Chylous Leakage after Endometrial Carcinoma Surgery: A Case Report

Ann. Ital. Chir., 2025 96, 2: 127–137
https://doi.org/10.62713/aic.3583

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AIM: This report represents a case of chylous leakage after endometrial carcinoma surgery, providing therapeutic insights into similar cases in future.

CASE PRESENTATION: This report describes a case of chylous leakage after endometrial carcinoma surgery. A 67-year-old woman with a 25-year of menopause was admitted to the hospital due to vaginal bleeding that had persisted for 5 days. She was diagnosed with high-grade serous carcinoma with partial sarcomatoid changes. Subsequently, she received surgical treatment for a malignant endometrial carcinoma, and chylous leakage occurred afterwards. A series of treatments were administered, eventually achieving satisfactory control over the patient's condition.

RESULTS: The patient was managed with a multidisciplinary approach, including conservative measures such as bowel rest, total parenteral nutrition, and octreotide to reduce chyle production. Despite initial conservative treatment, chylous leakage persisted, leading to the decision for surgical intervention. Post-surgery, the patient showed significant improvement, with cessation of chylous drainage, and she was eventually discharged with a plan for follow-up care.

CONCLUSIONS: Chylous leakage after endometrial carcinoma surgery is a serious complication that requires timely diagnosis and comprehensive treatment. This case provides valuable therapeutic insights into treatment plans and ways to improve prognosis of patients grappling with the same condition.

Keywords: endometrial carcinoma; chylous leakage; surgery; case report

Introduction

Also known as uterine body cancer, endometrial carcinoma (EC) is a malignant tumor originating from endometrial epithelium. It is a common gynecological malignant tumor and is more commonly affecting perimenopausal and postmenopausal women [1,2]. Most postmenopausal patients have symptoms such as irregular vaginal discharge or bleeding, which is easy to be detected in the early stage, coupled with relatively good prognosis. The 5-year survival rate of early-stage patients is as high as 90%, but the rates dropped to 60% and 20% for those in stage III and IV [3–5]. According to statistics, more younger women are falling victim to EC and its incidence also presents an increasing trend at the global scale, accounting for 25.00% to 33.33% of all female reproductive system malignant tumor cases, and becoming a major life-threatening disease for women [2,6]. Clinically, surgical treatment is the chief mode of treatment for endometrial cancer, while chemotherapy and radiotherapy are often used as adjuvant treatments, but their treatment effect is modest [7]. Nevertheless, the continuous improvement of surgical technology and medical equipment has elevated the standard of gynecological tumor surgeries, including pelvic lymphadenectomy and abdominal para-aortic lymph node resection (PALN). However, this radical form treatment significantly increases the incidence of nerve and vascular injury, the amount of bleeding, the operation time, as well as the incidence of lymph leakage, chylous leakage and lymphedema [8,9].

Chylous leakage is a pathological accumulation of lymph containing triglycerides in the peritoneal cavity. Postoperative chylous leakage is a complication of retroperitoneal surgery caused by damage to the chyle tube and its branches [10,11]. At present, reports on chylous leakage after EC remain limited, and there is no systematic clinical analysis and summary. As a result, most clinicians face a dearth of reference when it comes to making the most well-informed treatment decisions for such patients.

This case has been reported in line with the case report guidelines: Case Report (CARE) Guidelines to ensure the accuracy and completeness of the report (**supplementary material**).

This paper reports a case of chylous leakage after EC surgery, providing some reference for the treatment of this complication through clinical analysis of the diagnosis and treatment process of this case.

Submitted: 12 July 2024 Revised: 30 September 2024 Accepted: 14 October 2024 Published: 17 January 2025
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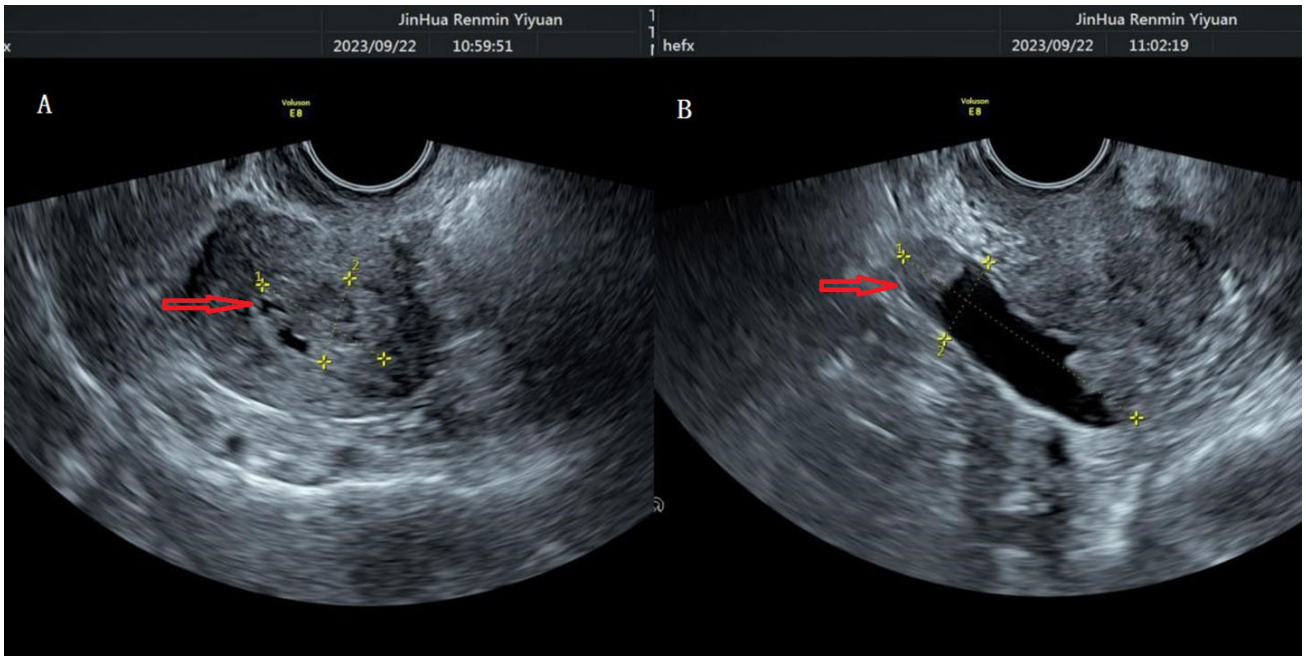

Fig. 1. Ordinary color Doppler ultrasound examination film of the patient. (A) Uterine mass. (B) Ovarian cyst. The red arrow points to an uneven mass/mass in the uterine cavity.

Case Presentation

Chief Complaints

A 67-year-old woman with a 25-year history of menopause was admitted to the Department of Gynecology, Jinhua People's hospital on 20 September 2023 for due to vaginal bleeding that had persisted for 5 days. This study was approved by the Ethics Committee of the Jinhua People's Hospital, and the informed consent was obtained from the patient (No.2024-027).

Past Medical History

Prior to hospital admission, the patient experienced natural menopause and 30-day regular menstruation cycle with 5–7 days of menstrual period and moderate menstrual volume. She reported no vaginal bleeding after menopause and no dysmenorrhea. She had a history of bilateral tubal ligation and surgery for varicose veins of the lower extremities, and has been suffering from hypertension for more than ten years. She was on anti-hypertensive medications to keep her blood pressure under control. Further, she had no prior history of infectious diseases such as hepatitis and tuberculosis, chronic diseases such as diabetes, major organ diseases such as heart, liver, brain, lung, kidney and endocrine system, food and drug allergy, major surgery and trauma, blood transfusion and blood product use, poisoning, and vaccination. Further interrogation also revealed no family history of infectious diseases, genetic diseases, tumors and mental illness diagnosis in the second- and third-generation members.

Personal History

The patient was born and raised at the same place, and is a Chinese resident with no history of living at other places for a prolonged period. The highest education standard she had attained was junior high school level. She has no history of close contact with water-borne and viral infections during epidemic outbreaks, and had never been exposed to toxic substances, dust and radioactive substances. She had no bad habits such as smoking and drinking. She was married at the age of 23 (non-consanguineous marriage) and has two children. Her spouse was in good physical health condition.

Physical Examination

The vital signs of the patient were normal. The patient had vaginal bleeding persisting for 5 days before admission; the blood loss was of low amount and in dark red color. The patient reported absence of abdominal pain, abdominal distension, frequent urination, urgent urination, chills and fever, difficulty in urination and defecation, as well as dizziness and fatigue.

Imaging Examination

On 22 September 2023, ordinary color Doppler ultrasound examination revealed heterogeneous masses in the uterine cavity, aside from the EC, uterine effusion, and cystic dark area shown in the right accessory area (as shown in Fig. 1A,B). Accordingly, preliminary diagnosis was made, i.e., (i) postmenopausal bleeding; (ii) right ovarian cyst; and (iii) hypertension.

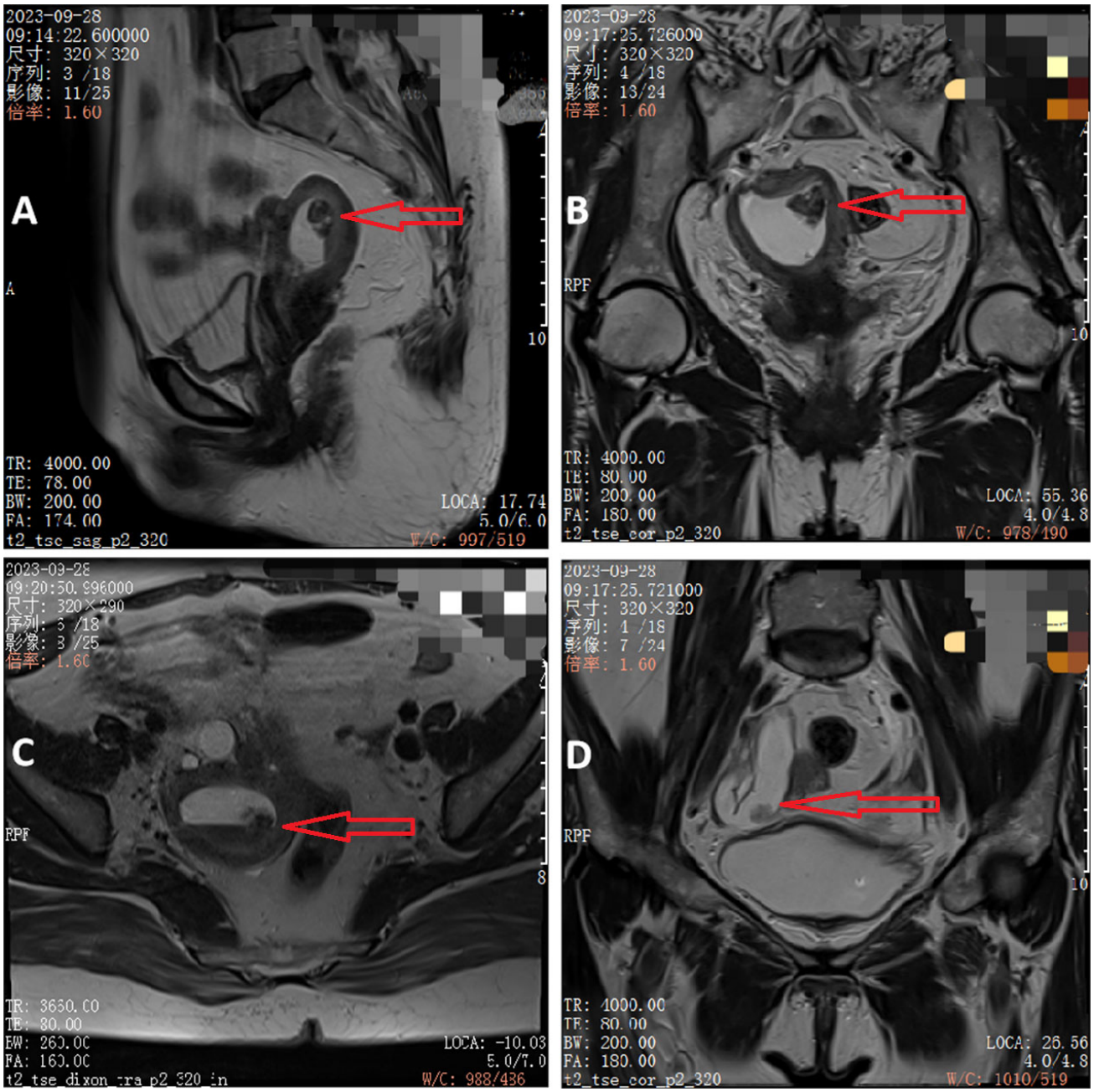

Fig. 2. Pelvic enhanced magnetic resonance imaging (MRI) for the patient revealing uterine and right fallopian tube masses. (A–C) Uterine mass. (D) Right fallopian tube mass. The red arrow points to the uterus/right fallopian tube mass. RPF, Retroperitoneal Fibrosis; TR, Repetition Time; TE, Echo Time; BW, Blood Flow Width; FA, Fractional Anisotropy; LOCA, Location; W/C, Wall/Cavity.

Treatment Process

The patient underwent hysteroscopic adhesiolysis on 25 September 2023.

During the operation, it was found that the uterine cavity was too large. A cauliflower-like mass with a diameter of about 2.5 cm was examined on the right uterine wall, and vascular hyperplasia was seen. A polypoid neoplasm with a diameter of about 2.0 cm was seen at the bottom of the uterus with a thick endometrium. On 28 September 2023, the patient was further examined using pelvic enhanced magnetic resonance imaging (MRI), and the results unveiled uterine cavity tumor, cystic lesion in the right adnexal area (regarded as dilated fallopian tube), and multiple nodules in the wall of the tube, which were likely indicative of tumor (Fig. 2A–D). On 29 September 2023, laparoscopic extra fascial hysterectomy, double adnexectomy, pelvic lymph node resection, high para-aortic lymph node resection, omentectomy and pelvic adhesion lysis were performed.

Surgical procedure: after successful anesthesia, the patient was placed in the lithotomy position. The surgical field was routinely disinfected, sterile drapes were laid, and a uterine

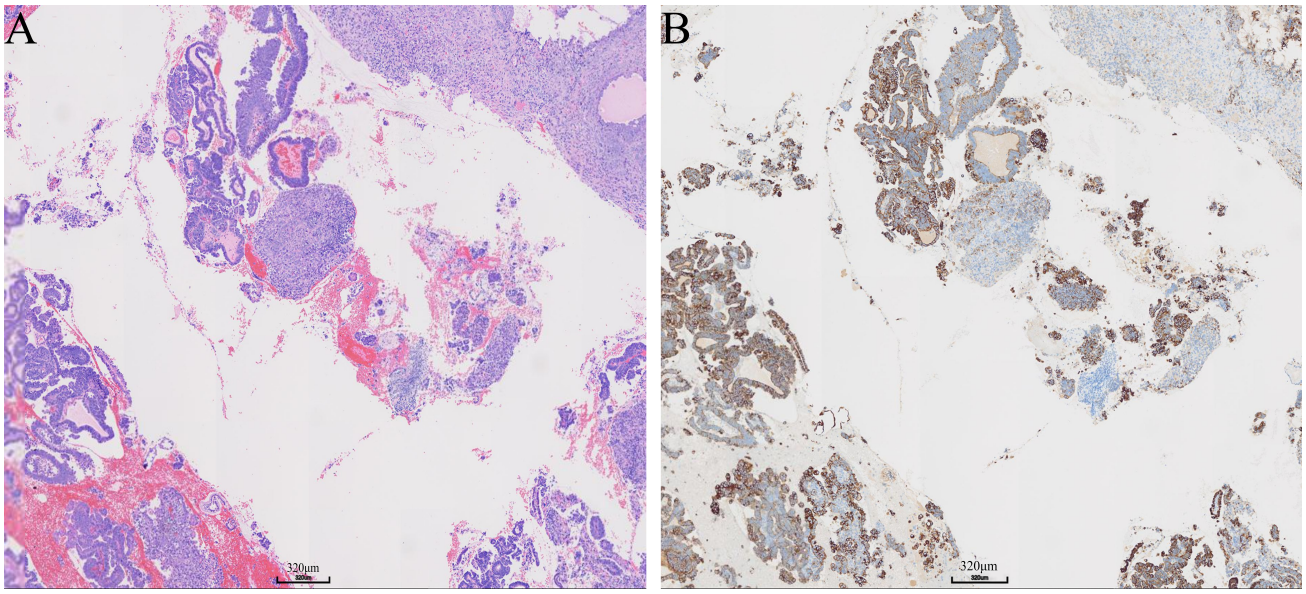

Fig. 3. Postoperative histopathologic results. (A) Endometrial carcinoma (hematoxylin-eosin staining; magnification: 20×). (B) Immunohistochemical staining of ER in the endometrial carcinoma (magnification: 20×). (A,B) scale: 320 μm.

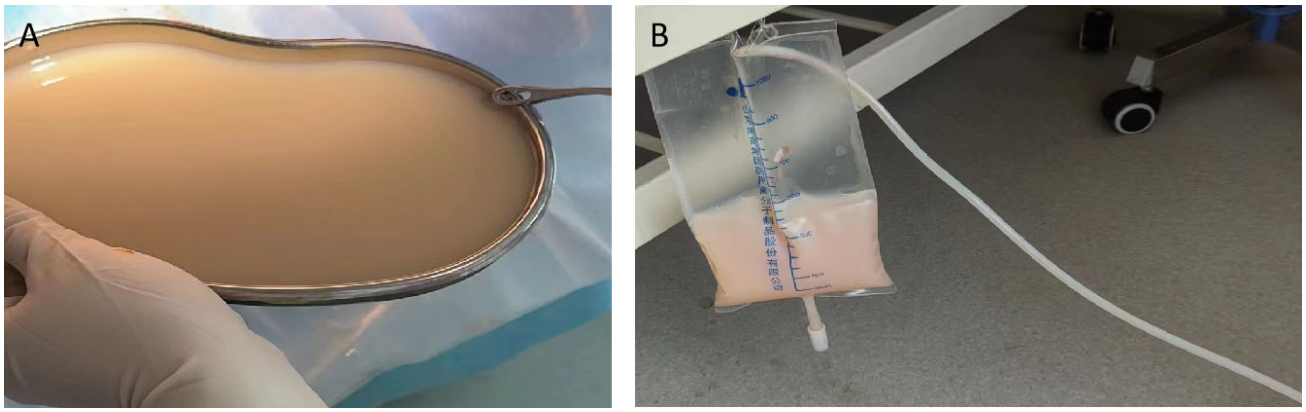

Fig. 4. Chylous leakage of patient. (A,B) This is chylous drainage fluid from the patient's left pelvic cavity.

manipulator was placed. The various components of the laparoscope were connected. A 10-mm-long skin incision was made on the upper edge of the umbilicus, and a Trocar with a diameter of 10 mm was inserted. Carbon dioxide gas was insufflated to raise the intra-abdominal pressure to 12 mmHg, and the laparoscope was inserted into the abdominal cavity. Under the direct vision of the laparoscope, Trocar with diameters of 5 mm, 5 mm, and 5 mm were inserted into the left and right lower abdomen respectively. Upon exploration: the surface of the liver and spleen in the upper abdomen is smooth, and there are no obvious abnormalities on the surface of the stomach, intestines, and greater omentum. The uterus is full, the left fallopian tube appears soft, the right fallopian tube is twisted and thickened, and it is extensively adhered to the right sidewall. The bilateral ovaries appear smaller in size. The pelvic cavity was irrigated, and the irrigation fluid was collected. Adhesions were separated, the uterus was lifted, and the intestines were retracted. The right pelvic infundibulopelvic ligament was electrocoagulated and resected, and the round ligament was cut, opening the broad ligament. The same method was applied to the left side. Incise the bladder peritoneal reflection, push down the bladder, and open the bladder-cervical space; free the ureter, expose the left uterine artery, and coagulate and transect the uterine artery, free the ureter, continue to push down the bladder, open the rectovaginal space, and resect the cardinal ligament of the uterus by about 1 cm; and separate downward to resect the sacral ligament by about 1 cm, treat the opposite side in the same manner. Make a circular incision on the vagina, resect about 1 cm of the vagina, and remove the uterus. Remove the uterus and bilateral adnexa through the vagina, and continuously suture the vaginal stump margin with absorbable sutures. The right internal cerebral artery was exposed, and the umbilical artery was ligated. The right common iliac vessel sheath was opened, and the right common iliac lymph nodes were resected. Lymph nodes outside the sheath were resected along the external iliac vessels. The right inguinal region

was exposed, and the deep inguinal lymph nodes were resected. The right external iliac arteriovenous septum was opened, and dissection along the pelvic wall led to the resection of the right internal iliac lymph nodes. The obturator nerve was exposed, and the right obturator lymph nodes were resected. The same procedure was performed to resect the various lymph node groups in the left pelvic cavity. Resect the greater omentum along the transverse colon, open the peritoneum on the surface of the abdominal aorta, expose the inferior mesenteric artery, expose the left renal vein, expose the bilateral ureters, coagulate and resect the left, right, and middle para-aortic lymph nodes, remove the specimen and irrigate the pelvic cavity with saline. Check for no active bleeding, place one drainage tube, remove the instruments after checking for no errors, degas, and close the abdomen. The operation went smoothly, with minimal bleeding, the patient was stable during the surgery, and the anesthesia was satisfactory.

The whole uterus and bilateral fallopian tube were resected during surgery. The specimens were subjected to postoperative histopathologic analyses (Fig. 3). The staining results revealed that the specimens had complete integrity, featuring endometrial enlargement and maximum tumor diameter of 2 cm. Based on the biopsy specimen report, the tumor was diagnosed as a high-grade serous carcinoma with partial sarcomatoid change. The results also showed muscle layer infiltration, with a depth of 5 mm (superficial muscle layer). There was no tumor infiltration into uterine serosa, lower uterine segment, and superficial (non-muscular) interstitial layer, with no other tissue/organ involvement. There was no peritoneal effusion/ascites, no cervical external orifice of malignant tumor cells, as well as no tumor involvement in parametrial/paracervical resection margin, vessels, negative left annex, and left and right broad ligament resection margin. No tumor involving regional lymph nodes was found in the vaginal wall margin, and no tumor metastasis was found in para-aortic lymph nodes (0/20), left pelvic lymph nodes (0/12), and right pelvic lymph nodes (0/9). No tumor involvement was found in the right ovary. According to FIGO staging, the pathological stage of the tumor was IA (Tia, N0, M) [12]. In addition, no tumor was found in the greater omentum, and low-grade serous carcinoma (right fallopian tube) was found to be involved. The tumor size was about 1.7 × 0.5 cm, located in the fallopian tube mucosa. Immunohistochemical results in this case are as follows: CK5/6 (–), ER (3+, 70%), Ki67 (5%), P16 (+), P53 (wild-type), Pax-8 (+), PR (–), WT-1 (partial+), napsin A (–), vimentin (partial +).

Postoperative Drainage Observation

On the first day after operation, the patient had an albumin level of 28.6 g/L, and this albumin infusion of 20 g/day was initiated and continued for 3 days. On the second to seventh day post-operation, the patient's health condition did not show significant improvement, and the drainage of pale bloody fluid gradually decreased from 830 mL to 129 mL, with no abnormalities being observed during this period. On the 8th day post-operation, a total of 18 mL was drained at 24 h. Considering the blockage of the drainage tube, 5 mL of milky white or milky peritoneal fluid was drained from the left pelvic drainage tube for the first time (Fig. 4A,B). On the 9th day after operation, the patient had obvious perineal edema and traces of yellow vaginal fluid. On the 10th day after operation, only 7 mL of light yellow liquid was drained at 24 h. Considering the blockage of pelvic drainage tube, the pelvic drainage tube was removed. After removal, a large amount of yellow liquid (~500 mL) flowed out of the orifice of the drainage tube. Then, the fistula drainage bag was connected to the extubation of the left pelvic drainage tube. On the 12th day after operation, her total protein result showed 54.9 g/L and albumin 26.3 g/L, which indicated hypoproteinemia, warranting continued intravenous infusion of albumin 20 g for 3 consecutive days.

Diagnosis of Chylous Leakage

It is necessary to rule out other postoperative complications, such as anastomotic leakage, pelvic and peritoneal effusion infection, cancerous ascites, hypoproteinemia-related ascites, and urinary extravasation caused by urinary tract injury, before finalizing the diagnosis of chylous leakage. A diagnosis of chylous leakage should be considered in light of the changes in drainage fluid properties and the increase of drainage volume due to dietary changes, especially when the drainage fluid is found to change from clear to milky white, odorless liquid. The patient was diagnosed with chylous leakage after running a clinical diagnosis, an observation of drainage fluid color and a comprehensive laboratory test.

Postoperative Treatment and Treatment of Complications

On the 15th day after the operation, there was no obvious liquid drainage within 24 h. The left pelvic fistula device was removed, the vaginal stump was removed with a stitch, and a pelvic drainage tube was placed through the vaginal stump. After draining 2000 mL of chyle-like liquid, the tube was clipped, but there was still chyle-like liquid flowing out through the vagina. Octreotide was injected subcutaneously once every 8 h (discontinued on 21 October 2023). On the 16th day after operation, abdominal compression was performed, atropine 0.5 mg was injected intramuscularly once a day (discontinued on 20 October 2023), and spironolactone 20 mg was taken orally three times a day (discontinued on 17 October 2023). On the 21st day after operation (20 October 2023), a total of 286 mL of yellow liquid was drained in 24 h, and chemotherapy encompassing paclitaxel 240 mg and carboplatin 500 mg was administered intravenously. Bone marrow suppression (degree IV) occurred after chemotherapy, and 300 μg of human granulocyte stimulating factor was injected in the morn-

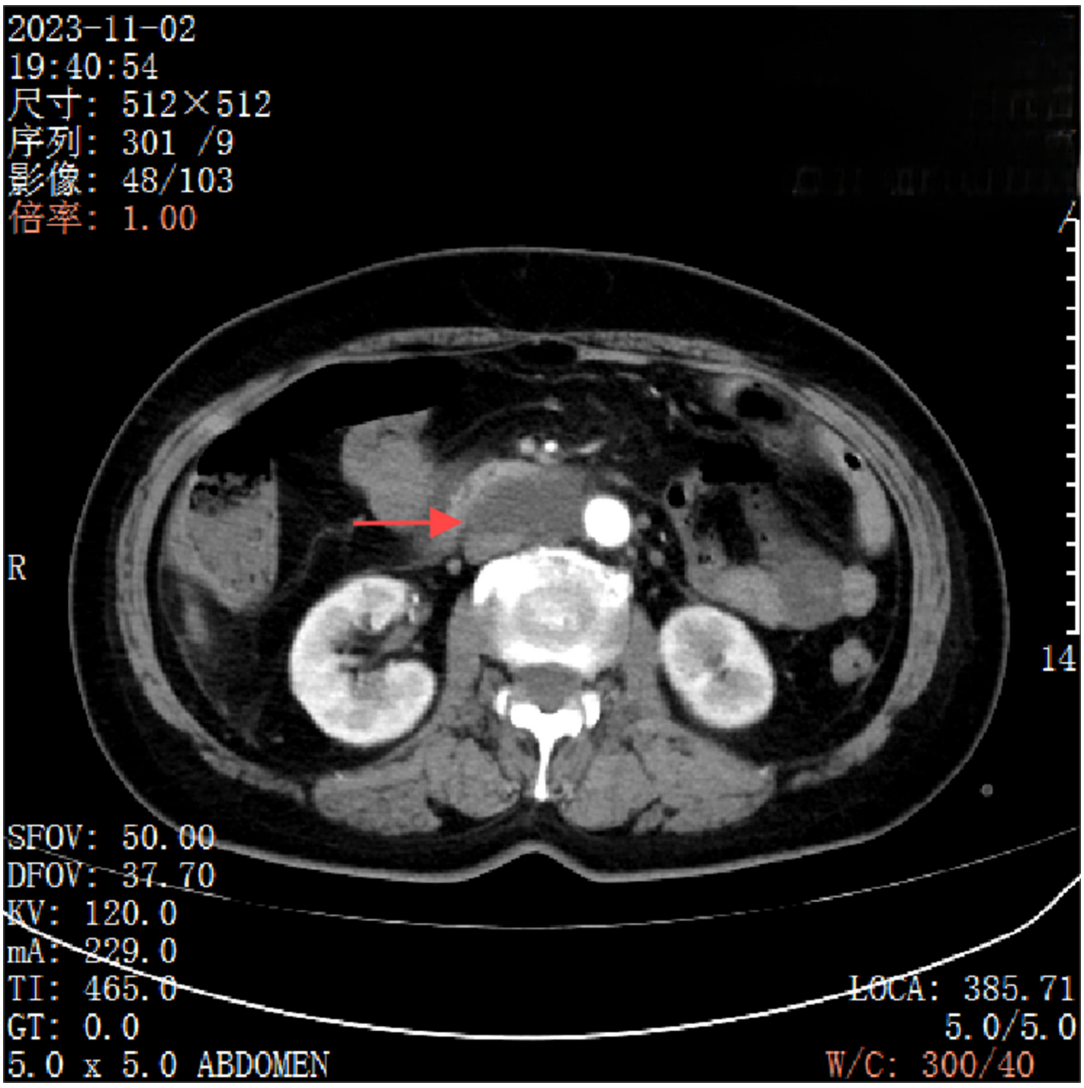

Fig. 5. Encapsulated effusion in the surgical area. The encapsulated effusion is on the surface of the abdominal aorta. The red arrow points to Cystic foci in the surgical area. SFOV, Scan Field of View; DFOV, Display Field of View; KV, Kilovolt; mA, Milliamperes; TI, Inversion Time; GT, greater trochanter.

ing and a separate dose of 150 μg was given in the afternoon. On the 34th day after the operation (2 November 2023), the patient complained of abdominal pain. Upper and lower abdominal enhanced computed tomography (CT) revealed common bile duct dilatation and cholecystitis secondary to lower common bile duct stones. Multiple abnormal enhancements were observed in the right lobe of the liver on MRI examination. The patient also had gallbladder stones and faced gallbladder adenomyomatosis. Postoperative changes in the uterus and cystic lesions in the surgical area suggest encapsulated effusion. Additionally, there were retroperitoneal cystic lesions in the right iliac fossa (Fig. 5). The patient was diagnosed with acute pancreatitis following hepatobiliary consultation, and her abdominal pain alleviated after symptomatic and supportive treatment was given. On the 52nd day post-operation, a pelvic drainage tube was placed in the vaginal stump, and the patient was discharge with the tube.

On 7 December 2023, she was admitted to the hospital for more than 2 months after endometrial malignant tumor surgery, and returned to the hospital for chemotherapy as scheduled. On 25 December 2023, laparoscopic chylous duct ligation, cholecystectomy, and pelvic adhesion lysis were performed.

After being anesthetized, the patient, who was in a supine position, was subjected to routine disinfection of vulva vagina, indwelling catheterization, and disinfection of surgical field with a sterile towel. A 10 mm long skin incision was made at the umbilical edge, and a 10 mm Trocar was inserted. The 10 mm Trocar was filled with carbon dioxide to elevate the intra-abdominal pressure to 13 mmHg, and then the laparoscope was inserted into the abdominal cavity. Under laparoscopic direct vision, 3 sets of 5 mm Trocar were placed in the left and right lower abdomens, respectively. The exploration revealed a little white effusion in the pelvic cavity, abdominal adhesion, encapsulated effusion on the

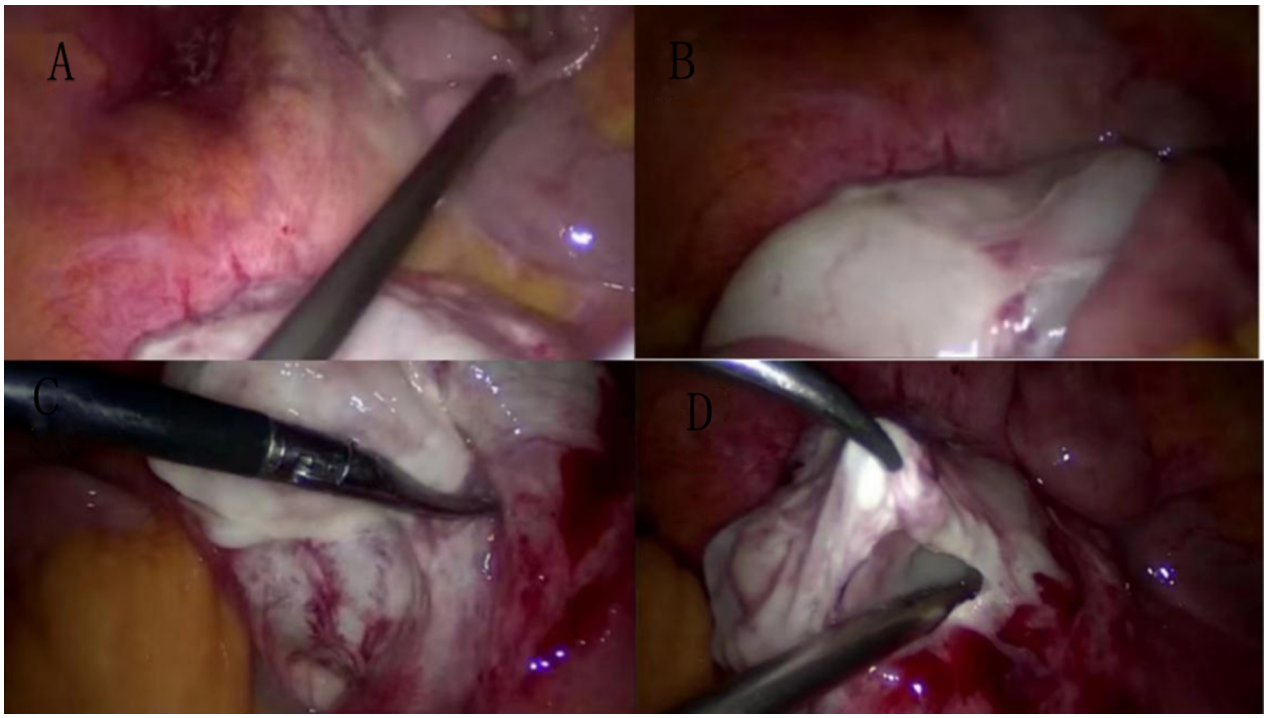

Fig. 6. Laparoscopic chylous duct ligation. (A) Chylous effusion. (B–D) Pre-aortic encapsulated effusion.

surface of the abdominal aorta, adhesion between the intestinal tube and the surface of the abdominal aorta, separation of adhesion, exposure of the abdominal aorta, chylous lymph outflow between the abdominal aorta and the inferior vena cava and below the left renal vein, mesenteric and intestinal adhesion, and exposure of the wound. Following suture and ligation of lymph nodes with Prolene suture, there was no obvious chylous liquid outflow after washing. Puncture was made under the xiphoid process and the right upper abdomen, and then a set of Trocar was inserted. The following signs were monitored following one-time tissue closure and cut-off of the clipping: gallbladder enlargement, gallbladder congestion and edema, chronic inflammation coupled with fiber hyperplastic changes, dissection of the gallbladder triangle, and separation of the cystic duct and cystic artery. The seromuscular layer of the gallbladder was incised, and the gallbladder was completely stripped from the subserosa, and the gallbladder bed was electrocoagulated to stop bleeding. The abdominal cavity was rinsed with normal saline. A pelvic drainage tube was placed to check for presence of active bleeding. After counting the instrument correctly, remove the instrument, deflate and close the abdomen. The operation went smoothly with minimal amount of the bleeding, and the patient's conditions were stable intraoperatively, who was induced by optimal anesthetic effect.

During the operation, a small amount of chyle-like effusion was found in the pelvic cavity, and the encapsulated effusion (which was chyle-like effusion) was formed on the surface of the abdominal aorta (Fig. 6A–D). During the operation, 20 g of human serum albumin (self-contained) was infused, and a pale pink chyle-like liquid was discharged after the operation, which was considered as preoperative residue. After detecting a small amount of pale yellow liquid draining from the patient for 24 h, vaginal fluid of the patient was discharged into a tube up until 2 January 2024.

Discussion

Featuring rising clinical incidence, EC is one of the common malignant tumors arising in the female reproductive tract [13,14]. According to the statistics of China Cancer Center in 2022, the incidence of EC in China ranks second among the female reproductive system malignant tumors, with about 82,000 new cases [15]. Study has shown that postmenopausal women with endometrial cancer is associated with hypertension [16]. In addition, study has shown that early menarche and late menopause increase the risk of EC [6]. In this case, the patient was 52 years old and had a history of hypertension for more than ten years, which are the high-risk factors for EC. Hypertension affects hormone levels and metabolic processes in the body, subsequently impacting the normal physiological function of the endometrium. At the same time, postmenopausal women lack the protective effect of progesterone, which further increases the susceptibility to EC. Abnormal vaginal bleeding after menopause is the most important clinical symptom of EC, but it is not specific and may also be related to other gynecological diseases [3]. Therefore, when these symptoms occur, further examination should be implemented as soon as possible. Ultrasonography can be used as a first-line imaging examination for EC, although some shortcomings

of this approach have been reported, including low specificity, subjective evaluations, and instrumental errors [17]. In this case, the patient had vaginal bleeding without obvious inducement, and was diagnosed with EC using ultrasound combined with biopsy specimen report. This suggests that in clinical practice, ultrasound alone cannot be used for EC screening for suspected patients, and it needs to be combined with histopathological tests to confirm the diagnosis.

The conventional treatment for EC patients mainly includes total hysterectomy, bilateral adnexectomy, pelvic lymph nodes, and/or PALN. Chylous leakage is one of the complications after PALN in gynecological malignant tumors. The incidence rate of chylous leakage stands at only 0.17% to 11%, considered a rare complication [18]. The formation of chylous leakage is closely related to the specific structure in the lymphatic and circulatory systems. The chyle pool is generally located at the anterior side of the first lumbar vertebra, which is composed of the left and right sides of the lumbar trunk and the intestinal trunk. The lumbar trunk is responsible for collecting lymph from the paired organs in the abdominal cavity, the pelvic floor area, the posterior wall of the abdomen, and the lower limbs. The lymph will eventually converge to the chyle pool or directly flow into the thoracic duct. The epithelial cells of small intestinal villi synthesize fat particles after absorbing fatty acids, glycerol and glyceryl ester. These fat particles are mainly transported by capillary lymphatic vessels. The lymphatic capillaries combine and form a lymphatic trunk for the intestine, facilitating the flow to the chyle pool. The lymph of small intestinal villi is therefore rich in a large amount of fat, showing a unique milky white coloration, that is, chylous. The damage of intestine may trigger the occurrence of chylous leakage. In the PALN operation, especially in the high-level PALN, chylous leakage occurred due to the excessive damage of the chylous vessels around the chyle pool during the separation of blood vessels and tissues, without complete ligation and effective closure [19]. In fact, after routine preoperative bowel preparation, the lymphatic fluid in the lymphatic vessels is colorless and transparent, and the pressure of the lymphatic vessels is low after fasting. It is difficult to identify the lymphatic vessels and their damaged sites with the naked eye during surgery. At present, there is no uniform diagnostic criteria for chylous leakage. It has been reported in the literature that non-contrast magnetic resonance lymphangiography has a high sensitivity for the diagnosis of cervical and thoracic chylous leakage [20], but its diagnosis for abdominal chylous leakage has not been reported. Relevant literature shows that the diagnostic criteria mainly depend on clinical manifestations and laboratory tests. If a continuous bright, pale yellow or chyle-like liquid is observed in the postoperative drainage bag, regardless of the size of the drainage volume, as long as the protein content of the exudate is >30 g/L, the total cell number is $>0.5 \times 10^9$/L, and the triglyceride concentration is >100 mg/dL, chylous leakage would be a plausible diagnosis [21]. In this case, the postoperative chyle liquid drawn from the drainage tube was milky white, and the total protein of the patient was 54.9 g/L, all of which were consistent with the diagnostic criteria for chylous leakage described in the above. The current case was the first to demonstrate the diagnosis of chylous leakage based on chyle fluid draining from the patient's drainage tube after laparoscopic extrafascial hysterectomy, double attachment resection, pelvic lymph node resection, high PALN, greater omentum resection, and pelvic adhesion lysis. The postoperative chylous leakage was probably caused by the untimely and ineffective lymphatic vessel closure after accidental injury during lymph node resection [22]. At the same time, inadequate heat emanating from the laparoscopic assisted energy device used in the operation could be a reason for the unsuccessful closure of the lymphatic vessel, although stronger heat can cause large burns of the tissue and thus impact postoperative healing. This suggests that during the operation, in addition to paying attention to ligation or coagulation of lymphatic vessels in the PALN area, physicians should also optimize the treatment through pelvic lymph node resection.

In addition, although chylous leakage is a rare complication, once it occurs, it will extend patient's hospitalization time, affect the treatment effect, and increase the medical cost. The patient was re-operated due to postoperative chylous leakage, and the hospitalization time was long. Therefore, it is necessary to evaluate the patient's negative emotions in a timely manner. Through multimedia videos, promotional materials and sharing of other successful cases, patients are encouraged to vent out their emotions appropriately, and their families are advised to maintain close communication with patients, take up a positive and optimistic attitude, and cooperate with the physicians during the treatment process. Li *et al*. [23] pointed out that if postoperative chylous leakage is not treated in a timely and effective manner, the loss of a large amount of lymph may cause metabolic disorders, which lead to complications such as hypoproteinemia, edema, emaciation, secondary infection, and poor wound healing, thus affecting the prognosis of patients.

In terms of treatment, conservative treatment is the first choice for postoperative chylous leakage. It can be used as preoperative preparation for other treatment methods if the associated success rate is not high. Therefore, the existing conservative treatment is essential, but the best conservative treatment mode has yet to be determined [24]. Kadota *et al*. [25] pointed out have shown that once postoperative chylous leakage is detected, the patient should modify their sitting posture, limit level of activity, adopt an elevated head position while lying in the bed, optimize their dietary and nutritional habits, and actively receive conservative treatment such as somatostatin drugs, local pressure dressing, continuous negative pressure suction, and local injection of drugs. Octreotide, a somatostatin analogue, is an ef-

fective drug for conservative treatment of chylous leakage, mainly reducing portal vein pressure by inhibiting glucagon and other intestinal peptides-mediated visceral vasodilation. At the same time, it can also reduce intestinal peristalsis, fat absorption, and concentration of triglycerides in the thoracic duct, thereby restricting lymph flow [26]. The study found that the success rate of octreotide in the treatment of chylothorax after esophageal surgery was 38% to 100% [27]. Some studies also suggest that octreotide is an effective method for the treatment of high-flow chylous fistula [26,28]. In this case, chylous leakage was detected after lymphadenectomy, and octreotide acetate injection was given via subcutaneous route following fasting. Because the half-life of octreotide acetate was about 1 to 3 min, the withdrawal time during infusion should not exceed 3 min to ensure the continuity and effectiveness of medication. At the same time, the infusion speed (<0.05 mg/min) should be controlled to avoid nausea, vomiting and chest tightness caused by very rapid infusion. In addition, it is worth noting that octreotide can affect the secretion of islet cells, with a certain hypoglycemic effect. Thus, both patients and their families should be informed of the potential hypoglycemic events, and close monitoring for such events should be conducted too.

Persistent chylous leakage can lead to water and electrolyte imbalances, nutrient loss and decreased immunity; therefore, correcting water, electrolyte, and nutrient imbalances is equally critical [29]. Therefore, this patient was given intravenous rehydration support and nutritional support according to the results of daily blood routine test to avoid nutritional deficiencies, electrolyte disorders or other complications. In this case, it was found that the conservative treatment effect was not pronounced, and 1500 mL of chyle was still drained. Previous studies have pointed out that when leaked chyle exceeds 1000 mL/d, conservative treatment fails to deliver the desired therapeutic efficacy, or serious complications occur, surgical treatment can be considered to ligate or repair lymphatic vessels [30,31]. Therefore, after laparoscopic chylous duct ligation, the amount of chyle fluid outflow was controlled, the peritoneal drainage was gradually reduced, and the chyle's color returned to normal. This suggests that in the face of chylous leakage, we should choose the right treatment plan according to the patient's specific situation for symptomatic relief.

The prevention and treatment of chylous leakage requires surgeons to be familiarized with the anatomical level of lymphatic vessels in order to avoid accidental injury during operation. In previous studies, few articles mentioned the effect of surgeon's skills on the incidence of chylous leakage after gynecological malignant tumor surgery. During the operation, without a complete knowledge of the anatomical structure, and with rough intraoperative techniques, large intraoperative separation of anatomical wounds, unligated lymphatic vessels with large diameter, and no detailed layer-by-layer closure during wound closing may be resulted, leading to postoperative chylous leakage. Favero *et al*. [32] proposed that careful separation of anatomical structures during surgery and the use of sutures to clamp blood vessels and major lymphatic vessels during surgery can reduce the occurrence of postoperative lymphatic leakage. Therefore, the prevention of chylous leakage after operation and the reasonable treatment after the occurrence must be paid attention to by surgeons. In addition, Kanno *et al*. [33] reported that effective clamping of open lymphatic vessels during retroperitoneal lymphadenectomy can significantly reduce the incidence of postoperative chylous leakage. When performing lymph node dissection, silk ligation or clips should be used to clip lymphatic vessels to avoid electrocautery and blindly expanding the scope of dissection [33]. In fact, chylous leakage after EC is a relatively rare postoperative complication. To date, no expert consensus and guidelines on the prevention and treatment of chylous leakage have been issued. We believe that mastering the distribution of uterine lymphatic drainage and the precise surgical scope are the key measures to prevent chylous leakage after EC.

Conclusions

This case report introduces the clinical treatment of one patient with chylous leakage after EC surgery. Despite the rarity, chylous leakage after EC has severe implications, affecting wound healing and leading to electrolyte disorder and concurrent infection, thus prolonging hospitalization time and increasing hospitalization expenses. Reducing the incidence of chylous leakage requires high level of familiarity with the anatomical structure, full closure of the lymphatic vessel during operation, quick identification of the leakage after EC surgery, and timely implementation of corresponding measures. Conservative treatment or surgical treatment can be used to address chylous leakage. Diet adjustment is a standard conservative treatment, encompassing consumption of low-fat high-protein diet, supplementation with medium-chain triglycerides, or fasting plus supplementation with total parenteral nutrition. Somatostatin or its synthetic analogue octreotide can be used in patients who do not respond to dietary adjustments. Surgical treatment can be conducted in patients facing ineffective conservative treatment or long-term massive chylous leakage. In the events of surgical suture and lymphatic venous anastomosis failures, peritoneal shunt can be considered. In the current case, the patient's condition was brought under effective control after a series of comprehensive treatments and finally discharged with tube installed. This case offers valuable treatment reference for future cases, but the diagnosis and treatment strategies need to optimized through further studies.

Availability of Data and Materials

The data analyzed was available on the request for the corresponding author.

Author Contributions

SSL designed the research study. JL and SSL performed the research. AZ and CYY were responsible for conducting the experiments and provided expertise in data analysis. WWL analyzed the data and drafted the manuscript. All authors contributed to important editorial changes in the manuscript. All authors read and approved the final manuscript. All authors have participated sufficiently in the work and agreed to be accountable for all aspects of the work.

Ethics Approval and Consent to Participate

This study was approved by the Ethics Committee of the Jinhua People's Hospital with the informed consent of the patients (No.2024-027). This study complies with the Helsinki Declaration.

Acknowledgment

Not applicable.

Funding

This research received no external funding.

Conflict of Interest

The authors declare no conflict of interest.

Supplementary Material

Supplementary material associated with this article can be found, in the online version, at https://doi.org/10.62713/aic.3583.

References

[1] Kosa SD, Ferguson SE, Panzarella T, Lau S, Abitbol J, Samouëlian V, *et al*. A prospective comparison of costs between robotics, laparoscopy, and laparotomy in endometrial cancer among women with Class III obesity or higher. Journal of Surgical Oncology. 2022; 125: 747–753.

[2] Crosbie EJ, Kitson SJ, McAlpine JN, Mukhopadhyay A, Powell ME, Singh N. Endometrial cancer. Lancet (London, England). 2022; 399: 1412–1428.

[3] Clarke MA, Long BJ, Del Mar Morillo A, Arbyn M, Bakkum-Gamez JN, Wentzensen N. Association of Endometrial Cancer Risk with Postmenopausal Bleeding in Women: A Systematic Review and Meta-analysis. JAMA Internal Medicine. 2018; 178: 1210–1222.

[4] Zhao L, Fu X, Han X, Yu Y, Ye Y, Gao J. Tumor mutation burden in connection with immune-related survival in uterine corpus endometrial carcinoma. Cancer Cell International. 2021; 21: 80.

[5] Harris KL, Maurer KA, Jarboe E, Werner TL, Gaffney D. LVSI positive and NX in early endometrial cancer: Surgical restaging (and no further treatment if N0), or adjuvant ERT? Gynecologic Oncology. 2020; 156: 243–250.

[6] Raglan O, Kalliala I, Markozannes G, Cividini S, Gunter MJ, Nautiyal J, *et al*. Risk factors for endometrial cancer: An umbrella review of the literature. International Journal of Cancer. 2019; 145: 1719–1730.

[7] Du M, Wang L, Zhao L, Huang W, Fang X, Xia X. Independent Risk Factors of Postoperative Lymphatic Leakage in Patients with Gynecological Malignant Tumor: A Single-Center Retrospective Study. Medical Science Monitor: International Medical Journal of Experimental and Clinical Research. 2021; 27: e932678.

[8] Ditto A, Martinelli F, Reato C, Kusamura S, Solima E, Fontanelli R, *et al*. Systematic para-aortic and pelvic lymphadenectomy in early stage epithelial ovarian cancer: a prospective study. Annals of Surgical Oncology. 2012; 19: 3849–3855.

[9] Doğan Durdağ G, Alemdaroğlu S, Yılmaz Baran Ş, Alkaş Yağınç D, Yüksel Şimşek S, Çelik H. Laparoscopic para-aortic lymphadenectomy: Technique and surgical outcomes. Journal of Gynecology Obstetrics and Human Reproduction. 2021; 50: 101917.

[10] Unno N, Yamamoto N, Suzuki M, Tanaka H, Mano Y, Sano M, *et al*. Intraoperative lymph mapping with preoperative vein mapping to prevent postoperative lymphorrhea following paramalleolar bypass surgery in patients with critical limb ischemia. Surgery Today. 2014; 44: 436–442.

[11] Ardicli B, User IR, Ciftci AO, Karnak I, Tanyel FC, Ekinci S. An unusual complication of tumor surgery: chylous leakage. Surgery Today. 2022; 52: 330–336.

[12] Pecorelli S. Revised FIGO staging for carcinoma of the vulva, cervix, and endometrium. International Journal of Gynaecology and Obstetrics: the Official Organ of the International Federation of Gynaecology and Obstetrics. 2009; 105: 103–104.

[13] Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, *et al*. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. CA: a Cancer Journal for Clinicians. 2021; 71: 209–249.

[14] Shu J, Fang S, Teichman PG, Xing L, Huang H. Endometrial carcinoma tumorigenesis and pharmacotherapy research. Minerva Endocrinologica. 2012; 37: 117–132.

[15] Siegel RL, Miller KD, Wagle NS, Jemal A. Cancer statistics, 2023. CA: a Cancer Journal for Clinicians. 2023; 73: 17–48.

[16] Habeshian TS, Peeri NC, De Vivo I, Schouten LJ, Shu XO, Cote ML, *et al*. Hypertension and Risk of Endometrial Cancer: A Pooled Analysis in the Epidemiology of Endometrial Cancer Consortium (E2C2). Cancer Epidemiology, Biomarkers & Prevention: a Publication of the American Association for Cancer Research, Cosponsored by the American Society of Preventive Oncology. 2024; 33: 788–795.

[17] Epstein E, Fischerova D, Valentin L, Testa AC, Franchi D, Sladkevicius P, *et al*. Ultrasound characteristics of endometrial cancer as defined by International Endometrial Tumor Analysis (IETA) consensus nomenclature: prospective multicenter study [published erratum in Ultrasound in Obstetrics & Gynecology. 2018; 52: 684]. Ultrasound in Obstetrics & Gynecology: the Official Journal of the International Society of Ultrasound in Obstetrics and Gynecology. 2018; 51: 818–828.

[18] Ohsuga T, Kotani Y, Takamatsu S, Murakami K, Nakai H, Matsumura N. A case of left renal atrophy following the development of an infected giant retroperitoneal chylous cyst after laparoscopic para-aortic lymphadenectomy for endometrial cancer. International Cancer Conference Journal. 2020; 9: 203–206.

[19] Dogan NU, Dogan S, Erol M, Uzun BT. Cisterna chyli: An important landmark in laparoscopic paraaortic lymphadenectomy. Gynecologic Oncology. 2020; 156: 511.

[20] Bora Makal G. Lymphatic leakage after laparoscopic sleeve gastrectomy; presentation, management and review of the literature. Annals of the Royal College of Surgeons of England. 2020; 102: e115–e117.

[21] Baek SJ, Kim SH, Kwak JM, Kim J. Incidence and risk factors of chylous ascites after colorectal cancer surgery. American Journal of Surgery. 2013; 206: 555–559.

[22] Hyun D, Lee HY, Cho JH, Kim HK, Choi YS, Kim J, *et al*. Pragmatic role of noncontrast magnetic resonance lymphangiography in postoperative chylothorax or cervical chylous leakage as a diagnostic and preprocedural planning tool. European Radiology. 2022; 32: 2149–2157.

[23] Li YZ, Yang J, Hu S, Zhan H. Progress in diagnosis and treatment

of chylous leakage following pancreatic resection. Zhonghua Wai Ke Za Zhi [Chinese Journal of Surgery]. 2021; 59: 316–320. (In Chinese)

[24] Lin Y, Sun Y, Lin H, Huang Y, Jiang W, Xu Z, *et al*. Prediction of prolonged resolution of chylous ascites after radical D3 resection for colorectal cancer: A population-based experience from a high-volume center. European Journal of Surgical Oncology: the Journal of the European Society of Surgical Oncology and the British Association of Surgical Oncology. 2022; 48: 204–210.

[25] Kadota H, Shimamoto R, Fukushima S, Inatomi Y, Ikemura K, Miyashita K, *et al*. Lymphaticovenular anastomosis for lymph vessel injury in the pelvis and groin. Microsurgery. 2021; 41: 421–429.

[26] Molena E, King E, Davies-Husband C. Octreotide versus oral dietary modification for the treatment of chylous fistula following neck dissection: A systematic review and meta-analysis. Clinical Otolaryngology: Official Journal of ENT-UK; Official Journal of Netherlands Society for Oto-Rhino-Laryngology & Cervico-Facial Surgery. 2021; 46: 474–484.

[27] Power R, Smyth P, Donlon NE, Nugent T, Donohoe CL, Reynolds JV. Management of chyle leaks following esophageal resection: a systematic review. Diseases of the Esophagus: Official Journal of the International Society for Diseases of the Esophagus. 2021; 34: doab012.

[28] Kim EA, Park H, Jeong SG, Lee C, Lee JM, Park CT. Octreotide therapy for the management of refractory chylous ascites after a staging operation for endometrial adenocarcinoma. The Journal of Obstetrics and Gynaecology Research. 2014; 40: 622–626.

[29] Pan W, Cai SY, Luo HL, Ouyang SR, Zhang WD, Wei ZR, *et al*. The application of nutrition support in conservative treatment of chylous ascites after abdominal surgery. Therapeutics and Clinical Risk Management. 2016; 12: 607–612.

[30] Kawasaki R, Sugimoto K, Fujii M, Miyamoto N, Okada T, Yamaguchi M, *et al*. Therapeutic effectiveness of diagnostic lymphangiography for refractory postoperative chylothorax and chylous ascites: correlation with radiologic findings and preceding medical treatment. AJR. American Journal of Roentgenology. 2013; 201: 659–666.

[31] Chang GH, Lee CY, Tsai YT, Fang CC, Fang KH, Tsai MS, *et al*. Strategic Approach to Massive Chylous Leakage after Neck Dissection. Healthcare (Basel, Switzerland). 2021; 9: 379.

[32] Favero G, Lanowska M, Schneider A, Marnitz S, Köhler C. Laparoscopic approach for correction of chylous fistula after pelvic and paraaortic lymphadenectomy. Journal of Minimally Invasive Gynecology. 2010; 17: 262–264.

[33] Kanno T, Kobori G, Ito K, Nakagawa H, Takahashi T, Takaoka N, *et al*. Complications and their management following retroperitoneal lymph node dissection in conjunction with retroperitoneal laparoscopic radical nephroureterectomy. International Journal of Urology: Official Journal of the Japanese Urological Association. 2022; 29: 455–461.