Journal of Pediatric Surgery (2007) **42**, E15–E18

ELSEVIER

Journal of Pediatric Surgery

www.elsevier.com/locate/jpedsurg

Successful laparoscopic ligation of the lymphatic trunk for refractory chylous ascites

Minoru Kuroiwa*, **Fumiaki Toki, Makoto Suzuki, Norio Suzuki**

Department of Surgery, Gunma Children's Medical Center, Shibukawa, Gunma 377-8577, Japan

Index words:
Laparoscopic surgery;
Chylous ascites;
Lymphatic trunk

Abstract A 3-year-old girl with recurrent chylous ascites was successfully treated by laparoscopic ligation of the ruptured lymphatic trunk. She was referred to our hospital at 16 days of age because of marked abdominal distension. Imaging methods showed massive ascites of unknown origin, and analysis of the ascites revealed its chylous nature. Conservative treatments were started. Her condition improved to some extent, and she was discharged. Two years later, she was readmitted with abdominal distension and loss of appetite. Laparoscopic surgery was planned to clarify the etiology and to treat intractable ascites. Sudan black B was orally administered, and laparoscopy revealed the presence of a whitish-gray fluid in the abdominal cavity, and a dark-blue stream of the dye was noticed. The responsible lesion of the chylous ascites was detected by tracking the stream. The lesion was ligated twice with an endoloop. She has been completely free from the symptoms for 3 years and 9 months. This experience indicates the usefulness of laparoscopic surgery in investigating the etiology of chylous ascites and treating it. The concomitant use of a lipophilic dye is mandatory to find the responsible lesion at surgery. Laparoscopic surgery, instead of open surgery, should be considered as a treatment of choice for intractable chylous ascites.

Congenital idiopathic chylous ascites is a rare condition in the pediatric population; however, it presents a challenge for treatment because the ascites is frequently intractable, and detection of the responsible lesion is difficult even by open surgery [1]. We herein report a case of refractory chylous ascites that had recurred 2 years after the initial treatment and was successfully treated by laparoscopic surgery with concomitant use of a lipophilic dye.

1. Case report

A 3-year-old girl with a history of treatment for congenital chylous ascites was readmitted to our hospital because of marked abdominal distension. Her ascites was first detected on an ultrasonography at 32 weeks of gestation. She had presented with noticeable abdominal distension immediately after birth and was referred to our institution. Imaging methods showed massive ascites of unknown origin, and analysis of the ascites revealed its chylous nature (total lipids, 5290 mg/mL of ascites; triglyceride, 7060 mg/mL of ascites). Her parents refused for her to undergo surgical therapy. Conservative treatments (low-fat milk, a special formula with middle-chain triglycerides, and elementary diet) were started, but no improvement was observed; this was followed by total parenteral nutrition. She was discharged from the hospital 9 months after the admission. At the outpatient clinic, mild ascites was observed on serial ultrasonography; however, the physical development was normal with no clinical symptoms. Two years and 6 months

* Corresponding author. Tel.: +81 279 52 3551; fax: +81 279 52 2045.
E-mail address: kuroiwa@gcmc.pref.gunma.jp (M. Kuroiwa).

0022-3468/$ – see front matter © 2007 Elsevier Inc. All rights reserved.
doi:10.1016/j.jpedsurg.2007.02.036

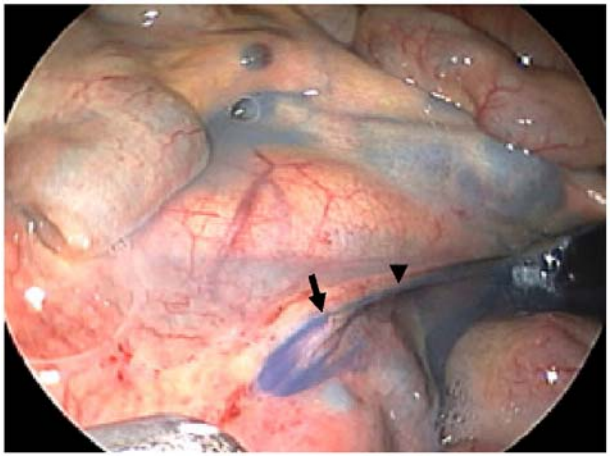

Fig. 1 A responsible lesion detected by tracking a dark-blue stream. Arrow shows a rupture site, and arrowhead indicates a leaking lymphatic trunk.

later, she was readmitted with marked abdominal distension and loss of appetite. Imaging methods showed massive ascites, and surgical intervention was planned to clarify the etiology and treat the intractable ascites.

Laparoscopic surgery was planned instead of open surgery because if the responsible lesion was detected, appropriate intervention would be easier during the former procedure. Sudan black B (1 g) was orally administered 6 hours before the start of laparoscopic surgery to enable the easy identification of a leaking lacteal or lymphatic trunk. Three ports (1 for the camera and 2 for working) were introduced under general anesthesia. The intraabdominal pressure obtained by carbon dioxide insufflation was 8 mm Hg. A large amount of whitish-gray ascites was observed, and on aspiration of the ascites, a dark-blue stream of the dye was noticed. The responsible lesion was detected by tracking the stream (Fig. 1). The leaking site—a ruptured lumbar lymphatic trunk—was ligated twice with an endoloop (Fig. 2). All the intraperitoneal lacteals and lymphatics were stained deep blue by Sudan black B; thus, identification of the leak was extremely easy. The patient has been completely free from symptoms for 3 years and 9 months after the surgery.

2. Discussion

Congenital chylous ascites is rare during the newborn period and infancy; however, it is a challenging disorder with regard to its successful treatment [1,2]. Generally, it presents with abdominal distension with or without respiratory embarrassment and occasional signs of peritoneal irritation and malabsorption. The most common cause of chylous ascites (in 45% to 60% of cases) is congenital malformation of the lymphatic channels such as atresia or stenosis of the major lacteals, mesenteric cysts, and generalized lymphangiomatosis [1,3]. The other causes are external compression with obstruction of the lymphatics, namely intestinal malrotation, incarcerated hernia, and inflammatory lesions (in 25% to 30% of cases) [4,5]. Traumatic injury to the lymphatics owing to surgery, various accidents, and child abuse may be responsible for 15% to 20% of the cases of chylous ascites [1].

The analysis of the ascitic fluid obtained by paracenthesis was diagnostic [6]. On analysis, the ascites generally appears like a milky-white fluid if the patient is receiving a fat-containing enteral diet. Ultrasound, upper gastrointestinal series, and magnetic resonance imaging help in the identification of underlying etiologies such as intestinal malrotation, mesenteric cysts, and lymphangioma. A lymphangiography should be considered only if surgical intervention is being contemplated.

Nonsurgical treatments such as low-fat milk, formulas in which the fat is replaced with medium-chain triglycerides, and total parenteral nutrition are initially carried out because of the benign nature of the disease and better responsiveness to conservative therapy [1,7]. However, in our case, the chylous ascites was completely not cured and recurred 2 years after the conservative therapies.

Surgical intervention was indicated when the conservative therapy could not decrease the volume of the ascitic fluid. Cochran et al [1] reported that exploratory laparotomy was indicated in a patient who did not improve after 2 months of total parenteral nutrition. However, it is frequently difficult to locate the site of chylous leakage at surgery; therefore, various methods to identify the site of the leakage have been developed. Generally, lymphangiography and lymphoid scintigraphy are less relevant than the administration of a dye. In many cases, a fat-rich formula or lipophilic dye was administered to detect the lymph-leaking site.

A review of the English literature published between 1967 and 2004 revealed 30 patients with congenital chylous ascites including our case, and operative intervention was carried out in 14 of these patients. With the exception of 2 patients with intestinal malrotation, the details of 12 patients [8-17] were

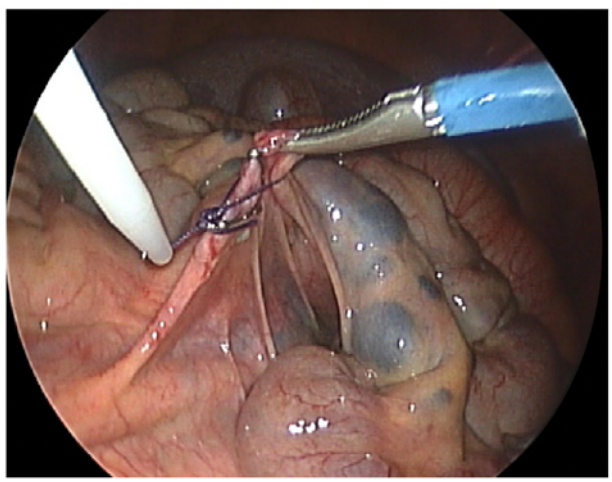

Fig. 2 Endoscopic view of the leaking site, which is ligated. The mesenteric lymphatics are stained dark blue.