Chylous Leakage After a Laparoscopic Live-Donor Nephrectomy: Case Report and Literature Review

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Abstract

Laparoscopic donor nephrectomy is an established operation for organ procurement in living-donor transplant. Minimal access approach for organ procurement from living donors ensures early convalescence and improved patient participation. Chylous leakage is a rare complication of laparoscopic living-donor nephrectomy. Chylous leakage is mostly determined by iatrogenic injury of cisterna chyli and its main tributaries. It may lead to malnutrition and immunologic deficits because of protein and lymphocyte depletion.

An 18-year-old woman underwent left-hand–assisted laparoscopic donor nephrectomy for living donor transplant. She developed chylosus leakage in third postoperative day. A conservative management with total parenteral nutrition total parenteral nutrition and subcutaneous somatostatin was immediately initiated. The patient had an abatement of drainage daily output in 4 days of therapy. Chylous leakage is a potentially insidious and perhaps misdiagnosed complication of laparoscopic donor nephrectomy. Conservative therapy is effective in most donors and should be initially attempted. Surgical ligatures or fibrin sealants may be indicated in case of refractory chylous leakage before the arising of malnutrition and/or relevant immunodeficiency.

Key words: Left-hand–assisted laparoscopic donor nephrectomy, Chylous leakage, Malnutrition and immunologic deficits, Conservative management

Introduction

Laparoscopic donor nephrectomy is an established operation for organ procurement in living-donor transplant. Minimal access approach for organ procurement from living donors ensures early convalescence and improved patient participation. Chylous leakage (CL) is a rare complication of laparoscopic living-donor nephrectomy (LLDN).

Chylous leakage is mostly determined by iatrogenic injury of cisterna chyli and its main tributaries. It may lead to malnutrition and immunologic deficits because of protein and lymphocyte depletion. Generally, both abdominal aortic surgery (0%-1%) and oncologic surgery with extensive retroperitoneal lymph node dissection (2%-7%) have been associated with CL.

Chylous leakage can lead to chylous ascites, as defined by the accumulation of milky, triglyceride-rich fluid inside the peritoneal cavity. In the current literature, CL after LLDN ranges from 0% to 1.8%.

Case Report

An 18-year-old woman underwent left-hand–assisted laparoscopic donor nephrectomy. Her 23-year-old sister received the live-related renal transplant with good graft function. Operative time was 180 minutes, blood loss was 150 mL, and the postoperative hospitalization was 14 days.

There were no intraoperative or immediate postoperative complications. She had an abdominal drain tube that became productive in the third postoperative day with a creamy, turbid, odorless, nongranular, and nonbloody fluid (500 cc/d). A drain tube is inserted as routine in all laparoscopic donor nephrectomy.

Patient had no abdominal pain and no clinical signs of this fluid. Bowel sounds were present, and there was...
no rebound tenderness or peripheral edema. No signs and symptoms of an acute abdomen were noted.

Laboratory data included serum blood urea nitrogen of 5.35 mmol/L creatinine of 123.76 mmol/L, and white blood cell count of $4.6 \times 10^3/\text{mm}^3$. We performed an abdominal ultrasound scan that revealed significant ascites.

Biochemical analysis of the drain fluid was compatible with chyle (triglycerides at 6.3 mmol/L, high nonpolynuclear nucleated cells content, and sterile culture). Conservative management with total parenteral nutrition total parenteral nutrition and subcutaneous somatostatin was immediately initiated. The patient had an abatement of drainage daily output for 4 days of therapy. Total parenteral nutrition was terminated 1 week later.

The patient was discharged at day 14 with a high-protein and low-fat diet. The patient returned to work (modeling) and resumed a normal diet without any additional complications in 1 month.

Discussion

Chylous ascites is a rare clinical condition that occurs as a result of disruption of the abdominal lymphatics. Abdominal aortic surgery is the most frequent procedure implicated in chylous complications, via injury to retroperitoneal lymphatics, most often the cisterna chyli (CC). Postoperative CL, though, may actually occur more frequently given that, during laparoscopy, in this way lymphatics are not routinely either ligated or clipped despite being usually burned with energy-based sealing devices.4

Chyle, flowing across the intestinal lymphatic trunk, reaches the cisterna chyli either directly or through the left ascending lumbar trunk.4 The only studies depicting the detailed anatomy of the CC are from almost 100 years ago.

The CC was found in 33 of the specimens, and both the tributaries of the CC and the location, with respect to vertebral level, demonstrated wide variation.

The potential for clinical significance concerning the demarcation of the exact origin and contributing lymphatic channels of the CC has increased in recent years because of the changing face of surgical procedures in modern medicine.

The first case of CL after LLDN was reported by Shafizadeh and associates5 in 2002. Leventhal and associates observed 31 complications in a series of 500 patients (6.2%) that were classified as grade 3 complications because they needed recurrent hospitalization and hospital visits for their non-operative management.6 Only 2 cases of CL occurred in the 2280 LLDN reported by the 4 largest single-center series published so far.7,8 In most reported series, the use of a surgical drain is not specifically described,6,8 but with the trend of sparing it, CL may be misdiagnosed because only a minority of patients will develop signs and symptoms prompting specific investigation.

Kim and associates observed a total of 69 complications (13.7%) occurred in 505 consecutive cases. Of the postoperative complications, chylous ascites (in 18 cases) is the most common. Most patients were treated conservatively with total parenteral nutrition for 3 to 7 days.

However, 1 patient required surgical management because of persistent chyle drainage despite conservative management for 2 months.9 Boggi and associates report 8 cases of 208 LLDN successfully treated with conservative measures, providing further insight into both anatomic basis and available therapeutic options.10

Breda and associates8 described 2 cases of chylous ascites, both patients were treated with low-fat, medium-chain triglyceride (MCT) diet. The chyle leak resolved after 2 weeks of conservative management, but the dietary regimen modifications were prolonged for 6 months to prevent recurrence.

Bachmann and associates11 reported 3 cases of chyle leak managed conservatively (short and medium chain fatty acids, somatostatin), but 2 of them needed surgical correction. Caumartin and associates12 reviewed 7 cases, which received conservative treatment based mostly on an MCT diet, total parenteral nutrition, and somatostatin. Optimal treatment of CL has not been defined yet.

Many authors advocate an initial trial of conservative treatment during the first 4 to 8 weeks after diagnosis.10,12 Approximately 60% of CL tend to resolve with supportive measures, especially if they are caused by tiny leaking lymphatics.12

Withdrawing the long-chain triglycerides quota from the diet in favor of MCT should help avoiding lymph overflow. In fact, after being primarily absorbed across the intestinal mucosa, MCT are directly conveyed to the portal system, bypassing the lymphatic channels.12

The conservative treatment is based on dietary modifications (MCT plus low-fat and high-protein
content) eventually associated with or followed by total parenteral nutrition and/or somatostatin.\textsuperscript{13} Total parenteral nutrition aims toward lessening lymph overlap avoiding intestinal absorption of nutrients. Multihormone release-inhibiting properties of somatostatin seem to reduce intestinal absorption of fats, chyles triglycerides concentration, and major tributaries lymphatic flow.\textsuperscript{14} All donors of Boggi’s experience were treated with subcutaneous octreotide.

Seven donors were put on total parenteral nutrition, left strictly nil per os, and received 600 grams of octreotide daily. Instead, 1 patient was kept on a strict low-fat and high-protein dietary regimen along with MCT oil supplement and octreotide injections at a lower dosage (100 g/q 8 h).\textsuperscript{10}

A surgical approach is usually recommended if the lymphatic leak persists, despite 4 to 8 weeks of conservative treatment to avoid malnutrition and/or clinically relevant immunodeficiency.\textsuperscript{15}

To prevent CL, it is mandatory to spend some extra time trying to identify major lymphatics nearby renal vessels and the anterolateral surface of the aorta. Meticulous and extensive clipping remains the safest way of securing lymphatic channels along the dissection area.\textsuperscript{10} It has been shown that bipolar cautery can effectively ligate and control lymph leakage. Using bipolar cautery, we have not seen 1 case of lymph leakage after more than 1500 laparoscopic donor nephrectomy.\textsuperscript{17,18} Prevention is important, above all using bipolar coagulation. It has been shown in animal\textsuperscript{19} and human studies\textsuperscript{20} that bipolar coagulation can effectively occlude lymph channels.

Box and associates compared for the first time the quality of lymphatic sealing by each of 4 commonly used laparoscopic dissection devices and show that each bipolar and ultrasonic energy device tested consistently produced an adequate seal and should be suitable for sealing lymphatic vessels during laparoscopic surgery but monopolar scissors were unreliable with respect to sealing lymphatic channels.\textsuperscript{19} Simforoosh and associates evaluate the outcome of laparoscopic retroperitoneal lymph node dissection using bipolar electrocauagulation instead of clipping the lymphatic vessels and demonstrates that bipolar electrocauagulation instead of clips do not hamper the outcome of the procedure.\textsuperscript{20}

In conclusion, CL is a potentially insidious and perhaps misdiagnosed complication after LLDN. It occurs in nearly 4% of LLDN. Conservative therapy is effective in most donors and should be initially attempted. Surgical ligatures or fibrin sealants may be indicated in case of refractory CL before the arising of malnutrition and/or relevant immunodeficiency.

References