [11]. According to Pan et al. the reason is the proximity of major lymphatic vessels around the abdominal aorta [11]. This may be because the abundant lymphatic tributaries posterior to the abdominal aorta are in close proximity to the cisterna chyli [11]. CA after surgery may be caused by radical lymphadenectomy, concomitant vascular resection, pancreatic fistula, and intra-abdominal abscess [12].

Of the total patients with CA, 66–77% of them can be successfully treated using conservative therapy [13]. Conservative management of CA includes total parenteral nutrition, a medium-chain triglyceride diet, and subcutaneous administration of octreotide [5]. Although these measures are successful in most cases, surgical repair and lymphatic intervention may be needed in 23–34% of the patients in whom CA is not resolved through conservative management [13]. These approaches include: 1) peritoneovenous shunt, 2) direct lymphostasis by suturing, 3) surgery combined with the use of fibrin glue, and 4) lymphangiography with lipiodol. Peritoneovenous shunts were utilized in the past to treat CA; however, they are rarely used currently because of high morbidity rates from sepsis, electrolyte imbalance, disseminated intravascular coagulopathy, small bowel obstruction, and air embolism [14].

However, because surgical management may not be successful, it is essential to exercise caution when deciding on surgical intervention.

LL has traditionally been used as a method for diagnosing chylous leakage and enabling the identification of the leakage point before surgical intervention [15]. However, LL may also be applied as a treatment method. A previous study demonstrated that LL was efficacious in 35% of patients with chylothorax, even when the volume of pleural drainage fluid was >500 ml/day. This procedure was also reportedly successful in 51% of patients who are refractory to non-surgical treatments [16].

Lymphatic intervention involving injection of ethiodized oil into the lymphatic system to obtain a lymphangiogram, is a less invasive

Table 2

Cases that utilized surgical repair after conservative treatment for chylous ascites.

No.	Author/year	Age/sex	Comorbidities	Disease/stage	Operation/operation time/blood loss	Complication (other than chylous ascites)	Conservative therapy	Method of surgical repair for chylous ascites	The days from surgical repair to cure
1	Lee et al. [23]/2019	66/M	None	Sigmoid colon cancer/I	Laparoscopic anterior resection/110 min/10 ml	None	Octreotide, MCTD, TPN	Suture	14
2	Shimajiri et al. [24]/2018	31/M	None	Neuroendocrine carcinoma/not mentioned	Laparoscopic descending colectomy/not mentioned	None	Octreotide, MCTD, TPN	Surgery with fibrin glue	10
3	Won Ha et al. [25]/2015	65/M	None	Sigmoid colon cancer/IIIB	Laparoscopic anterior resection/not mentioned/not mentioned	None	MCTD, TPN	Suture	10
4	Fukui et al. [26]/2017	53/M	None	Rectosigmoid cancer/not mentioned	Laparoscopic low anterior resection/not mentioned/not mentioned	None	MCTD, TPN	Surgery with fibrin glue	14
5	Powell et al. [27]/2012	41/M	None	Gastro-esophageal reflux disease/not mentioned	Laparoscopic Nissen fundoplication/not mentioned/not mentioned	None	MCTD	Suture	6
6	Liu et al. [28]/2017	23/F	None	Dysgerminoma of the ovary/not mentioned	Laparoscopic right side pelvic lymph node dissection/not mentioned/not mentioned	None	Octreotide, MCTD, TPN	Suture	182

MCTD: medium-chain triglyceride, TPN: total parenteral nutrition.

treatment compared with surgery. In addition to its diagnostic value, lymphangiography has also been reported to have therapeutic effects [16]. It is hypothesized that chylous leakage cessation after LL occurs because of accumulation of lipiodol at the leakage point, which activates an inflammatory reaction and acts as an embolic agent [15].

To compare treatment methods for CA, we reviewed cases that employed lymphatic intervention (Table 1) and surgical repair (Table 2). Six patients, including ours, underwent LL, of which five (83.3%) were cured after one round of treatment. Our patient underwent LL twice before being cured of CA.

Surgical repair was performed in six cases, and LL was not carried out in any case. Among these, suturing was performed in four cases, while in two cases, surgery was done with glue [23–28].

The time (mean,(range)) taken to cure CA was 20.5 (3–41) days using LL and 39.3 (6–182) days through surgical repair. Although there is no significant difference between them, treatment time using LL tends to be shorter ($p = 0.531$). Further, LL is less invasive than surgical repair and is, therefore, the first choice when conservative treatment failed.

Surgical repair is considered for CA that is not cured after several rounds of LL. Severe CA is uncommon, and the optimal management methods remain controversial.

This is single case report and has limitations. LL has been shown to be useful for CA that does not cure with conservative treatment but additional prospective studies are required to determine the safety. In addition, LL is less invasive than surgical repair, but there are no reports showing a difference in the healing rate of CA, so further studies are needed. However, the outcome of the present case and our review of previous cases from the literature suggest that LL is clinically effective in resolving CA caused by abdominal surgery.

4. Conclusion

We have shown that LL is effective for intractable CA by conservative treatment after laparoscopic low anterior resection.

We will accumulate cases and investigate the validity of LL for intractable CA.

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Ethical approval

This case report has been performed in accordance with Declaration of Helsinki.

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 request.

Guarantor

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Provenance and peer review

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CRedit authorship contribution statement

HU wrote this case reports, and JH revised the manuscript. All authors have made substantial contributions to the conception and design of the case report. HU performed the management. All authors read and approved the final manuscript.

Registration of research studies

None.

Declaration of competing interest

None.

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