



## **A Case of Retained Guidewire Spontaneous Emerging from Skin Near Right Knee 8 Months after Central Venous Catheterization**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. Authors RSC, NJS designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors RSC and AA managed the analyses of the study. Authors RSC and RG managed the literature searches. All authors read and approved the final manuscript.*

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**Case Study**

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### **ABSTRACT**

Central venous catheterization is a common utensil used to monitor central venous pressure and administer intravenous fluids.

Retained guidewire is a rare but dreaded complication of intravascular interventions. The majority of cases are identified immediately or shortly after the procedure.

In our hospital a case of 22 years old female patient with symptoms of knee pain and right lower limb swelling with guide wire emerging out just below right knee joint 8 months after central venous catheterization.

With the help of artery forcep guidewire is slowly withdrawn from the protruding site in operation theatre.

Attention and proper guidance to trainee during procedure are required to minimize such complications as this is a completely preventable complication; a hold on tip of wire is maintained during placement.

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## 1. INTRODUCTION

Central venous catheterization is a technique used in the emergency department and intensive care unit and necessary for critical patients in special conditions like hypotension and as a route for parenteral nutrition. Jugular, Subclavian, Femoral, and Brachial veins are different veins which can be chosen depending on the catheter type and size. Complication rate of central venous catheterization is approximately 12% to 15% [1,2].

Arterial puncture, bleeding and hematoma formation, pneumo-thorax, and infections are known complications of intravascular catheterization.

Loss of a guide wire is extremely rare complication, which is often found incidentally following a routine x-ray or venous Doppler performed after the procedure [3–10].

## 2. CASE REPORT

A 22 years old female patient presented with right knee pain, right lower limb swelling for about 3 months and with emerging out the end of guidewire from skin below right knee. The patient has past history of cerebral venous thrombosis about 10 month previously.

Patients was admitted to medicine intensive care unit ward for about 3 months and Central venous

catheterization had been performed at sir sayaji hospital in medicine department during previous admission in right femoral venous access.

2 month back patient presented with right lower limb swelling and pain. Xray abdomen pelvis and right lower limb venous Doppler was done which showing upper end of guidewire was in inferior vena cava at the level of L2-L3 vertebra and lower end was in thigh area but not protruding from skin, so patient advised for vascular surgical intervention but refused at that time and was on follow up after that.

On present admission, patient presented with swelling in right knee with a guide wire protruding below the right knee.

An Xray of right knee, Xray PBH, Xray right hip with proximal femur has been done. Xray shows abnormal radio-opacity noted in the soft tissue shadow, suggestive of foreign body (guide wire).

Ultrasonography right lower limb arteriovenous doppler shows linear echogenic line noted in its course of right common femoral vein, extending distally in great saphenous vein & primarily upto right external iliac and inferior vena cava, Possibility of foreign body.(?guide wire). Hypochoic material filling the lumen of common femoral vein, great saphenous vein, right external iliac partially, which gives patchy colour flow on application of doppler, Possibility of partial thrombosis.



**Fig. 1. Xray pelvis with bilateral hip showing Upper end of guidewire was in inferior vena cava 2 month back. (R- Right Side)**



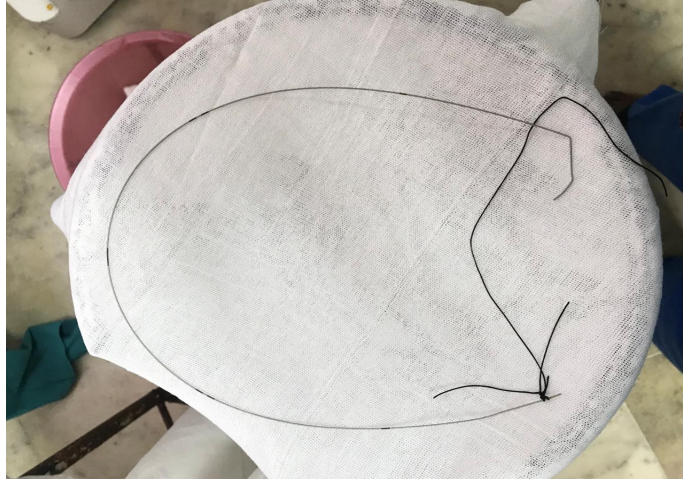
**Fig. 2. Lower end of guidewire protruding out from skin below knee joint lateral side on present admission first seen by patient**



**Fig. 3. Xray right knee anteroposterior and lateral view showing lower end of guidewire below the knee joint on present admission**



**Fig. 4. Xray pelvic bone with bilateral hip joint showing upper end of guidewire below the level of iliac crest on present admission**



**Fig. 5. Removed guidewire with bent upper end**

Under spinal anesthesia on 13/12/2019 in operation theatre with the help of artery forcep guidewire is slowly withdrawn from the protruding site. There was no any complication even bleeding was absent. Patient is discharged 2days removal and patient is on follow up with no any complains.

### 3. DISCUSSION

Guidewires are used in almost all intravascular interventions, including central venous catheterization. There are many complications associated with the insertion of guidewires including Arterial puncture, bleeding and hematoma formation, pneumo-thorax, and rarely retention of guidewire after insertion which may be associated with complications [4–10]. The incidence of complications associated with guidewire insertion has been increasing either due to increase in the vascular interventional procedures or due to increased reporting of clinical case reports [11].

Many factors can increase the risk of retention of an intravascular guidewire, including mind diverting during the procedure, experience of the operator, high workload in the hospital, or lack of proper guidance. Lack of guidance is the commonest risk factor, with most of the cases seen with trainee doctors [7].

Most retained guidewires are discovered immediately when the operator notes the missing guidewire, or when the tip of wire is lost, or while inspecting the catheter tray after the procedure but some may be discovered after a long period,

as with our patient (after approximately 8 months). Guidewire retention may also be detected with radiographic imaging after procedure, either performed immediately or later for unrelated conditions[17]. Some cases have been detected during post mortem examination and during laparotomy [7]. Our study reports a case of retained guide wire[17]. The guidewire was detected when it emerging out from skin to the outside of the body below right knee, which is an extremely rare occurrence.

Complications related to the retained wire when detected were pain and right lower limb swelling and partial venous thrombosis in femoral vein.

Condition of the wire in the body (during the time of diagnosis or retrieval) upper end slightly bent but not adherent to vascular wall and removed without breaking of wire.

Placing a central line as an emergency procedure increases the risk of missing a guidewire and multiple punctures may further increase the risk. This patient underwent an admission to the intensive care unit (ICU), which may have made it easier to miss the findings on X-ray local part, due to the presence of the multiple wires attached to his body at that time [17].

Guidewire retention may result in multiple complications including cardiac arrhythmias, conduction abnormalities, perforation of blood vessels or a cardiac chamber. Also, the guidewire can undergo breakage of the distal tip with subsequent embolization, and kinking, looping, or knotting of the wire so difficult to

**Table 1. Timeline table showing the events along with dates**

	<b>Events</b>
March 2019	Central venous catheterization through right femoral access and loss of guide wire.
September 2019	Diagnosed as guide wire in situ but not emerging through skin. proximal tip of guidewire was in inferior vena cava at the level of L2-L3 vertebra and distal tip was in thigh area but not protruding from skin
12 December 2019	Guide wire emerging from skin and first seen by patient. Site of the proximal tip was in external iliac vein. Site of the distal tip Protruded outside the skin below the right knee.
13 December 2019	Guidewire removed
15 December 2019	Patient discharged without complications

remove [14]. Even after following procedure protocols there are increasing incidence of guidewire retention continues to occur, because this relies on the human factor as remembering to remove the guidewire. To minimize the risk of guidewire retention there is a need of more stringent procedural protocol. Mariyaselvam et al. have investigated the use of a locked procedure kit, where the suture, suture holder, and antimicrobial dressing are placed in a special pack where the guidewire acts as a key and is required to open the pack[17]. This procedure requires that the clinician confirms that he has removed the guidewire before attempting to place the sutures, and has been confirmed to be an effective preventative approach that improves patient safety [15].

The guidewire can be removed through percutaneous endovascular means with using a gooseneck snare device [16].

#### **4. CONCLUSION**

Retention of guidewires during vascular catheterization is as an increasingly reported complication due to increasing use of central line. It is important to perform these techniques with the guidance of skilled and experienced operators so such complications can be minimized. While most cases are discovered immediately during or following the procedure, rare cases are discovered late on x-rays and arterio-venous Doppler study. It is very unusual presentation of retained guidewire by protruding outside the body at eight months after placement of a central venous catheter [17].

These complications can be minimized by Measures to train personnel under the

supervision of expert operators, confirming that the guidewire has been returned to the catheter kit after insertion of a central venous catheter, and confirming with a X-ray local part [12].

#### **CONSENT**

As per international standard or university standard written patient consent has been collected and preserved by the author(s).

#### **ETHICAL APPROVAL**

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

#### **COMPETING INTERESTS**

Authors have declared that no competing interests exist.

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