

## CASE REPORT

# Chyloma formation after anterior cervical disc fusion

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**Abstract**

Chyle leak from iatrogenic thoracic duct injury is a rare but serious complication of head and neck surgery. The chyloma in this case took months to recognize and required open thoracic ligation. He fully recovered.

**KEYWORDS**

anterior cervical disc fusion, chyle, chyle leak, chyloma, head and neck, thoracic duct

## 1 | BACKGROUND

Chyle leak formation is an uncommon but serious sequela of head and neck (H&N) surgery, including esophageal, parathyroid, and thyroid surgery. It has only been reported postoperatively twice after anterior cervical disc fusion (ACDF). One prior case was repaired during the initial spine surgery, and another required postoperative needle aspiration. A 62-year-old obese male patient underwent ACDF via a left-sided neck approach. There were no issues intraoperatively, and no chyle leak was noted. Four months later, he presented to the clinic with lower left neck pain and swelling inferior to the incision. Examination and CT imaging showed a 4 × 4 cm left lower cervical abscess. He underwent transcervical incision and drainage. He required a second return trip to the operating room with ligation of the thoracic duct in the chest. He returned to a regular diet and had no further issues more than 5 years following the index operation. We encountered a patient with a chyloma 4 months after ACDF. With neck pain and swelling following ACDF, chyloma should be considered as a part of the differential diagnosis. This is the only reported case that required open repair with ligation of the thoracic duct in the chest.

Chyle leak formation is an uncommon but serious sequela of H&N surgery. The thoracic duct is the primary structure that returns lymph and chyle from the left and right lower

half of the body. Injury to the thoracic duct can result in chyle extravasation, leading to delayed wound healing and immunosuppression. Prompt identification and treatment of a chyle leak are needed for optimal surgical outcomes. Chyle leak is reported after esophageal surgery, parathyroid, and thyroid surgery. It has only been reported twice after ACDF to our knowledge. This case is the only one we are aware of that required open drainage of a chyloma following an anterior cervical spinal procedure.

## 2 | CASE PRESENTATION

The patient is a 62-year-old male with a BMI 24.2 who presented with cervical spinal disk disease. He had a herniated nucleus pulposus with associated radiculopathy at the level of C5-C6. He had hypertension, but no other comorbidities at the time of the initial surgery. He underwent ACDF via a left-sided neck approach. There were no complications intraoperatively, and no chyle leak was noted. The patient was discharged home following the operation in stable condition. Four months later, he presented to clinic with lower left neck pain and swelling inferior to the incision. Examination showed indurated and erythematous left neck and upper chest skin (Figure 1). He had no accompanying symptoms of fever or dysphagia. CT imaging showed

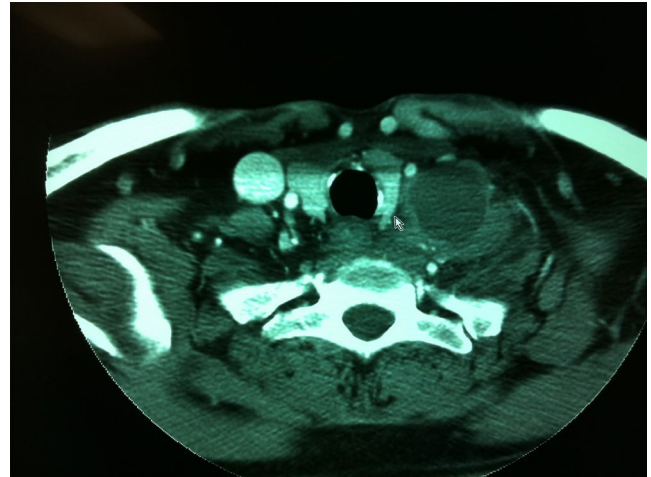


**FIGURE 1** Indurated and erythematous left neck and upper chest skin 4 months after initial surgery

a 4 × 4 cm left lower cervical abscess (Figures 2 and 3). He underwent transcervical incision and drainage. A JP drain was placed at that time. This drain had >1000 cc of cloudy output per day. ENT was consulted. The drainage was felt to be chyle. The patient was taken back to the OR with ENT and thoracic surgery. A fluid cavity with a capsule was noted. The chyloma was felt to have walled itself off. As this capsule was opened, copious chyle was released. The thoracic duct was noted inferior and lateral to the subclavian vein. This was ligated in the chest. Another JP drain



**FIGURE 2** Sagittal CT imaging showing a 4 × 4 cm left lower cervical abscess



**FIGURE 3** Axial CT imaging showing a 4 × 4 cm left lower cervical abscess

was placed. The drain was observed postoperatively, and no further chyle leak was noted. The drain was removed after 5 days. He returned to a regular diet and had no further issues greater than 5 years following the index operation.

### 3 | DISCUSSION

The vast majority of lymphatic injury during spine surgery occurs in the thoracic and lumbar regions. Injury due to the close proximity of the thoracic duct and the cisterna chyli to the vertebral column results in chylothorax or chyloretroperitoneum. The incidence of thoracic duct injury following cervical spine surgery is substantially lower in than in thoracolumbar surgery. This may be due to the longer anatomic course of the thoracic duct in the thoracolumbar area as compared to the cervical spine. The height of the arch of the thoracic duct in the root of the neck also varies, and can be inferior to, at, or superior to the clavicle.<sup>1</sup> Langford et al reported that a thoracic duct can extend as much as 5 cm above the clavicle,<sup>2</sup> and Hart et al described a case in which the arch was situated 7-8 cm above the clavicle.<sup>3</sup> Also, there is significant deviation in the termination pattern of the thoracic duct as it joins the systemic circulation. It may end as single or multiple outlets into the left internal jugular vein, the left subclavian vein, the left external jugular vein, the left brachiocephalic vein, the left transverse cervical vein, or the right internal jugular vein.<sup>1,3-5</sup>

Intraoperative identification of lymphatic injury can be difficult due to the usual fasting state of patients prior to surgery, which diminishes lymphatic production and transport. Thus cloudy lymphatic material may not be visible in the wound even if an injury exists. Valsalva administration or placing the patient in the Trendelenburg position may assist in identifying an intraoperative leak.

During head and neck surgery, chyle leak from iatrogenic thoracic duct injury is a rare but serious complication that occurs in 0.5%-1.4% of thyroidectomies<sup>6-10</sup> and 2%-8% of neck dissections.<sup>2,6,11-13</sup> However, it has only been reported postoperatively twice before following an ACDF.<sup>14</sup> Our case is the third case of chyle leak after cervical spine surgery.

Of the three reported cases of iatrogenic thoracic duct injury from ACDF (Table 1), two were male and one was female. All three of the patients were undergoing surgery focused on level C5-6 and were approached from the left side.

The patients were relatively healthy, with patient 1 being in an MVA, patient 2 having no comorbidities, and patient 3 having hypertension. None of the patients were obese. The size of the postoperative chyle collection on imaging was 2.3 cm for Patient 2 and 4 cm for Patient 3. One of the three leaks was noted intraoperatively and was repaired immediately with clips. One of the leaks was noted after 2 months and was treated with needle aspiration. The third leak was noted 4 months after the initial surgery and required intrathoracic ligation of the thoracic duct. In the two patients with delayed leaks, there was no noted direct sizeable injury to the thoracic duct intraoperatively during initial surgery. Given the delayed presentation and return after 2 and 4 months following ACDF, the differential diagnosis before imaging and exploration was the formation of a post-op hematoma, seroma, or chyloma. Following imaging, drainage, and surgery, the suspicion of a chyloma was confirmed. We believe the chyloma likely occurred secondary to a retraction injury on a portion of her thoracic duct. There was a small leak that over time created a cystic capsule which contained the leak. Patient 3 had immediate release of significant chyle (after a drain had already collected 1000 mL) once this capsule was opened during subsequent repair, but Patient 2 was able to heal after a simple needle aspiration of 3.5 mL. These three patients show the range of leak severity after injury during ACDF.

Two patients were discharged the day after their initial ACDF, and one was discharged the same day as ACDF. As the ACDF surgery is trending toward an outpatient procedure, postoperative chyle leaks will often more likely be discovered in a delayed manner during an office visit, like Patients 2 and 3.

Presenting symptoms of the delayed leaks were nontender, mobile neck mass in Patient 2 and neck pain and swelling in Patient 3. No patient had postoperative fever, dysphagia, hoarseness, shortness of breath, or electrolyte abnormalities.

The 3 patients are doing well with follow-up periods of 80 days, 3.5 years, and 5 years. Patient 3 who underwent thoracic duct ligation had no subsequent nutrition deficiency, as has been reported previously.<sup>15</sup> After being addressed,

**TABLE 1** Patients with chyle leak after anterior cervical disc fusion

Patient	Age of patient	Sex	BMI	Level of spine surgery	Approach side	Time leak noted	Method of repair	Size of fluid collection on imaging	Date of initial discharge	Symptoms	Length of follow up
1	NA	M	NA	C5-6	Left	Intraoperative	Clips	NA	Postoperative day 1	NA	80 d
2	NA	F	21.9	C5-6	Left	2 mo postoperatively	Needle aspiration	2.3 cm	Same day	Nontender, mobile neck mass	3.5 y
3	62 y old	M	24.2	C5-6	Left	4 mo postoperatively	Ligation of thoracic duct in the chest	4 cm	Postoperative day 1	Neck pain and swelling	5 y

patients may recover completely from this complication. None of these 3 patients has long-term side effects.

## 4 | CONCLUSIONS

Chyle leaks can occur intraoperatively or become evident months after ACDF. Three cases have reported, with an incidence of <0.001%. These all occurred after surgery at the C5-6 level and a left-sided approach. They present as lower neck swelling and pain. These can be treated postoperatively with needle drainage if small or open ligation of the thoracic duct if severe. Patients can experience a full recovery.

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None.

## CONFLICT OF INTEREST

The authors report no relevant financial disclosures related to this current work.

## AUTHOR CONTRIBUTIONS

CBS: Collected data, wrote and edited article; TK: Collected data, wrote and edited article; MS: Collected data, wrote and edited article.

## ETHICAL APPROVAL

All issues related to ethics were taken into consideration throughout the study design and proposal and implemented during the research study itself. Informed consent was obtained, beneficence was made a top priority, and respect for confidentiality and privacy were upheld during the study and its various analysis and information assertion components.

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