



## Minimally Invasive Surgery in Loss of the Guide Wire: Case Report

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### ABSTRACT

**Background:** Catheterization of central veins is a routine technique which is widely used in general hospitals and medical intensive care units. It should be carefully performed and managed to prevent adverse side effects.

**Case Presentation:** In this case report, we describe a case of lost guide wire during central venous catheterization, which was successfully treated with a minimally invasive surgical technique.

**Conclusions:** Inattention is the main cause of the retained guide wires. The interventional angiography is usually successful as the first line therapy.

### ► Implication for health policy/practice/research/medical education:

Loss of the guide wire is a rare, relatively dangerous, and preventable complication. Inattention is the main cause of the retained guide wires. The diagnosis is simple, but they are usually disregarded by the radiologists. The guide wires should be removed as quickly and completely as possible to prevent any complication. The interventional angiography is usually successful as the first line therapy.

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## 1. Background

Central venous catheterization is a routine technique in modern medicine. Central venous catheters are needed for monitoring patients in special conditions and as a route for parenteral nutrition. Depending on the catheter type, cannulation is performed at different sites such

as the jugular, subclavian, femoral and brachial veins. Complications associated with the central venous catheters are infection, failure to place the catheter, arterial puncture, improper catheter position, pneumothorax, hematoma, hemothorax, asystolic cardiac arrest of unknown etiology, and inferior vena cava (IVC) trauma (1).

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Infection is the most common complication in subclavian vein route; though arrhythmias and air embolism can occur (2). These complications occur in about 12% of cases (2, 3). One of these extremely rare complications is intravascular loss of a guide wire, which is usually recognized immediately or sometimes with delay (2-5). Since radiologists are attuned to detecting small and medium size foreign bodies, most are likely unaware that an object as large as 60 cm in length can be unintentionally misplaced within a patient (5). Here, we elucidate a case of retained guide wire during cannulation of the right internal jugular vein, which was successfully treated with a minimally invasive surgical technique.

## 2. Case Presentation

A 65 year old woman presented to the emergency department with abdominal pain in RUQ, fever, chills, and jaundice. She was hospitalized with primary diagnosis of cholangitis. Because of patient's history of heart disease, the central venous catheterization was attempted for fluid resuscitation via the right internal jugular vein using the Seldinger technique. The catheter was inserted by a first-year surgical resident with no supervision by senior residents. No complications or difficulties in cannulation were reported; back flow was also normal. The catheter tray was not checked for the guide wire after the procedure. After the patient was stabilized, she underwent chest X-ray, plain abdominal radiography, and ultrasonography. The radiographs were assessed by the radiology resident and then re-assessed by the surgical resident. The ultrasonography revealed dilated common bile duct according to paraclinic and liver function tests. So, the definitive diagnosis of cholangitis was established. Fluid therapy and suitable antibiotics were started and the patient became a candidate for endoscopic retrograde cholangiopancreatography (ERCP). One day later, the case was reviewed during the surgical morning report session and the faculty members noticed the guide wire in chest and abdominal radiographs. The radiographs showed that the catheter had been entered in the inferior vena cava (IVC) via the right internal jugular vein and then, had remained in the right iliac vein at the point of bifurcation into the internal and external iliac veins (Figures 1 and 2). Based on the consultation with the vascular surgeons and radiologists, the patient underwent interventional radiology for the removal of the catheter. The patient was heparinized, and the foreign body was caught by a gooseneck snare passed via the femoral vein. The method was successful and the retained guide wire was removed by interventional radiology using endovascular retrieval forceps (gooseneck snare). The day after, the patient underwent ERCP and endoscopic sphincterotomy (ES) for cholangitis. The procedure was successful, but unfortunately the septic course continued and despite aggres-



**Figure 1.** The Chest X-Ray Showing the Guide Wire Passed Through the Internal Jugular Vein to the Inferior Vena Cava



**Figure 2.** The Abdominal X-Ray Showing the Guide Wire in the Right Common Iliac

sive treatment, she died with feature of end stage septic shock.

### 3. Discussion

Central venous catheterization has many complications such as infection, failure to place the catheter, arterial puncture, improper catheter position, pneumothorax, hematoma, and so on (1, 2). This study reports a case of retained guide wire and its treatment. In our case, the catheter was retained in the right iliac vein at the point of bifurcation. An important point in preventing this complication is that the guide wire should be held at least 18 cm distant from the vein (3, 5). If this rule is followed, the guide wire cannot get lost. Predisposing factors include: inattention, inexperienced operator, inadequate supervision of trainees and exhausted staff (3, 5), which all influence our case. The signs of guide wire loss include: missing the guide wire in the tray after the procedure, resistance to injection via catheter, poor venous backflow, guide wire visibility on radiographs, asymptomatic, and deep vein thrombosis (4, 5). Our patient was asymptomatic. The diagnosis is very simple, which is often established incidentally during routine radiographic exams (4, 5). However, radiologists are often searching for certain routinely detected objects such as the laparotomy pads, reactors, or surgical clamps, but they would never expect for a misplaced guide wire with 60 cm length (6). Another cause of overlooking the guide wire in radiographs is multiple tubes that are inserted for various reasons such as nasogastric tubes and foley catheters (7, 8). There are limited published literatures on the complications of lost guide wire, but such a foreign body can cause arrhythmias, vascular damage, thrombosis, cardiac tamponade, arterial puncture, and embolism (3-6, 9). The potential risk of death or serious complications from retained catheter fragments has been reported as high as 71% (9). Our patient did not experience any complication from the retained guide wire. There are different methods for the management of the retained guide wires, which the interventional radiology is the method of choice. Usually, the foreign body is caught by modern devices such as the goose-neck snare catheter, endovascular forceps, or dormier basket, which the two latest methods increase the risk of endovascular trauma (4, 5). The foreign body should be removed along with the vascular sheath, which is usually twice the size of the lost guide wire. In the case of failure, or when heparinization is contraindicated, extraction should be attempted by careful surgical exploration (5, 6). This method was successfully

performed in our patient.

### 4. Conclusion

Loss of the guide wire is a rare, relatively dangerous, and preventable complication. Inattention is the main cause of the retained guide wires. The diagnosis is simple, but they are usually disregarded by the radiologists. The guide wires should be removed as quickly and completely as possible to prevent any complication. The interventional angiography is usually successful as the first line therapy.

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### Authors' Contribution

None declared.

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