Subject Area:

**Femoral tunneled hemodialysis catheter as a permanent access for hemodialysis patients**

Ahmed A. Morsi  
*Mataria Teaching Hospital*

Assem M. Herzallah  
*Mataria Teaching Hospital, assemherz010@hotmail.com*

Mohamed T. Y. Madkour  
*Mataria Teaching Hospital*

Tarek S. ElShanshoury  
*Mataria Teaching Hospital*

Follow this and additional works at: https://jmisr.researchcommons.org/home  
Part of the Medical Sciences Commons, and the Medical Specialties Commons

**Recommended Citation**  
"Femoral tunneled hemodialysis catheter as a permanent access for hemodialysis patients,"  
DOI: https://doi.org/10.4103/JMISR.JMISR_31_18

This Original Study is brought to you for free and open access by Journal of Medicine in Scientific Research. It has been accepted for inclusion in Journal of Medicine in Scientific Research by an authorized editor of Journal of Medicine in Scientific Research. For more information, please contact m_a_b200481@hotmail.com.
Femoral tunneled hemodialysis catheter as a permanent access for hemodialysis patients

Assem M. Herzallah, Mohamed T. Y. Madkour, Tarek S. ElShanshoury, Ahmed A. Morsi
Department of Vascular Surgeon, Mataria Teaching Hospital, Cairo, Egypt

Abstract

Background
Vascular access (VA) remains the cornerstone in HD patients. The survival of the patients becomes risky if approaches like arteriovenous fistulae, grafts, and thoracic tunneled central catheters are used with no benefits. The options become limited to transplantation, dialysis through the peritoneum, and catheter insertion transilumbarally or femorally, which in some cases is the only available approach.

Methods
We are discussing our experience from Mataria Teaching Hospital with 17 patients; in those patients, all the vascular procedures were used with no benefits. We could not perform other options like transplantation or peritoneal dialysis. Hence, we chose femoral tunneled catheters (FTC) permanent VA. The follow-up period ranged between 2 and 14 months, with a mean period of 10 months. The mean age of the patients was 55 (40–70) years. In 10 patients, a Perm cath was inserted, and in the other seven, a Duraflow was inserted. All patients were administered warfarin after bridging with low molecular weight heparin to avoid occurring of catheter thrombosis. Aseptic procedures and personal hygiene were followed.

Result
Two patients died at 5 and 12 months, correspondingly, with a functional catheter, owing to causes other than related to the FTC. In one patient, accidental pulling of the catheter occurred, so the site of the catheter was changed at 5 months. One catheter was altered because flow became inadequate after 8 months. No patients presented with deep vein thrombosis or late hemorrhage. In one patient, the catheter functioned for 14 months after insertion. In four patients, the catheter was removed, after 2, 3, 4, and 14 months, correspondingly, as they developed catheter-related septicemia. In two patients, the catheter was removed owing to perforation after 2 months.

Keywords: Catheter, dialysis, vascular access

INTRODUCTION
Central venous catheters in patients with hemodialysis (HD) are commonly and seriously complicated with bloodstream infections. During insertion, a technique of tunneling the catheter in the subcutaneous tissue is used to decrease catheter colonization, especially in the internal jugular and subclavian veins, which has proven to be effective [1–3].

Recently, the internal jugular vein is becoming the first choice, as the subclavian vein for catheter placement is associated with a high incidence of vascular stenosis [4,5]. In many patients, repeated attempts at cervical and thoracic vein catheterization have been associated with a significantly high occurrence of serious complications such as injuries, thrombosis, infections, and hemothorax. In these patients, it is advised to use a percutaneous insertion of a femoral tunneled catheters (FTC).

PATIENTS AND METHODS
In Mataria Teaching Hospital from November 2015 to March 2017, 17 patients with long-term HD (seven males and 10 females) had tunneled femoral vein central venous catheters. The patients’ age averaged between 40 and 70 years, with a median age of 55 years.

Correspondence to: Assem M. Herzallah, MD.
Department of Vascular Surgeon, Mataria Teaching Hospital, Cairo, Egypt.
Tel: 01001714960.
E-mail: assemherz010@hotmail.com

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

How to cite this article: Herzallah AM, Madkour MT, ElShanshoury TS, Morsi AA. Femoral tunneled hemodialysis catheter as a permanent access for hemodialysis patients. J Med Sci Res 2018;1:106-8.
All patients had been with subclavian or internal jugular vein central lines, which accidentally or secondary have been removed owing to obstruction or infection. The conventional access sites had been exhausted in 17 patients because of the inability of placement of new catheter via the internal jugular veins, or the subclavian veins also had suffered from superior vena cava thrombosis or strictures.

In 10 patients, polyurethane dual-lumen tunneled catheters (Hickman; Bard Access Systems, Inc. 605 N. 5600 W. Salt Lake City, UT 84116 United States) were inserted, which were 55 cm in overall length, with tip to cuff 36 cm long, having 13.5-French diameter. In the other seven, DuraFlow (AngioDynamics: 14 Plaza Drive Latham, NY 12110) was inserted, which was 55 cm in overall length, with tip to cuff 35-cm long, having 15.5-French diameter. Catheters were inserted under strict aseptic conditions in the major operating room using povidone-iodine at the insertion site. The tip of the catheter was placed in Inferior Vena Cava or in a triocaval junction to ensure maximum blood flow. The tunnel was subcutaneously fashioned by the catheter’s retrograde passage through the cannula to preselected site point of exit in the ipsilateral thigh; it was directed laterally to be away from the patients’ private area. The distance separating the cutaneous puncture site from the venous entry had to be ~9–12 cm. Every 48–72 h, the dressing was changed. Inspection of the catheter dressings was done at least twice per week for excluding local signs of infection. It was not allowed to take medications or blood samples through the catheter.

At every session of HD, every hour, we recorded systolic and diastolic blood pressures, and also by pump speed, we measured the blood flow rate. We considered greater than or equal to 25% drop in blood flow, below that recommended in the absence of hypotension, hypovolemic episode, or patient/catheter malposition, to be secondary to catheter malfunction.

In all patients, blood flow at 300 ml/min or more was adjusted. A routine intradialytic heparin protocol was used. All patients were administered warfarin after bridging with low molecular weight heparin to prevent catheter thrombosis keeping international normalized ratio at a therapeutic level (2–3).

**Results**

The duration of functional life of the FTC ranged between 60 and 5 days, with mean time of 153 days. We had functional catheters at 2 months. The mean blood flow was 230 ml/min (200–260 ml/min). Two patients died at 5 and 12 months correspondingly, with a functional catheter, owing to causes not directly related to the FTC. In one patient, the site of the catheter was changed at 5 months owing to accidental pulling of the catheter by the patient during HD. One catheter was altered because flow became inadequate after 8 months. In one patient, the catheter functioned for 14 months after insertion. For four patients, the catheter was removed after 2, 3, 4, and 14 months, correspondingly, as they developed catheter-related septicemia. In Two patients, the catheter was removed owing to perforation after 2 months in each. None of the patients developed late hemorrhage. No catheter-associated thrombosis was detected in any of our cases.

**Discussion**

Most nephrologists select femoral vein as a temporary access site for HD. The femoral vein is more comfortable to be done, safe and convenient in its catheterization. On the contrary, the subclavian or internal jugular vein access might cause life-threatening complications. The insertion-related complications are a comparatively low risk by accessing the femoral vein [6]. The landmark for the femoral vein is the pulse of the femoral artery. The vessel can be directly compressed in the case of bleeding to be controlled. Lazarus et al. [7] showed that tunneled femoral central venous catheters were placed in five adult patients undergoing transplantation of autologous bone marrow, in whom the catheters remained in place for an average of 35 days. Infection events in two catheters was resolved with antibiotic therapy without the need for catheter removal [7]. Another report showed that femoral catheter was successfully used for 3 months for an adult patient with recurrent high-grade non-Hodgkin’s lymphoma who received high-dose chemotherapy and allogeneic peripheral blood stem cell transplantation [8].

Fecal contamination was frequently the cause of common femoral vein catheterization infections [9]. The skin catheter junction is the site where infection mainly originates from [10], especially in the short-term catheters [11–13] therefore, subcutaneous tunneling of the catheter is recommended to decrease the passage of organisms by increasing the distance between the skin catheter junction and the vein. As a result, it associated with a threefold decline in catheter-related infection [14]. Timsit et al. [15] had shown a similar recommendation but in critically ill patients. On the contrary, reports are conflicting, in HD when using long-term femoral cannulation was believed to carry a higher incidence of infection in comparison with nonfemoral cannulation [16–21]. Although, in a study by Daniel, the rate of femoral catheter-related infections was equal to those with the catheter of jugular veins [22]. This is in contrast with our study, where the incidence of infections and catheter-related bacteremia was only 23%. This significant reduction of the risk of infection can be explained by using of subcutaneous tunneling to remove the exit site of the catheter from the perineal area. The low thrombosis incidence is another explanation [23–25]. The low rate of catheter-related thrombosis in our series was done by keeping therapeutic anticoagulation (international normalized ratio: 2–3) with Marevan, as previous reports [26–28] had shown that thrombosis usually occurs within 7 weeks.

For many years, the primary concern of nephrologist was the inadequate delivery of blood flow for dialysis. It occurs in either acute or chronic phases: acutely diminished flow may be owing to systemic hypotension, catheter malpositioning, or...
other mechanical problems, whereas diminished flow occurring later may be owing to mechanical difficulties, thrombosis, or formation of a fibrin sheath. Until lately, we considered rates less than 200 ml/min as inadequate blood flow; however, the DOQI guidelines raised the standard for blood flow rates by suggesting a minimum flow rate of 300 ml/min. We achieved this without difficulty.

**Conclusion**

In our study, we conclude that FTCs are favorable vascular access for long-term HD. Additional more extensive studies are needed to confirm our finding.

**Financial support and sponsorship**

Nil.

**Conflicts of interest**

There are no conflicts of interest.

**References**

8. Rabitsch W, Kalits P, Herold C, Jaeger U, Greinix HT. Central venous catheters inserted percutaneously via the femoral vein can be used long-term in recipients of allogeneic peripheral blood stem cell transplants. Bone Marrow Transplant 1999;24:115.