



## An Unusual Complication of Internal Jugular Vein Catheterization: Chylothorax

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### ABSTRACT

**Background:** Infection and vascular occlusion are common catheter-related complications in patients with central venous catheters.

**Case Report:** A hemodialysis patient presented at the emergency department with frequent shortness of breath. Diffuse pleural fluid was observed on the right side in a computerized tomography image of the chest. Thoracentesis was performed, a chest tube was inserted to treat chylothorax, and a triglyceride diet was administered. On the 13<sup>th</sup> day of hospitalization, the chest tube was removed and video-assisted thoracoscopic surgery was performed with successful results.

**Conclusion:** Chylothorax should be kept in mind in the differential diagnosis of hemodialysis patients with hypervolemia symptoms. Thoracentesis can aid in the diagnosis.

**Keywords:** Catheter, central vein, chylothorax, infection, thrombosis

### INTRODUCTION

Tunneled catheters are often used as an alternative means of vascular access in hemodialysis patients, especially those with limited life expectancy, patients with vascular access problems, and those with comorbidities (1). However, intravascular catheterization is a serious risk factor for thrombosis development. Conventional radiological imaging methods can reveal venous thrombosis in most cases with clinical signs of vascular occlusion, and the incidence of catheter-related thrombosis has been reported to be between 42% and 80% in patients who do not exhibit symptoms. Additionally, a fibrin sheath has been detected in patients with a central venous catheter in postmortem studies (2, 3).

Infection, vascular dissection, misplacement, phlebitis, pneumothorax, and pulmonary embolism are common central venous catheter-related complications (4).

This case report describes a patient who developed chylothorax, a very rare complication of a central catheter.

### CASE REPORT

A 64-year-old male patient presented at the emergency department with complaints of shortness of breath as well as neck and facial swelling. He had been in treatment for diabetes mellitus for 10 years. Based on observation of uremic symptoms and diabetic nephropathy, hemodialysis sessions 3 days a week using a tunneled transjugular catheter had been initiated approximately 1 month prior. The patient was hospitalized in the nephrology clinic due to swelling in the face and neck region. Computerized tomography (CT) angiography was performed and revealed an occlusion in the vena cava inferior as well as diffuse collaterals in the right axilla and the anterior chest wall (Fig. 1).

A catheter revision was attempted by an interventional radiology team, however, the obstruction could not be sufficiently removed. The patient did not agree to a second intervention and he continued to undergo hemodialysis via the same catheter.

The patient was admitted to the emergency department with frequent shortness of breath, and diffuse pleural fluid was observed on the right side in a chest X-ray. After admission, frequent ultrafiltration was performed to achieve a dry weight. Thoracentesis was performed because a thorax CT revealed that a large quantity of pleural fluid remained and the shortness of breath persisted. A chest tube was inserted by a thoracic surgeon (Fig. 2a, b) and chylosis-like fluid was seen, suggesting chylothorax (Fig. 3). Laboratory examinations yielded the following values: blood urea nitrogen (BUN): 59 mg/dL, creatinine: 4 mg/dL, sodium: 136 mmol/L,

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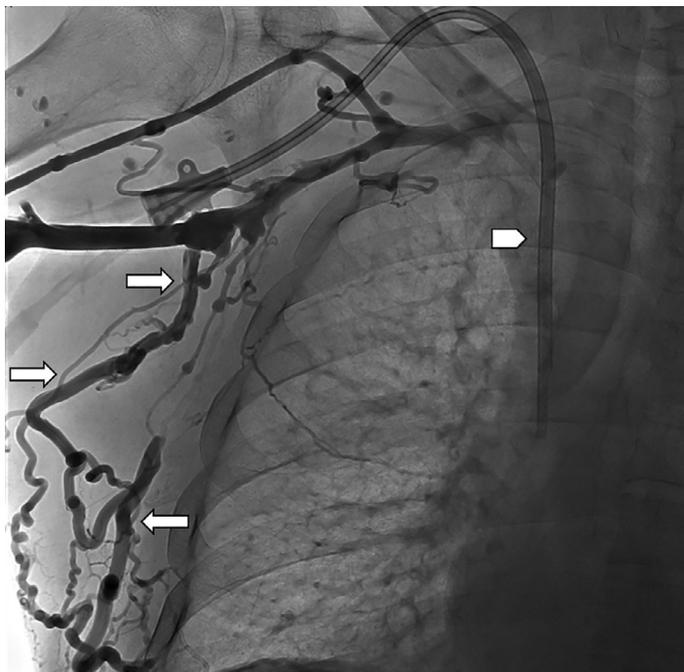
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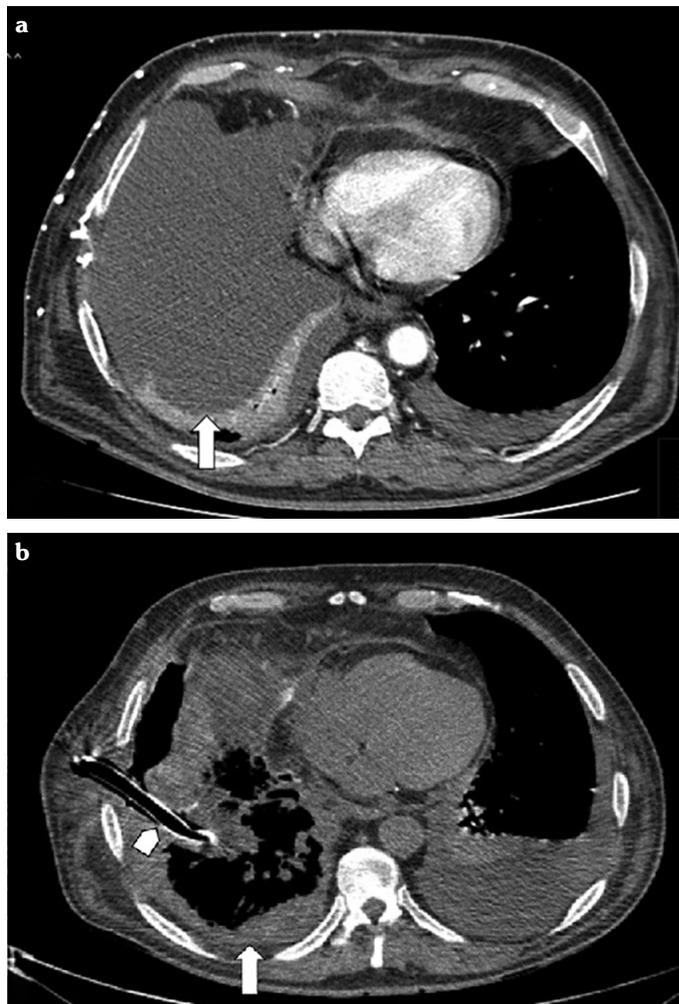
**Figure 1.** Venography of the right upper extremity shows occlusion in the vena cava superior (arrowhead) and venous collection stalk in the chest wall (arrows)

potassium: 4 mmol/L, total protein/albumin: 7.4/3.9 g/dL, aspartate transaminase: 24 u/L, alanine transaminase: 28 u/L, calcium: 8.1 mg/dL, phosphorus: 4.8 mg/dL, C-reactive protein: 39 mg/L, amylase: 108 U/L, total cholesterol: 129 mg/dL, low-density lipoprotein cholesterol: 60 mg/dL, triglyceride: 92 mg/dL. The triglyceride level of the pleural fluid sample was 1200 mg/dL. The dialysis adequacy calculation of Kt/V was 1.4. A tuberculosis polymerase chain reaction test of the pleural fluid was negative.

Broad-spectrum antibiotic (vancomycin+meropenem) treatment was initiated for pneumonia during follow-up, as well as a triglyceride diet. Daily posteroanterior chest radiography was performed and the drainage was followed up by the thoracic surgery unit. On the 13<sup>th</sup> day of hospitalization, the chest tube was withdrawn and video-assisted thoracoscopic surgery was performed. Most major procedures traditionally performed with an open thoracotomy can be performed using smaller incisions with video assistance. The patient was discharged in good general condition with recommendations for follow-up care. No complications were seen at the post-operative sixth month.

## DISCUSSION

Catheter infection, vascular dissection, misplacement, pneumothorax, pulmonary embolism, and thrombosis are common complications in patients with a central venous catheter (4). Chylothorax may occur as a result of trauma, malignancy, or thoracic surgery operations (5, 6). Chylothorax has also been reported in patients with vena cava thrombosis, lymphoma, isolated left subclavian vein thrombosis, and Behçet's disease (7–9). An accumulation of fluid in the pleural or pericardial space of the ductus thoracicus is an extremely rare condition.



**Figure 2.** (a) Axial thoracic computed tomography image of massive pleural effusion in the right hemithorax (arrow), and (b) reduction (arrow) after the thoracic tube (arrow-head) operation



**Figure 3.** Milky-white fluid obtained in tube thoracostomy

Chylothorax is often caused by a rupture, perforation, or blockage of the lymphatic drainage system. The thoracic duct usually drains into the venous system at the junction of the left internal jugular vein and the subclavian vein. However, significant variations in anatomy have been described. Abnormal anatomy, resulting from circumstances such as catheterization of a large lymphatic vessel, right heart failure, or high systemic venous and lymphatic back pressure

due to previous cardiothoracic surgery, may predispose a patient to lymphatic damage. Chylothorax may develop in the early postoperative period after any cardiac surgery (10). There are a number of treatment options for chylothorax: drainage of the milky-white fluid, a triglyceride diet, total parenteral nutrition, administration of somatostatin, or ligation of the thoracic duct (11). Endovascular treatment has been reported to demonstrate better early results than surgery. However, long-term follow-up imaging after endovascular treatment is required. This should be considered in the evaluation of late-period mortality and morbidity rates. CT and/or ultrasonography guidance reduces the risk of visceral organ injury during a transabdominal embolization. This procedure could not be performed in this case because of the high risk of complications (12, 13).

In our case, catheter-related thrombosis occurred in the orifice where the thoracic duct connects to the proximal left subclavian vein, and as a result, increased intraluminal pressure in the communicating vessels and leakage from the pleural and pericardial lymphatics may have caused chylothorax. Also, our patient had continued to undergo hemodialysis therapy using the same central venous catheter, since no other vascular access was available.

Imaging methods should be used in invasive procedures to reduce mortality and morbidity. The use of ultrasound-guided cannulation of the internal jugular vein has been shown to reduce the complication rate (14).

## CONCLUSION

Chylothorax should be kept in mind in the differential diagnosis of hemodialysis patients with hypervolemia symptoms and persistent pleural fluid despite achievement of dry weight, and thoracentesis can be beneficial to the diagnosis.

**Informed Consent:** Written informed consent was obtained from patients who participated in this study.

**Peer-review:** Externally peer-reviewed.

**Author Contributions:** Concept – SK, İK; Design – EE, SK, AG; Supervision – MHS, BT; Resource – NH, SK; Materials – OO, BT; Data Collection and/or Processing – EE, OO; Analysis and/or Interpretation – SK; Literature Search – SK, BT; Writing – SK, İK; Critical Reviews – BT, AG.

**Conflict of Interest:** The authors have no conflict of interest to declare.

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