Removal of Broken Hemodialysis Catheter from Subclavian Vein via Snare Under Fluoroscopy

Floroskopi Altında Kırık Hemodiyaliz Kateterinin Kıskaç ile Subklavyan Venden Çıkarılması

ABSTRACT

Venous access with a central catheter is typically a necessary technique for hemodialysis. Although, central venous catheters are widely used, they may cause life-threatening complications by migration of fractured catheter pieces. Thus, venous catheters should be controlled routinely by medical staff or the patients themselves. In this paper we report a case of a fractured catheter with vena cava migration in which there were no symptoms and describe the non-surgical retrieval of the migrated catheter by snare technique.

KEY WORDS: Broken catheter, Snare technique, Fluoroscopy

ÖZ

Bir santral kateter ile venöz girişim tipik olarak hemodiyaliz için gerekli bir tekniktir. Santral venöz kataterler yaygın olarak kullanılsa da, kırık katater parçalarının migrasyonu yaşamı tehdit eden komplikasyonlara yol açabilir. Bu yüzden, tüm hemodiyaliz kateterleri tıbbi personel veya hastaların kendileri tarafından rutin kontrol edilmelidir. Bu yazıda, kateterin kırılarak vena kavaya ilerlediği bulgu vermeyen bir olgu bildirdik ve ilerlemiş kateter parçasının cerrahi olmayan kıskaç tekniği ile uzaklaştırılmasını tarifledik.

ANAHTAR SÖZCÜKLER: Kırık kateter, Kıskaç tekniği, Floroskopi

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INTRODUCTION

Hemodialysis is a procedure that is used for end-stage renal failure. Femoral or jugular venous access with a catheter is essential for this method until a permanent venous access is constructed (1). Thrombosis, infection, and stenosis are the most common problems for functioning hemodialysis catheters. Malpositioning or migration of catheters is rare but may similarly result in serious consequences (2). We describe a patient whose hemodialysis catheter accidentally migrated and the subsequent successful retrieval. A major surgical intervention and the associated morbidity were therefore avoided.

CASE REPORT

A 73-year-old male with end-stage renal failure underwent hemodialysis for three years. A new arteriovenous (AV) fistula was applied to his left arm, and an 11-French temporary catheter was inserted into his right internal jugular vein for hemodialysis. When he arrived at the hemodialysis unit, the doctors ascertained that the catheter was not in place. It was subsequently located through radiography of his chest (Figures 1 A,B). He was advised of the treatment for the removal of the catheter and admitted to the cardiovascular surgery department of our hospital for surgical removal of the fractured catheter. Following a review of the fluoroscopic images, the patient was transferred to the angiography unit for a possible percutaneous retrieval. Since he was asymptomatic, an elective procedure was planned. His blood investigations showed hemoglobin: 10.1 g/dl; blood sugar: 95 mg/dl; blood urea: 156 mg/dl; serum creatinine:

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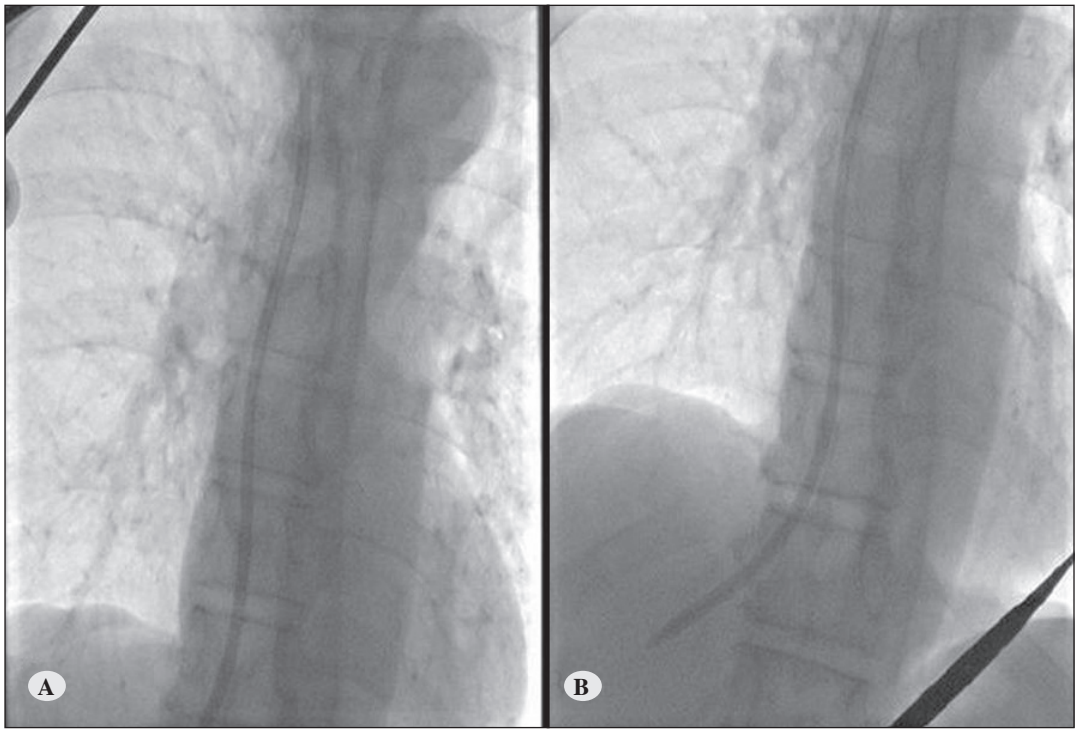

Figure 1 A,B: *The migrated catheter in the vena cava.*

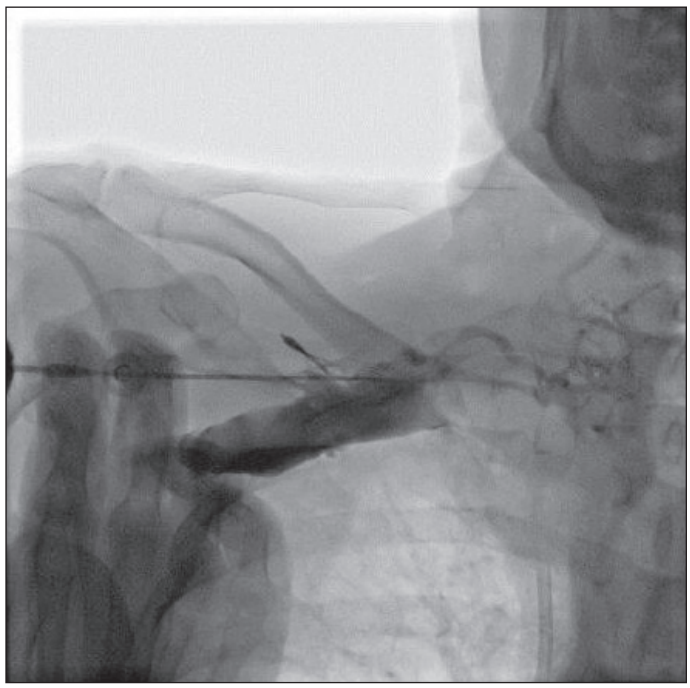

Figure 2: *The obstructed right subclavian vein.*

7.8 mg/dl; sodium: 134 mmol/l; potassium: 5.8 mmol/l; and calcium 7.8 mg/dl. His electrocardiogram showed sinus rhythm with no dysrhythmia.

Under fluoroscopic guidance, the catheter was revealed in the last part of the internal jugular vein leading through to the hepatic vein. Initially, cannulation was attempted in the right subclavian vein, but the guidewire could not advance in the vein because of the obstruction (Figure 2). Therefore, non-surgical retrieval of the migrated catheter was performed with a 6-Fr snare catheter through a 14-Fr sheath from the left subclavian vein. The upper floating end of the catheter was snared and pulled up toward the left subclavian vein under fluoroscopic guidance. Finally the catheter and retrieval sets were removed through the left subclavian vein (Figures 3 A,B, Figure 4). The patient was discharged without complications one day later.

DISCUSSION

Incidence of hemodialysis requirement reached over than 58.000 patient with chronic renal failure in Turkey at 2009. Despite, AV fistulas are more reliable in terms of infective complications, venous catheters are first choice of vascular access (over than 50% of patients) and almost 13% of these patients maintain their hemodialysis catheter dependently(3). Most common catheter related problems are occlusion and infection. Migration or malposition of catheters can be seen rarely but these conditions can be result to more important complications (2).

A broken central venous catheter event can be caused by pinch-off syndrome (4). In subclavian approaches, the clavicle and first rib can compress the venous catheter which results with pinch-off syndrome(4). Breakage typically occurs as a result of excessive traction force in the central venous catheterization approaches of the jugular vein (2). Iatrogenic complications (via guidewire) have been reported during the application stages of jugular venous catheterization (2,5). However, according

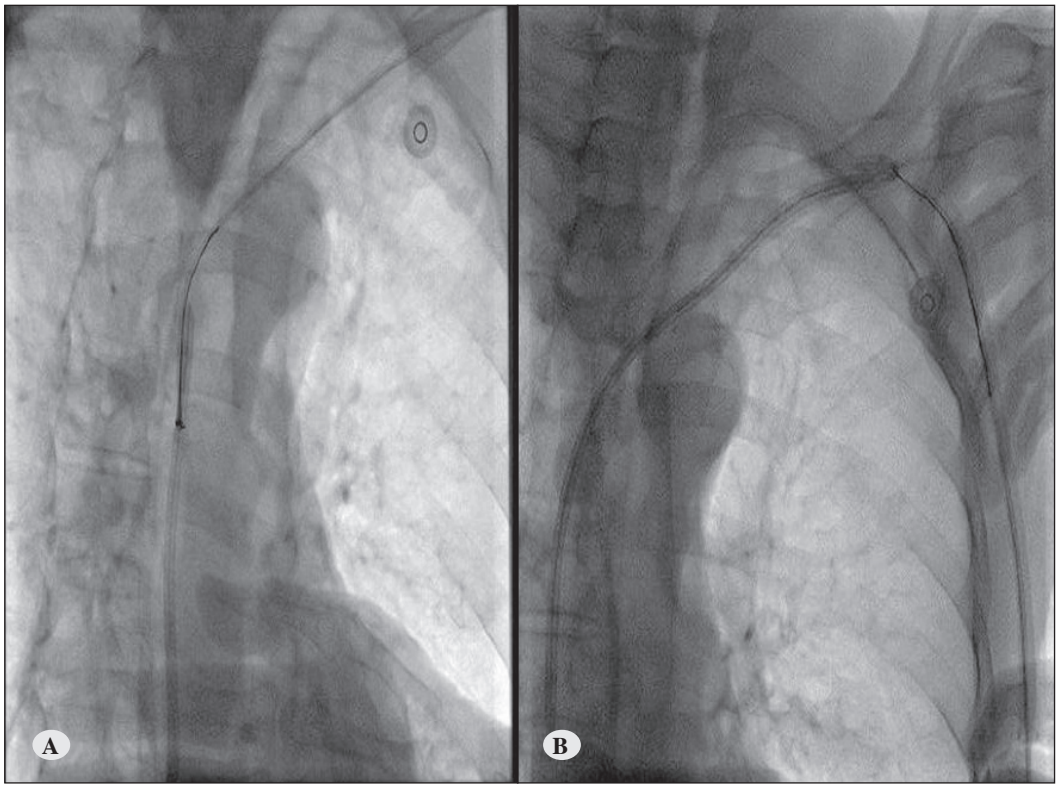

Figure 3 A,B: *The various stages during the removal of catheter through the left subclavian vein.*

Figure 4: *The fractured catheter after removal.*

to previous reports, external force and trauma are the most-described long-term breakage mechanisms (2). If the distal end of the catheter reaches to the atriocaval junction, right atrium or right ventricle, it may causes to dysrhythmia, tricuspid valve malfunction, and intracardiac thrombosis (6-8).

In our patient, the intravascular section of the central venous dialysis catheter fractured spontaneously. Thereafter, the rest of the catheter migrated from the internal jugular vein towards the inferior vena cava and hepatic vein. We extracted it with an interventional procedure rather than a surgical procedure.

The clinical symptoms of this complication are nonspecific, and patients may even be without symptoms until the fractured catheter is recognized. Such intravascular hardware breakage and migration occur often, and the range of interventional procedures is expanding rapidly. The minimum hardware required for such procedures should be readily available. The success rate of this kind of operation depends directly on the available expertise and hardware. We suggest that non-surgical retrieval of migrated catheters by the snare technique should be attempted in every such case before surgery. We have found that percutaneous retrieval has proven to be a simple and dramatically rewarding experience.

Migration and malpositioning of catheters can be seen rarely so it can make a sensation in presantation but may cause undesirable effects if missed.

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