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Vuk Aleksić,
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Lymphorrhoea - a rare complication of thoracic outlet syndrome surgery

Vuk Aleksić[1], Radmila Aleksić[1], Aleksandar Lazić[2], Nemanja Aleksić[3], Katarina Samardžić[4], Ivan Marjanović[5], Nebojša Marić[6]

[1] Department of Neurosurgery, Clinical Hospital Centre Zemun, Belgrade, SERBIA
[2] Department of General Surgery, Clinical Hospital Centre Zemun, Belgrade, SERBIA
3 Clinic for Cardiac Surgery, Clinical Centre of Serbia, SERBIA
[4] Department for Anaesthesiology, Clinical Hospital Centre Zemun, Belgrade, SERBIA
[5] Clinic for Vascular and Endovascular Surgery, Military Medical Academy, Medical Faculty, University of Defence, Belgrade, SERBIA
[6] Clinic for Cardiothoracic Surgery, Military Medical Academy, Medical Faculty, University of Defence, Belgrade, SERBIA

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ABSTRACT

The thoracic duct injury is an extremely rare entity and is sometimes seen in the surgery of the oesophagus or the heart. This injury can result in the formation of chylothorax e.g. chylous pleural effusion and can cause significant patient morbidity and mortality. Thoracic duct injury is an extremely rare complication of thoracic outlet syndrome surgery with only a few cases described in the literature so far. We present a 29-year-old female patient operated on for thoracic outlet syndrome with resection of the anterior scalene muscle on the left side. During the first postoperative day, the patient had more than 1.5 L of chyle leak drainage without signs of chylothorax. The patient was successfully treated conservatively with bed rest and total parenteral nutrition.

Corresponding author:
Vuk Aleksić

Department of Neurosurgery, Clinical Hospital Centre Zemun, Belgrade, Serbia

aleksicvuk@hotmail.com

INTRODUCTION

The thoracic duct injury can result from trauma or it can be developed iatrogenicaly during chest surgery procedures. Surgery of the esophagus and the heart are the most common source of iatrogenic injury. Injury to the thoracic duct can result in formation of chylothorax e.g. chylous pleural effusion and can cause significant patient morbidity and mortality (1). Thoracic duct injury is extremely rare complication of thoracic outlet syndrome surgery (2). We describe a case of a 29-year-old female patient who was operated on due to thoracic outlet syndrome, during which a thoracic duct injury occurred and was managed conservatively.

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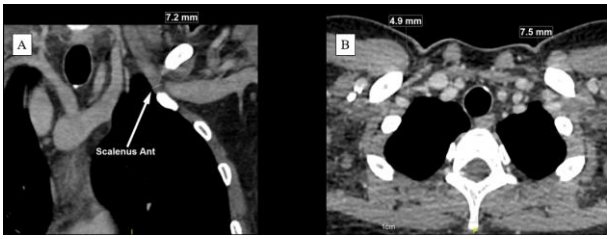
CASE REPORT

A 29-year-old female patient developed pain, numbness and tingling in her left arm which progressed to upper limb intermittent claudication at any sustained upper extremity activity such as opening and closing the left hand or lifting a weight. She also had cyanotic discoloration of the left hand in the abduction position of the arm. The arterial pulses of the left hand were weaker than on the right, especially in the abduction position. The electrophysiological examination indicated that patient developed thoracic outlet syndrome on the left side. CT scan of the chest showed narrowing of the costoclavicular spaces on both sides when the arms are elevated above the head with visible compression on both subclavian veins, more pronounced on the left side. In addition, a slightly voluminous anterior scalene muscle on the left was demonstrated, which was suspected as a probable cause of patient's thoracic outlet syndrome (picture 1).



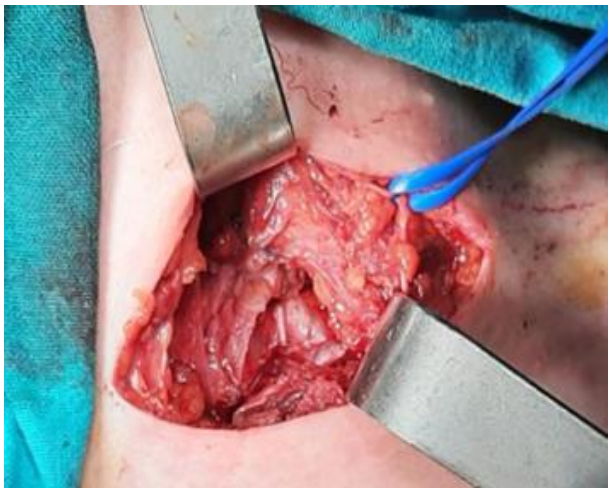
Picture 1. Chest CT scan showing voluminous anterior scalene muscle on the left side (A), and difference between left and right side on the transversal plane (B).

Patient was operated with supraclavicular approach and a resection of the fibrous and thickened anterior scalene muscle was performed (picture 2). During the procedure a small amount of milky fluid discharge was observed in the operative wound, however, no clear injury to a major lymphatic vessel was observed. The patient tolerated the surgery well, the pain syndrome was reduced and the color of the hand returned to normal. Peripheral arterial pulses on the left hand were significantly more pronounced than before the operation.

During the first postoperative day, about 1.5 L of milky fluid discharge accumulated in the drain, and biochemical analysis of the content indicated chyle leak (picture 3).

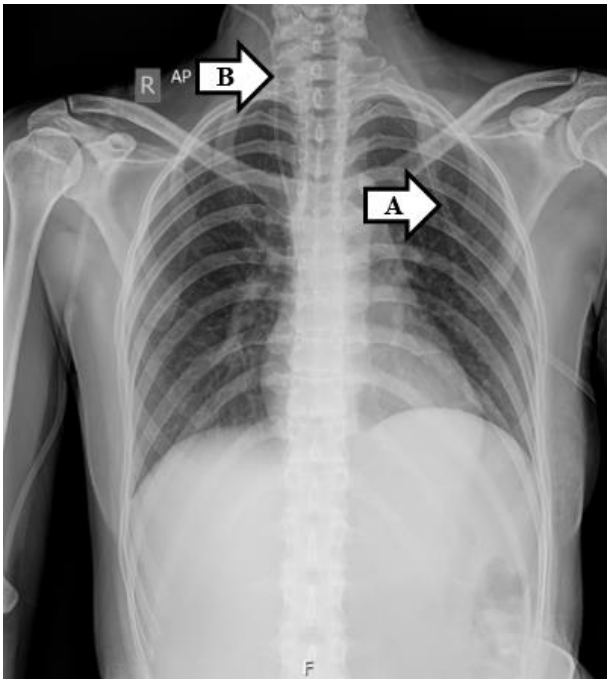
Chest X ray was performed and showed normal finding without signs of chylothorax (picture 4).

The high output chylorrhoea was successfully treated by conservative measures, bed rest, and total parenteral nutrition. Complete blood count, electrolytes, serum glucose, total proteins, CRP, albumin, triglycerides, and LDH were done routinely and any differences from reference values were corrected with appropriate therapy. Except for slightly lower albumin values which were corrected with albumin infusions, no other disbalances occurred. The patient was discharged after 15 days of hospital stay with a complete resolution of chylorrhoea and with normal neurovascular status of the left hand with complete resolution of preoperative symptoms. At the first control, one months after the operation patient is completely recovered without complaints.



Picture 2. Intraoperative view. Patient was operated with supraclavicular approach.

Picture 3. The content of the drain indicated lymphorrhoea.



Picture 4. Chest X ray showed normal finding. Arrow A is indicating wound drainage, and arrow B central venous catheter which was used for parenteral nutrition.

Discussion

About 50% of thoracic duct leaks are the result of a traumatic injury. The majority of traumatic injuries are iatrogenic (3), and about 20% are caused by penetrating or blunt trauma, hyperextension of the spine or forceful emesis and cough (4). Iatrogenic injury occurs during surgery on the esophagus, pleura, aorta, lunga, vagotomy, spine surgery, and others. Thoracic duct injury is extremely rare complication of thoracic outlet syndrome surgery. Bowden et al. reported a case of chylothorax after transaxillary resection of the first rib for the treatment of thoracic outlet syndrome (2). Similary, Schroeder et al. reported a case of a 31-year-old postal worker who was operated because of thoracic outlet syndrome with removal of the right first cervical rib and resection of the anterior and middle scalenes. On postoperative day 4, patient developed shortness of breath due to a chylothorax as a result of thoracic duct injury (5). We reported a similar case of a 29-years-old female patient who was operated for thoracic outlet syndrome with a resection of anterior scalene muscle on the left side. However, our patient did not develop chylothorax, since active tube drainage was placed at the end of the procedure.

If lymphatic leakage goes unnoticed dangerous complications can occur. Large losses of chyle can lead to hypovolemia if the fluid volume is not adequately replaced. Chyle is rich in nutrients and lymphocytes and continuous loss of these cells and molecules can lead to immunosuppression and malnutrition (3). Typically, there is a delay between the time of injury and the presentation of a chylothorax, since it takes tame for the chyle to leak into the mediastinum cavity and the pressure to be large enough to enter the pleural space and cause symptoms. Typically, this delay can be from 1 to 7 days. Approximately half of patients initially present with dyspnea, however about 35% of patients may experience no symptoms at the time of diagnosis. The mortality rate of untreated traumatic chylothorax is about 50% (3, 7). In our case chylothorax did not develop since drainage tube was places at the end of the operation. Daily monitoring of complete blood count, electrolytes, serum glucose, total proteins, albumin, and triglyceride enabled quick response and appropriate therapy if signs of malnutrition and immunosuppression occur, which was not the case in our patient, except for small protein disbalance, which has been corrected with albumin infusions.

Thoracic duct leak is classified as low output if the volume of lymphorrhoea is less than 1 liter and high volume if the volume is over 1 liter per day. If chyle output is less than 0.5 liter per day, the literature suggests a conservative therapy, initially involving dietary measures to decrease chyle production. Insertion of a thoracostomy tube to relieve pressure in the pleural cavity facilitates lung re-expansion and sealing of the leak in cases of chylothorax. A high-protein, medium-chain triglyceride diet with the restriction of long-chain triglycerides can be initiated. Medium-chain triglycerides fail to be absorbed by the lymphatic vessels and pass directly through the portal vein to the liver. In contrast, long-chain triglycerides enter the lymphatic system as chylomicrons. Reduced chyle production supports the spontaneous resolution of the chylous fistula (5). In case of a failure of diet therapy, a nil per os (NPO) regimen can be started while the patient is maintained with total parenteral nutrition (TPN). Octreotide or Somatostatin can be started because they can slow the production of chyle if TPN regimen is unsuccessful (2, 8). Although therapy of thoracic duct leak is best tailored to individual patient's

overall clinical picture, and in otherwise healthy patients, conservative management is most likely to be the best course of action, in cases of conservative therapy failure, more aggressive treatment with ligation of the thoracic duct may be the best strategy (9). If the chylous drainage last longer than 2 weeks despite conservative therapy or if lymphorrhoea is greater than 1 liter per day for more than 5 days, percutaneous or open surgical approaches with ligation of thoracic duct are required (10). In our case, conservative management with early start of TPN resulted in the cessation of lymphorrhoea.

References

1. Doerr CH, Allen MS, Nichols FC 3rd, Ryu JH. Etiology of chylothorax in 203 patients. Mayo Clin Proc. 2005;80(7):867-870.
2. Bowden S, Firdouse M, Roche-Nagle G. Chylothorax post transaxillary first rib resection for thoracic outlet syndrome. BMJ Case Rep. 2021;14(3):e236006
3. Champion S, Cheung VLS, Wiseman D. Isolated thoracic duct injury from blunt force trauma. J Radiol Case Rep. 2020;14(9):18-29.
4. Cammarata SK, Brush RE Jr, Hyzy RC. Chylothorax after childbirth. Chest. 1991;99(6):1539-1540.
5. Schroeder JR, Kumar A, Savage E, Rahaghi FF. Unusual cause of shortness of breath after surgery for thoracic outlet syndrome. BMJ Case Rep. 2012;2012:bcr2012006762.
6. Schild HH, Strassburg CP, Welz A, Kalff J. Treatment options in patients with chylothorax. Dtsch Arztebl Int. 2013;110(48):819-26.
7. MacNab DS, Scarlett EP. Traumatic chylothorax due to intrathoracic rupture of the thoracic duct. Can Med Assoc J. 1932;27(1):29
8. Kelly RF, Shumway SJ. Conservative management of postoperative chylothorax using somatostatin. Ann Thorac Surg. 2000;69:1944–1945.
9. Merigliano S, Molena D, Ruol A, Zaninotto G, Cagol M, Scappin S, Ancona E. Chylothorax complicating esophagectomy for cancer: a plea for early thoracic duct ligation. J Thorac Cardiovasc Surg. 2000;119(3):453-7.
10. Novelli PM, Chan EG, Frazier AA, Villa Sanchez M. Interventional Therapies for Thoracic Duct Injury and Intractable Chylothorax. J Thorac Imaging. 2019;34(4):258-265.