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Accidental migration of a guidewire during femoral venous catheterization -A case report-

Boukatta, Brahim[1], El bouazzaoui, Abderrahim [1], Houari, Nawfal[1], Jiber, Hamid[2], Sbai, Hicham[1], Kanjaa, Nabil[1]

1 Department of Anesthesiology and Critical Care, Hassan II university Hospital, Sidi Mohammed Ben Abdellah University, Fez, Morocco.
2 Department of vascular surgery, Hassan II university Hospital, Sidi Mohammed Ben Abdellah University, Fez, Morocco.

Corresponding author:

Dr. Boukatta Brahim
Assistant Professor of anesthesiology Department of Anesthesiology and Critical Care, Hassan II university Hospital, Sidi Mohammed Ben Abdellah University, Fez, Morocco.

Tel: (00212) 0661747812.
Address: 23 Jbel Zalagh Narjis C, Fez, Morocco 30070.

boukatta@yahoo.fr

Abstract

We report a case of a 60-year-old woman, which presented severe burns from a gas cylinder explosion in domestic accident. The burned body surface was about 35% with second and third degree burns. To ensure intravenous fluid resuscitation, a central femoral venous catheterization was decided, but during the procedure, the guidewire was pushed into the femoral vein by physician. The pelvic x-ray showed the guidewire in the femoral vein. It was successfully surgically extracted from right common iliac vein. This complication is rare and avoidable. Factors that contribute to a guidewire loss into circulation include operator inexperience, lack of supervision and inattention. The prevention is the best treatment and simulation training can significantly help to reduce this complication.

Keywords: Central venous catheterization, complications, femoral vein, guidewire.

Introduction

Percutaneous cannulation of the femoral vein is one of the most common methods to gain central venous access in emergent situations. The Seldinger guidewire method is the preferred approach [1]. This method gains access to the central vein via an introducer needle through which a matching guidewire is threaded to maintain venous access after needle withdrawal. The catheter is advanced into position over the intravascular guidewire, which is subsequently removed from the catheter [2]. This procedure proved to be relatively

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easy. Experienced operators enjoy greater success rates with fewer complications [3]. But without ultrasound, some complications can be observed with inexperienced operators. The main complications associated with this procedure are failure, femoral arterial puncture, hematoma formation, infection and thrombosis of the femoral or iliac veins [4]. In this paper, the authors report a rare complication of accidental migration of guidewire during a femoral venous catheterization.

Case report

A 60-year-old woman, without medication coexisting diseases, body weight 60 Kg, presented with five members of the same family, to our emergency department for severe burns from a gas cylinder explosion in domestic accident. At admission, she was conscious, anxious and thirsty. The heart rate was 100 beats/min, blood pressure was 120/60 mmHg and SpO_2 was 98%. The burned body surface was about 35% (face, neck, upper-limbs, trunk), with second and third degree burns. To ensure intravenous fluid resuscitation, and in the absence of an alternative site for venous access, a central venous catheterization was decided. An emergency physician decided to cannulate the right femoral vein, area where the surface of the skin remains intact. After cleaning and draping, an initial cannulation was done with needle attached to a syringe. Following this the dilator and the guidewire were introduced. Unfortunately, by inattention, the guidewire was pushed into the femoral vein by operator. The procedure was immediately stopped and an urgent pelvic x-ray was done, it showed the guidewire in the femoral vein (**Fig. 1**). The vascular surgeon decided to remove the wire by open surgery in the operating room. This procedure was performed under general anesthesia. The average peroperative blood pressure was 135/65 mmHg and heart rate 130 bpm. During surgery, which lasted for 60 min, the patient received 1500 ml normal saline solution by intravenous infusion. A venotomy revealed migration of guidewire to the right common iliac vein. It was successfully extracted. The patient was extubated at the end of operation, and then transferred to the intensive care unit. She was discharged from the hospital 18 days later in good condition.

Figure 1. Pelvic x-ray showing the guidewire in the femoral vein.

Discussion

Central venous catheterization is an imperative tool in the critically ill patient to administer fluids, medications, parenteral nutrition and for monitoring the central venous pressure [5]. Various routes are available, including the internal jugular, subclavian, femoral and even peripheral veins like basilica and cephalic veins. Several factors, such as anatomy, major systemic organ dysfunction such as coagulopathie, local factors like skin lesions and infections dictate the route for safe central venous cannulation [6].

The complication rate of this procedure maybe as high as 12% [7], these complications include infection, thrombosis, occlusion and, in particular, mechanical complications (perforation of central veins or the heart), which usually occur during insertion and are intimately related to the anatomic relationships of the central veins [8]. The femoral vein is the most common route for insertion of central lines in Emergency, as it has one of the lowest rates of complications. It's no risk of pneumothorax and in cases with coagulopathie; it is relatively easy to apply compression when bleeding ensues. But without ultrasound, some complications can be observed, like failure, arterial puncture and haematoma formation. The complications associated with the guidewire, like failure to pass, loss in the vessel, kinking, knotting and breakage were rare with this route [9, 10]. The review of literature has revealed case reports of similar complications of guidewire migration.

Omar was reported a case of missing the guidewire during cannulation of the internal jugular vein requiring surgical removal [11]. Abuhasna was reported a rare case where a complete guidewire was lost into the circulation during insertion of a hemodialysis catheter into the right femoral vein in a 19-year-old female with systemic lupus erythromatosis. The patient remained asymptomatic through two plasmapheresis treatments over a period of 2 days. The guide was accidentally discovered 3 days after on a chest radiograph at the right internal jugular vein [12]. Khasawneh was described a case of a lost guidewire during the left subclavian central venous catheter insertion procedure. The guidewire was removed successfully by an interventional radiologist [13].

The complications of leaving guidewire in-situ are thrombosis, infections, post-phlebitic syndrome, pulmonary embolism, and arrhythmias, cardiac and vascular damage [14]. However, this complication may remain unnoticed for a significant period of time [15]. Factors that contribute to a guidewire loss into circulation include operator inexperience, lack of supervision, and inattention [16]. The use of interventional radiology techniques is the preferred method for retrieval and removal, but surgery has a role especially in centers, where such facilities are lacking or when the percutaneous extraction fails [17].

In conclusion, hence recommendations are to perform the procedure by an experienced operator or under supervision, guidewire not to be pushed too far and while threading the catheter over guidewire, guidewire should at all the times be held by other hand, catheter should be rail-roaded over the guidewire into the vein and not pushing the catheter and guidewire together. Routine use of ultrasound and fluoroscope guidance throughout the procedure can be of great help in avoiding such complications. Finally the medical simulation is a useful tool for training physicians and can assess competence; it can reduce complications related to the central venous catheterization by Seldinger technique [18].

Conflict of Interest

The authors declare that they have no conflict of interests related to this manuscript.

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