

# Surgical Extraction of Residual CVC Guide Wire after One Year: Case Report

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## ABSTRACT

Complete remaining guide wire in the vascular system after CVC is very rare. For which the maximum symptom-free reporting time in studies was five months, and in our case, the patient was symptom-free for one year. The only finding was one session complaining of ear pain and mastoid tenderness two weeks after catheter placement. A 42-year-old male patient with the diagnosis of necrotizing pancreatitis and a retroperitoneal abscess was a candidate for laparotomy after ERCP. The patient was a candidate for central venous catheter insertion through the internal jugular vein before the surgery in the operating room by a third-year anesthesia resident. After one year, discovered that incidentally remaining guide wire during a follow-up MRI before pancreatitis. Which has been asymptomatic during this period. And despite the risk of rupture of the right heart and blood vessels due to possible fibrosis due to a long stay in the cardiovascular system, it is successfully removed by an endovascular surgeon.

The main reasons for the incident were the non-observance of scientific and safety principles at the time of catheter insertion and the failure to perform CXR after that.

## Introduction

Central venous catheter placement is very common in ICU, CCU, operating rooms, and critically ill patients. Because this procedure is invasive, complications such as cardiac arrhythmia, hemothorax, pneumothorax, vascular injury, hematoma, emphysema, infection, and catheter or guide wire emboli are possible [2]. One of the rarest side effects is the complete release of the guide wire in the vascular system, which can cause severe arrhythmias, heart damage, tamponade, pulmonary artery occlusion or vessel rupture, and even death. Compliance with safety principles during catheter operation can easily prevent these complications [4]. In the mentioned case, the patient was catheterized and discharged from the hospital after one month without any problems. After one year, accidentally during MR imaging noticed that the guide wire remained in the right atrium, ventricle, and internal jugular vein then referred

to a vascular surgeon due to the possibility of heart rupture during catheter withdrawal due to long-term fibrosis. All facilities were prepared for emergency cardiovascular surgery. Fortunately, the catheter was removed successfully without complication.

## Case Report

A 42-year-old male patient with the diagnosis of necrotizing pancreatitis and a retroperitoneal abscess was a candidate for laparotomy after ERCP. Due to major surgery and lack of suitable peripheral vein access, the patient was a candidate for central venous catheter insertion through the internal jugular vein before the surgery. Catheterization was performed by a third-year anesthesia resident using the Seldinger technique in an emergent setting. There weren't any problems with the installation. The surgery was performed without problems and the patient was extubated and transferred to the ICU. CXR is not requested after the surgery since the

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patient is extubated. CXR is not taken even during one month of hospitalization.

And there are no reports of catheter failure, respiratory problems, or cardiac arrhythmia. The only finding was one session complaining of ear pain and mastoid tenderness two weeks after catheter placement. No more findings were reported after the ENT consultation. Abdominal CT has been done.

### Clinical Findings

Up to one year after surgery, when the patient is asymptomatic and stable, MRI is requested for pancreatitis follow-up. Due to the creation of artifacts during the procedure, they noticed a metal object in the body of the patient, and after performing CXR, they notice that the CVC guide wire remains in the right atrium, ventricle, and internal jugular vein. The end of the J tip is facing up (Figures 1).

### Timeline

One year ago, a CV line was implanted in the operating room due to necrotizing pancreatitis surgery. One year later, the presence of a guide wire was accidentally detected in the patient's heart and internal jugular vein. And within 10 days of detection, it is successfully removed through vascular surgery.

### Diagnostic Assessment

The Presence of a guide wire inside the heart and internal jugular vein was confirmed in a chest CT scan and echocardiography. When we re-examined the patient's previous abdominal CT, we noticed the guide wire footprint in the cuts near the diaphragm, which unfortunately had not been noticed before (Figure 2).

### Therapeutic Intervention

Considering that the patient is asymptomatic and stable, he was electively referred to a center equipped with cardiovascular surgeries. Due to remaining in the cardiovascular system for more than one year, fibrosis and adhesion bands to the endothelium of the atrium, ventricle, and internal jugular vessels were possible. And the risk of any cardiovascular trauma was high. And there was a possibility of thoracotomy and open-heart surgery for him. And fortunately, it was removed through open vascular access without any rigid fibrosis and attachment of vascular branches or even the heart.

### Follow-up and Outcomes

After the guide wire was removed from the right internal jugular vein through open vascular surgery and a one-day observation, the patient was discharged from the hospital in good general condition and without any complications.

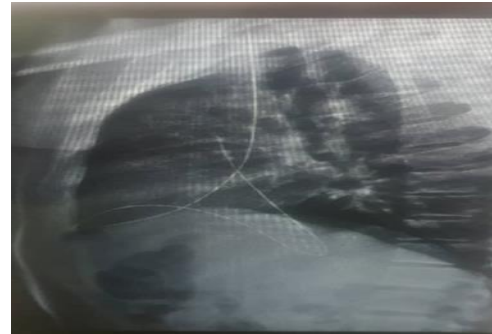


Figure 1- Lateral x ray

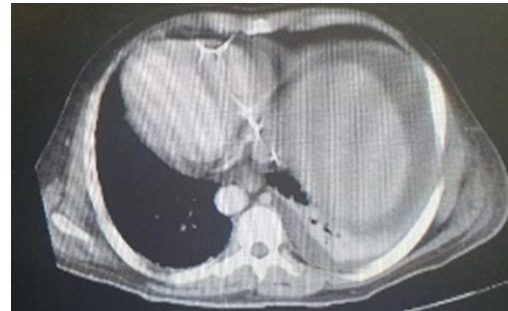


Figure 2- Axial ct scan

### Discussion

Insertion of a central venous catheter (CVC) is one of the common and practical procedures for pediatric and adults hospitalized in the ICU, operating room, and emergency and CCU [1]. This is an invasive procedure and can be associated with complications [2]. In the last decade, the incidence of the complication of complete release of the guide wire in the vessels has increased increasingly, which can be due to the increase in trainees, distraction during placement, and the increase in the number of catheterizations [3]. Although similar to our case, some patients can be asymptomatic [4]; complications such as distal obstruction of pulmonary vessels and systemic vessels (in the case of the right-to-left shunt), arrhythmia, rupture of vessels, and sometimes death can occur [5]. To reduce the occurrence of this dangerous complication, Simple but important points should be observed during the insertion of the catheter, including:

- 1- Before inserting the catheter, the physician should carefully examine the set for breakage or bluntness of the guide wire and catheter.
- 2- Keeping the proximal guide wire in the hand during the entire catheter insertion is necessary.
- 3- Never push the guide wire inside if there is resistance to the guide wire's entry. The guide wire is taken out and checked for breakage or damage. Or choose another place to enter the catheter.
- 4- Be sure to check for the presence of a guide wire at the end of the procedure.

5- A chest X-ray should be performed at the end of all catheterizations to check both the location of the catheter and possible complications [6].

Other proposed solutions to intensify monitoring and reduce complications include designing a checklist for performing procedures that doctors and nurses do not forget and always keep in mind [2].

In the field of treatment approach for patients with complete release of the guide wire in the vascular system, if we notice this complication immediately after the insertion, endovascular or surgical methods can be used to remove the guide wire, depending on the location of the guide wire and the facilities of the main center, although that the endovascular approach is the preferred method [7-8]. But if the guide wire is asymptomatic for a long time in the vascular system, it is recommended to remove it or not? In the past, if there were no symptoms, it was left, but today, due to the risk of moving the guide wire and the possibility of cardiac arrhythmias, it is recommended to remove it by the endovascular method [6]. In our case, failure to comply with simple instructions caused a serious complication for the patient, including not leaving the guide wire until the end of the procedure, and possibly when insertion was difficult the physician should not disrespect the safety rules. Like inserting the catheter from the opposite side, not controlling the presence of guide wire in the set at the end of the procedure, not informing the attending physician or senior resident about the catheterization problem during the catheter insertion; and also missing to order CXR or check the catheter after insertion. Maybe this catastrophe would not have happened if each of these wrong circles were rechecked by someone else.

The only symptom the patient had was ear and mastoid pain, which unfortunately no one noticed so If the patient complains of ear pain after placing the CV line, the residual guide wire should be considered in its differential diagnosis.

#### “Take-away” lessons

In the medical world, often what causes disaster for patients is the failure to follow simple but important points. It is important that with the increase in the number of graduates at different levels of education recalling the safety principles can prevent Individual error. This case report is a reminder of the importance of following simple safety tips in medical procedures. And another point is that if each person in the treatment cycle does not perform their duties according to the principles, the possibility of error increases.

#### Patient Perspective

Due to the distance, the patient was interviewed by phone. That the patient was satisfied with the treatment process and the measures taken and the support after the complication. Although he complained about carelessness in performing the procedure and the occurrence of this problem. Currently, the patient has no problems and continues to lead a normal life.

#### Informed Consent

Again, due to the distance, consent was obtained from the patient over the phone. He had no problem with this case being presented as a case report.

#### Conclusion

First of all, for any invasive procedure, a precautionary check was mandatory, and it is recommended to double or triple check, and for any different or even strange symptoms, it is better to look for a cause, however simple.

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