The use of fluoroscopy for permanent hemodialysis catheter placement

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Citation

Abstract
The number of central venous catheter implants has increased amongst hemodialysis (HD) patients who have been on long-term HD. In this study, we report a case of the use of fluoroscopy for permanent hemodialysis catheter placement. This approach is an appropriate alternative for patients in whom traditional venous access sites are no longer available.

INTRODUCTION
Long survival on dialysis and wide admissions of very old and high-risk patients, have focused attention to the problem of vascular access in uremic patients[]. Recurrent vascular access failure is a major cause of morbidity in patients receiving long-term hemodialysis. Central venous catheters are often necessary for dialysis. When standard access sites occlude, unconventional access methods become necessary[].

CASE PRESENTATION
Our case was a 57-year-old male. He was attending a continuous hemodialysis program for 4 years due to chronic renal failure. His past medical history was significant for occlusion of A-V fistulae of both upper extremities due to hypotensive episodes occurred during hemodialysis sessions for several times. He was continuing the hemodialysis program via a temporary femoral catheter inserted 15 days ago. Bilateral upper extremity venography revealed thrombosis in deep veins of right forearm and right brachial vein. There was a filling defect in right subclavian vein consistent with thrombus, as well (Figures 1&2).
Moreover; left brachial, axillary, subclavian and brachiocephalic veins were shown as patent (Figures 3&4).
After all these findings, insertion of the permanent hemodialysis catheter—proven to have a long term patency—through left internal jugular vein was decided to be performed on our case with consistent occlusion of A-V fistulae due to hypotensive episodes. Our case was taken into operating room. Under local anesthesia, puncture of the left internal jugular vein was performed and the guidewire was passed into the right atrium (Figures 5&6).

A subcutaneous tunnel was established in order to insert the catheter. A central venous catheter (CVC-medcomp REF SL32,12.5Frx32cm Hemo-Cath Silicone double lumen catheter set), also made of polyurethane and with a double lumen, was inserted. Fluoroscopic confirmation of the catheter’s location within the right atrium was done (Figure 7).

Chest X-rays taken 2 and 24 hours after the procedure showed no complication. Hemodialysis program of our case
The use of fluoroscopy for permanent hemodialysis catheter placement

Proceeded event-free. (Figure 8).

**Figure 8**

![Image](image.png)

**DISCUSSION**

The native arteriovenous fistula (NAVF), synthetic arteriovenous grafts fistula (GAVF) and silastic cuffed central venous catheters (CVCs) are used for permanent vascular access (PVA). The ideal dialysis access ensures adequate blood flow for dialysis, has a long life, and is associated with a low complication rate. Although no current type of access fulfills all these criteria, the native arteriovenous fistula (AVF) is close to doing so. Unfortunately, various kinds of vascular access (VA) are becoming more and more necessary to enable hemodialysis (HD). The central venous catheter (CVC), which is associated with higher morbidity and mortality, could be the only viable option to maintain permanent VA.

The type of access that deserved in the last few years the highest interest is the internal jugular vein cannulation. A possible future routine utilization of jugular vein catheters is advisable in cases where a waiting period (up to a few months) is requested to allow a new fistula to mature or to maintain an empty abdomen in a patient temporarily withdrawn from peritoneal dialysis.

Complications arising from vascular access contribute to frustration of health care providers and to high medical cost.

The aim of the study of Çetinkaya et al. is to investigate survivals and complications of the CVCs used for long-term VA. They looked at 92 CVCs (Medcomp) inserted in 85 (50 females, 35 males) chronic hemodialysis patients. The median duration of CVC survival was 289 days. Eleven (11.9%) CVCs were removed due to complications. Of the 85 patients, 56 have CVCs functioning. In addition, 27 (31.76%) patients have CVCs functioning for over 12 months. The total incidence of CVC related infections was 0.82 episodes/1000 catheter days. The most frequent indications for CVC removal were patient death (69.4%), thrombosis (16.6%) and CVC-related infections (13.8%).

Since the 1997 publication of the Disease Outcomes Quality Initiative (DOQI) vascular access guidelines for cuffed, tunneled catheter placement, additional evidence supporting these recommendations has been published, including additional documentation supporting the right internal jugular vein as the preferred site for insertion. Placing the catheter tip in the right atrium rather than in the superior vena cava will provide adequate blood flow to support effective hemodialysis. The right atrial positioning of the catheter tip will also accommodate catheter tip retraction and decrease the likelihood of malfunction.

The NKF-K/DOQI guidelines state that fluoroscopy is mandatory for insertion of all cuffed dialysis catheters.

Placement of peritoneal or permanent internal jugular vein dialysis catheters percutaneously with fluoroscopic guidance is as safe as placement with direct visualization techniques. In addition to the advantages of simplicity, minimal invasiveness, and relative safety, the survival rate of catheters placed using the percutaneous fluoroscopy-assisted method was comparable to that of more invasive methods.

**References**

7. Yevzlin AS, Song GU, Sanchez RJ, Becker YT. Fluoroscopically guided vs modified traditional placement of tunneled hemodialysis catheters: clinical outcomes and
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