

Intravenous Catheter Associated Complications

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Abstract

Two cases of intravenous catheter associated complications are reported herewith.

Introduction

Over 5 million central venous catheters and over 200 million peripheral intravenous catheters are placed annually in the United States. Catheter clotting and other complications cost the healthcare system over one billion dollar each year. Common complications associated with central venous catheter are infection, thrombus formation and catheter block. Air embolism, catheter migration, arteriovenous fistula, pseudoaneurysm, hemothorax and pneumothorax are other uncommon complications. Peripheral intravenous catheters usually cause phlebitis whereas blockage, infection and extravasation of fluid are other common complications. Although no such data is available from India but complications like migration of central venous catheters have been reported.¹ Here we report two cases with unusual complications associated with central venous catheter and peripheral intravenous catheter used during dialysis.



Fig. 1 : 16 French Gauge (FG) peripheral intravenous catheter (Venflon) in the right subclavian vein (Cx)

Case 2

A 35 years old male was admitted to a private hospital in Uttar Pradesh, a state of India in September 1999 as a case of ESRD presenting with pulmonary edema where he was given three sessions of hemodialysis using single lumen femoral venous catheters) as the vascular access. Femoral vein catheter was left in situ by the treating physician and the patient was discharged after symptomatic improvement. He moved to another nursing home in Varanasi in Uttar Pradesh for the second opinion and dialysis. The right femoral catheter was found to be fractured in situ. A plain X-Ray of Kidney Ureter Bladder (KUB) revealed a linear opaque shadow in the right pelvis medial to the greater

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Case 1

A 59 years male having End Stage Renal Disease (ESRD) on Continuous Ambulatory Peritoneal Dialysis (CAPD) associated peritonitis and outflow failure was subjected to hemodialysis via right femoral catheter as the arterial line and 16 French Gauge peripheral intravenous catheter (Venflon) in right antecubital vein as the venous line. During hemodialysis there was blood leak from the venous line, and peripheral intravenous catheter was found to be fractured with migration of its tip in the antecubital vein. Hemodialysis was immediately terminated and hemostasis was achieved with local pressure. Peripheral intravenous catheter tip was not traceable by superficial palpation. Patient was hemodynamically stable and was shifted for Colour Doppler ultrasound study which located the catheter tip in the right subclavian vein (Figure 1). Cardiothoracic surgeon advised no active intervention. However after receiving one more session of hemodialysis after the incident, the patient was again put on CAPD as peritonitis was resolved. Then he was discharged in a stable condition. Later on he was found to be doing well on CAPD procedures.



Fig. 2 : X-ray of pelvis showing linear radio-opaque shadow on the right side medial to the femur (C)

trochanter (Figure 2). The radiological picture was consistent with migration of catheter upward into the right external iliac vein. He was subsequently referred to our institute (Institute of Medical Sciences, Banaras Hindu university, Uttar Pradesh, India). On examination, the patient was conscious and oriented, pale, edematous and having blood pressure of 140/80 mmHg. Investigations revealed proteinuria of 3+ and hemoglobin of 6.8 gm%, Serum levels of creatinine, albumin, sodium, potassium, calcium and phosphate were 7.8 mg%, 2.8 gm%, 128 meq/L, 4.4 meq/L, 8.3 mg%, and 4.6 mg% respectively. Ultrasonography revealed features of chronic renal failure. He was managed with hemodialysis using double lumen internal jugular venous catheter as the vascular access. Repeat X-Ray KUB confirmed

the presence of broken portion of femoral venous catheter in external iliac vein. The broken portion of femoral venous catheter was removed by venotomy method under general anesthesia (Figure 3).

Discussion

The first case of central venous catheter embolization was described in 1954. Catheter embolization is the term generally applied to catheter fragments that embolize to various locations including pulmonary arteries. The nature of catheter embolization has changed over the years. Initially only seriously ill patients received central venous catheterization usually in the critical care set up and were susceptible to catheter emboli, but nowadays population at risk has grown considerably because of use of central venous catheters in the long term parenteral nutrition, blood sampling, delivery of chemotherapeutic agents for cancer and for maintenance hemodialysis in chronic renal failure patients. A preponderance of literature advocates immediate removal of catheter fragments. In a retrospective review of 73 cases in which catheter emboli were left intact, Fisher and Ferreyro³ reported a 71% incidence of complications including transient arrhythmias, sepsis, thrombus on the catheter, pulmonary emboli, arrhythmias and myocardial inflammation. They also documented death caused by retained catheter emboli in 16 cases. Bernhardt et al⁴ reviewed 28 cases of retained catheter fragments in pulmonary artery and found a mortality rate of 60% from sepsis, perforation, thrombosis, arrhythmias or myocardial infarction. Richardson et al⁵ followed 76 cases of retained catheter emboli and found a complication rate of 45% and mortality rate of 23.7% from similar causes.

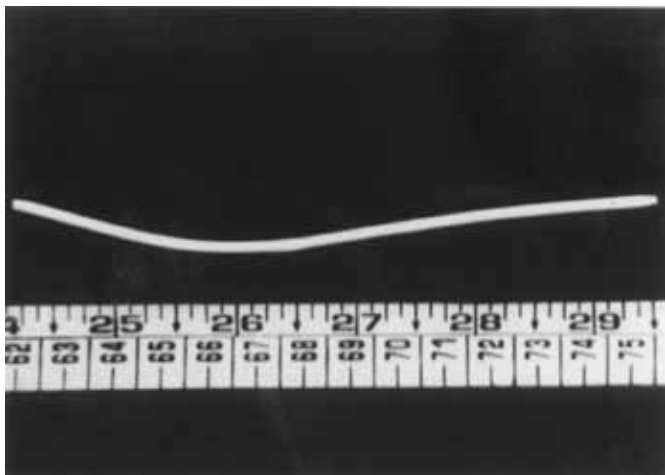


Fig. 3 : Broken portion of femoral venous catheter removed from the external iliac vein by venotomy

Despite these reviews, there are still dilemmas regarding the conservative management of catheter emboli, particularly asymptomatic emboli. Graham et al⁶ reported experience with intracardiac catheter embolism in six patients. They concluded that removal of catheter fragments was necessary unless the fragments had been asymptomatic and in situ for 2 years. Szekely et al⁷ followed three cases of chronically ill uremic patients with broken subclavian catheter pieces that had migrated to segmental pulmonary arteries without complications 6,14 and 33 months after fragment dissection. Richardson et al⁵ advocated individualization of treatment in poor risk patients with catheter emboli in low risk anatomic locations. However the decision to extract such foreign bodies should be individualized based on their location and risk of possible complications. High risk anatomic regions for catheter emboli include the intracardiac area, specifically the area of right heart. Mortality is lower if the embolus is located in the vena cava and the lowest if the embolus is located in the pulmonary artery. In our case 1 since the catheter fragment was small, there was a high chance of migration of catheter in segmental pulmonary artery, the least risk area, whereas in case 2 since the femoral catheter is large there was a higher risk for its migration in the right atrium or lodge in major pulmonary arteries with risk of arrhythmias. However if conservative management is opted, a sequential radiographic follow up is essential even in asymptomatic patients otherwise potentially life threatening complications may be provoked in future.

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