Annals of Clinical and Medical Case Reports

Case Report

ISSN 2639-8109 | Volume 11

# Chronic Central Venous Catheter Erosion: A Case Report

**Alomaish H[1*], Daghistani R[1], Elyahya F[1], Alwasiah R[1] and Arishi HA[2]**

[1]Department of Radiology, King Abdulaziz Medical City, National Guard Health Affairs, Riyadh, Saudi Arabia

[2]Department of Surgery, King Abdulaziz Medical City, National Guard Health Affairs, Riyadh, Saudi Arabia

**[*]Corresponding author:**

Hassan Rayhan Alomaish,
Department of Radiology, King Abdulaziz Medical City, National Guard Health Affairs, Riyadh, Saudi Arabia

Received: 02 Sep 2023
Accepted: 16 Oct 2023
Published: 24 Oct 2023
J Short Name: ACMCR



**Citation:**

Alomaish H, Chronic Central Venous Catheter Erosion: A Case Report. Ann Clin Med Case Rep. 2023; V11(8): 1-3

**Keywords:**

Central venous catheter; Lung injury; Complications; Computed tomography

**Abbreviations:**

CVC: Central Venous Catheter; ESRD: End Stage Renal Disease; SVC: Superior Vena Cava; ED: Emergency Department; CT: Computed Tomography

## 1. Abstract

Central venous catheters (CVC) provide vascular access for several clinical applications. Patients may suffer from acute or chronic complications, with acute complications being more common. Here, we present a case of CVC erosion through the superior vena cava that was subsequently surgically managed and diagnosed as a lung injury.

## 2. Introduction

Central venous catheters (CVCs) are crucial for obtaining vascular access for various clinical indications. CVCs are used to gain vascular access for hemodialysis in patients diagnosed with end-stage renal disease (ESRD) [1]. Breaching of the blood vessel wall by a CVC may result in a vascular wall injury, resulting in the extravasation of the injected material into the pleural cavity and mediastinum. Delayed diagnosis and treatment can markedly worsen a patient's condition and often lead to increased morbidity and mortality [2].

Here, we present a rare case of chronic CVC-related erosion, characterized by gradual erosion of the catheter within the central venous system over a prolonged period. We describe the patient's clinical presentation, diagnostic assessment, and treatment approach. To our knowledge, no similar cases have been reported in the literature. Therefore, this report aimed to raise awareness of this uncommon complication.

## 3. Case Report

The patient was a 40-year-old male with ESRD who presented to the ED because of a nonfunctioning CVC and hemoptysis during his scheduled hemodialysis session. The CVC was inserted two years prior to presentation. The patient reported the occurrence of the same complication a few months prior. Upon presentation, there were no clinical or laboratory signs of infection, or clinical symptoms of vascular occlusion. Moreover, no infection or manipulation occurred during the time the patient had the CVC inserted. He was admitted for further examination.

In the ED, a chest CT scan was performed to further investigate the patient's hemoptysis, which showed a CVC traversing the SVC with an extraluminal tip at the right hilum in close proximity to the right middle lobe, where a large cavity with surrounding ground-glass opacities was observed (Figures 1 and 2). Complementary images with IV contrast in the venous phase showed partial filling of the cavity with the contrast material (Figure 3 and 4). The findings revealed a chronically eroded central line through the SVC to the right middle lobe such that it created a cavity.

After obtaining the CT findings, the thoracic surgeon advised the patient to undergo urgent thoracotomy and exploration during cardiac surgery. Intraoperatively, an injury to the distal SVC was identified. The SVC was opened and the tip of the CVC was removed as it passed through the backwall of the SVC and into the lung parenchyma. The (SVC) was repaired using an interpositional graft. A new CVC was inserted the following day.

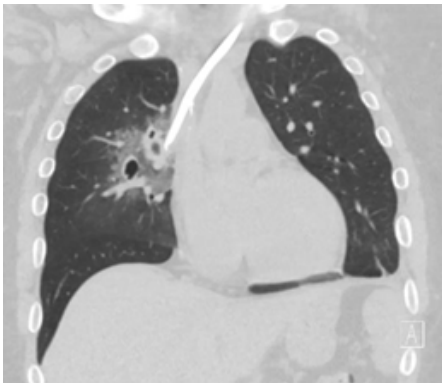

**Figure 1:** Coronal non-enhanced computed tomography scan of the chest shows erosion of the central line into the right upper lobe.

**Figure 2:** Axial non-enhanced computed tomography scan of the chest shows RUL cavitation with surrounding ground glass opacity.

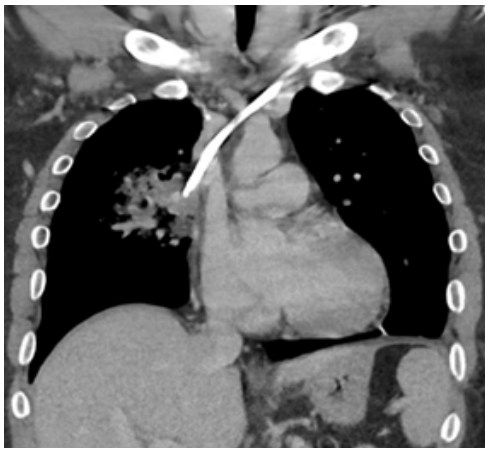

**Figure 3:** Coronal computed tomography scan of the chest in the venous phase with better delineation of the vascular structures, which shows protrusion of the line through the superior vena cava.

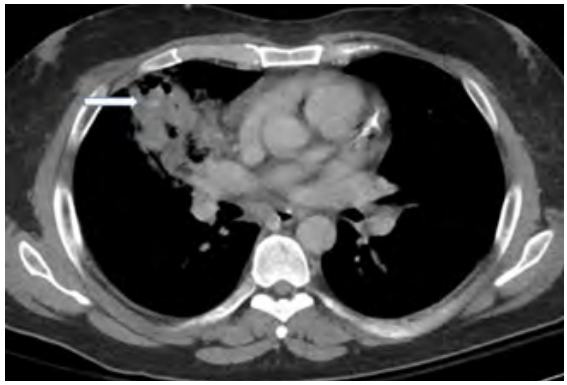

**Figure 4:** Axial computed tomography scan of the chest in the venous phase shows contrast pooling in the RUL cavity, proving that the central line is indeed within the RUL.

**Figure 5:** Frontal chest radiograph depicting the central venous catheter's tip perpendicular to the superior vena cava.

## 4. Results and Discussion

Complications arising from central venous catheters can manifest shortly after insertion or later during catheterization [3]. Early complications include infection, pneumothorax, and hematoma [4,5]. Late-onset complications associated with central venous catheters include catheter-related thrombosis, infections, and malfunction. Chronic catheter erosion, although uncommon, can develop gradually because of factors, such as mechanical stress, infection, or tissue inflammation, resulting in erosion of the surrounding tissues [2].

Vascular erosions by CVC is a rare complication [6].

Mukau et al (1991) reported an incidence rate of 0.4% and showed that left-sided subclavian and large catheters were risk factors for vascular erosions [7]. The fragility of the vascular wall caused by underlying conditions or drug therapy, such as corticosteroids or cytotoxic agents, could be related to vascular injury. Walshe et al. (2007) reported an incidence rate of 0.17% for vascular erosions and demonstrated that they were more likely to occur with left-sided catheters in the elderly population, presumably due to anatomical and orientation factors [8].

## 5. Conclusion

Variable acute and delayed complications can occur after the insertion of central venous catheters. One rare but serious complication that can happen is vascular erosion at the tip of the central line. The incidence of vascular erosion has been reported to be low. Knowing the ideal position of the catheter tip and the factors that may increase the risk for causing vascular erosions is essential in the evaluation of any chest radiograph following central line insertion. Several theories have been suggested to explain the mechanism that causes vascular erosions. Two major mechanisms are thought to have major effects on vascular erosions; the first is mechanical irritation from the catheter tip to the vessel wall. The other is chemical irritation of the intimal layer of the vascular wall by hyperosmolar solutions. In our case, abutment of the catheter tip was inserted in the superior vena cava at an angle of 45° perpendicular to the vessel wall, as shown on the post-procedure chest radiograph (Figure 5).

### References


1. Deere M, Singh A, Burns B. Central Venous Access of the Subclavian Vein. Updated 2023 Jul 31. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing. 2023.
2. Kim D, Ryu D, Jung H, Lee S. Evaluation of complications of totally implantable central venous port system insertion. Experimental and Therapeutic Medicine. 2019; 17(3).
3. Kornbau C, Lee KC, Hughes GD, Firstenberg MS. Central line complications. International Journal of Critical Illness and Injury Science. 2015; 5(3): 170-178.
4. Kolikof J, Peterson K, Baker AM. Central Venous Catheter. Treasure Island (FL): StatPearls Publishing. 2023.
5. Tsotsolis N, Tsirgogianni K, Kioumis I, Pitsiou G, Baka S, Papaiwannou A, et al. Pneumothorax as a complication of central venous catheter insertion. Annals of Translational Medicine. 2015; 3(3): 40.
6. Morano SG, Coppola L, Latagliata R, Berneschi P, Chistolini A, Micozzi A, et al. Early and late complications related to central venous catheters in hematological malignancies: a retrospective analysis of 1102 patients. Mediterranean Journal of Hematology and Infectious Diseases. 2014; 6(1): e2014011.
7. Mukau L, Talamini MA, Sitzmann JV. Risk factors for central venous catheter-related vascular erosions. Journal of Parenteral and Enteral Nutrition. 1991; 15: 513-6.
8. Walshe C, Phelan D, Bourke J, Buggy D. Vascular erosion by central venous catheters used for total parenteral nutrition. Intensive Care Medicine. 2007; 33(3): 534-7.