Most postsurgical chylous leaks are the result of damage to the thoracic duct and have been noted to occur after a variety of surgical procedures such as oesophagectomy, cardiac surgery, radical neck dissection, gastric resection, and supraclavicular lymph node biopsy. A chyle leak is a serious complication because it may impair nutrition and immunity or compromise and delay wound healing. The mortality rate for chylous fistula has been reported to be 12.5%.\(^1\)

Although chyle leaks have been reported after breast surgery for carcinoma,\(^2,3\) a search of the literature seems to indicate that they have not been reported after cosmetic breast surgery.

**CASE REPORT**

A 34-year-old woman sought the removal and replacement of her saline-filled breast prostheses to correct ripppling. A primary care physician had inserted the implants approximately 7 years earlier. A physical examination revealed a slim woman with palpable “folds” on both breasts. The implants felt firm, likely because of bilateral capsular contractures.

The patient subsequently underwent surgery and her saline-filled implants (240 cc McGhan round textured implants) were removed and replaced with anatomic cohesive silicone gel implants (410 FX, 360 g; Allergan, Irvine, CA). During surgery, she was noted to have an unusual pocket dissection: the upper pectoralis major had been elevated to cover the implant, but the inferior portion had been left posterior to the implant. During this procedure, the entire pectoralis major muscle was raised and the new implants were placed in subpectoral pockets.

The patient presented 1 week postsurgery with a left-sided hematoma. On questioning, she was found to have taken ibuprofen. She was therefore taken to the operating room and the hematoma was evacuated.

She returned 4 weeks after her initial surgery with concerns about swelling of her right breast during the preceding days. On examination, the right breast was swollen and a little bruised, but not tense. When she returned 2 days later following an ultrasound examination ordered by one of the authors (TS), both breasts were swollen. The ultrasound report confirmed a collection on both sides that appeared to be communicating through the presternal tissue.

Both breasts were explored the next day in the operating room. At the time of surgery, several hundred milliliters of milky fluid were drained from each breast. There was no evidence of inflammation or hematoma. No source for the leakage was seen. The collection was evacuated and a lavage of the cavity was carried out. The implants were cleaned and reinserted.

Analysis of the fluid drained revealed biochemical features compatible with chyle, as it was high in amylase, triglyceride, and lactate dehydrogenase. The case was discussed with a thoracic surgeon, who suggested that adequate drainage should be inserted. Therefore, larger drains (14-gauge Blake drains) were inserted in the operating room a few days later.

The patient was seen by the thoracic surgeon and treatment options were discussed. It was felt that the condition would likely resolve with conservative medical treatment. She was admitted to the hospital and prescribed total parenteral nutrition (TPN) for 17 days. Octreotide was also administered during this time. After the 17 days of TPN, a medium-chain triglyceride diet was started. The discharge of chyle through the drains ceased 2 days after this. The patient was discharged from the hospital on octreotide and the medium-chain triglyceride diet.

However, her breasts started to swell 2 days after her discharge from the hospital and chyle began to drain again. The patient was taken back to surgery and the cavities were drained. Ethibond sutures were used to plicate along the medial aspect of the cavity next to the sternum.

At the time of her surgery, sunflower oil with methylene blue was administered via a nasogastric tube in an

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gloves of clear or milky fluid that has a greasy feel.

Dry as possible.

The defect and the area of the leak should be made as small as possible. Once diagnosed, every effort should be made to close the leak quickly.

Intraoperative localization of a chylous leak can be facilitated by the administration of cream or methylene blue through a nasogastric tube before or during surgery.

The timing of operative intervention is still controversial. The definition of medical management failure has varied, but persistent output of more than 600 mL/day for 1 week despite medical therapy or an extremely high output (>2000 mL/24 hours) is an appropriate indication for surgical intervention.

Intraoperative localization of a chylous leak can be facilitated by the administration of cream or methylene blue through a nasogastric tube before or during surgery.

The reason for this chylous fistula was never determined. We can only assume a very rare aberrant lymph channel, most likely accompanying an intercostal vessel.

Various surgical techniques have been described for the control of chylous leaks, including mass ligature, the application of absorbable gel foam sponge impregnated with thrombin and plasma, polyvinyl formalized sponge, oxidized cellulose, methy-2-cyanoacrylate monomer (surgical glue), and tetracycline powder.

Suturing a muscle flap over the leak has also been described by some authors and theoretically works by

**DISCUSSION**

Trauma to the thoracic duct leading to chylous fistula is a known occurrence following several surgical procedures, typically neck or thoracic operations. Chylous leakage is diagnosed by the physical appearance of the fluid and biochemical features compatible with chyl.

Damage to the thoracic duct and/or its branches is rarely diagnosed intraoperatively because they are collapsed in the fasting state and the contents blend with the serous fluid and biochemical features compatible with chyle.

Sometimes a leak may be detected intraoperatively by the accumulation on the surgeon’s gloves of clear or milky fluid that has a greasy feel.

Once diagnosed, every effort should be made to close the defect and the area of the leak should be made as dry as possible. In the present case, there was no evidence of any intraoperative chylous leak and the wound was dry at the time of closure.

Management of chylous fistulae includes an initial trial of conservative treatment with bed rest, elevation of the head, continuation of closed drainage, and dietary management to decrease the rate of chyle formation. This last goal can be achieved through the use of TPN or enteral feeding with medium-chain triglycerides. The medium-chain triglycerides are absorbed directly into the portal circulation, bypassing the lymphatic system.

Octreotide, a long-acting synthetic analogue of somatostatin, is a promising addition to the conservative medical management of chyle fistulas. Somatostatin’s effectiveness in the context of chyle fistulas may be related to its ability to reduce gastrointestinal and pancreatic secretions, decrease hepatic venous pressure, and reduce splanchic blood flow. It has been demonstrated in dogs to decrease the thoracic duct lymph flow rate and the ratio of triglycerides in the lymph to that in serum.

The most important part of the conservative management of chylous fistula is a “fat-free” diet—free of long-chain fatty acids. In reality, the desirable completely fat-free diet is not possible with enteral nutrition and is only feasible with parenteral nutrition. In fact, most of the enteral fat-free diets are essentially reduced fat diets that only partially reduce chyle production. Because of the difficulties in maintaining a totally fat-free diet, the intestinal absorption phase of lipid metabolism is manipulated with a pancreatic lipase inhibitor.

Orlistat is a pancreatic lipase inhibitor used in the treatment of obesity. It interferes with the breakdown of lipid at the duodenum and consequently prevents the micelle formation necessary for the lipid absorption at the intestinal level. The introduction of orlistat in the treatment of chyle leaks dramatically reduces the chyle flow and consequently accelerates the healing and closure of the fistula.

Most chylous leaks close spontaneously with adequate nutritional support and the careful maintenance of biochemical, hematologic, and immunologic parameters. The timing of operative intervention is still controversial. The definition of medical management failure has varied, but persistent output of more than 600 mL/day for 1 week despite medical therapy or an extremely high output (>2000 mL/24 hours) is an appropriate indication for surgical intervention. Intraoperative localization of a chylous leak can be facilitated by the administration of cream or methylene blue through a nasogastric tube before or during surgery. The reason for this chylous fistula was never determined. We can only assume a very rare aberrant lymph channel, most likely accompanying an intercostal vessel.

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causing fibrosis.7 The leak in the present case was managed successfully with mass ligatures.

CONCLUSIONS

Chylous fistula is a highly unusual complication of breast augmentation surgery. Early diagnosis and management of chyle fistulas is important. An unrecognized or persisting leak can lead to serious local wound complications, debilitation from protein and electrolyte depletion, and prolonged hospitalization.

DISCLOSURES

The authors have no financial interest in and receive no compensation from manufacturers of products mentioned in this article.

REFERENCES


Accepted for publication October 8, 2008.

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1090-820X/$36.00
doi:10.1016/j.asj.2009.01.015