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# Percutaneous Transhepatic Venous Access for Permanent Hemodialysis Catheter Placement; Procedure and Complications

Maintenance of the patient's hemodialysis access is a major issue in chronic dialysis.
We report a patient with end stage renal disease who had no alternative for vascular access and failed peritoneal dialysis. A successful vascular access device was inserted using a transhepatic approach.

Keywords: Renal Dialysis, Liver, Catheterization

## Introduction

Patients on chronic hemodialysis are at risk of progressive loss of possible sites for vascular access. So, alternative access sites such as the transhepatic route have been suggested theoretically. In order to verify long-term safety and efficacy, more experience is essential.[1-3]

Reported complications include bleeding, billiard tract communication, infection, hepatic dysfunction and catheter dislodgement.[1]

However, reasons for selecting the transhepatic route are lack of a peripheral venous site, patients with no other possibilities such as arteriovenous fistulas or grafts, and sometimes preservation of the single remaining venous site for AV fistula or graft.[1]

We report a patient with end stage renal disease who had no alternative for vascular access and failed peritoneal dialysis in whom a vascular access device was inserted using a transhepatic approach.

## Case Presentation

The patient was a 59-year-old woman with a history of diabetes mellitus (DM) for 10 years, hyperlipoproteinemia, hypertension and 10 years of smoking and opium addiction.

In 1999, she had radical cystectomy and ileo-ureter anastomosis due to bladder cancer. Subsequently, the patient underwent bilateral percutaneous nephrostomy as a consequence of bilateral hydroureteronephrosis. She also required placing a temporary hemodialysis access because of rising of blood urea nitrogen (BUN) and creatinine (Cr). Further hemodialysis was not necessary and her BUN and Cr reached the normal limits.

She was in good condition under medication until Feb 2007 when she was admitted again because of low consciousness and dyspnea. Due to increased serum blood urea nitrogen and creatinine levels, the patient needed hemodialysis via

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inserting the dialysis catheter in different veins including both internal jugular veins, both subclavian veins and both common femoral veins, changing each time as a result of venous thrombosis. During these years, she was not a candidate for implantation of AV fistula because of no appropriate venous site.

In August 2008, she was a candidate for peritoneal dialysis because there was no vascular access for hemodialysis. For 50 days, she received dialytic therapy via peritoneal catheter. Once again, she was admitted because of abdominal pain and volume overload; during admission we found out peritonitis due to pseudomonas, so her peritoneal catheter was discharged.

According to vascular surgery consultation, there was no vascular access for implantation of native or graft AV fistula. Several painstaking attempts also failed to place a permanent catheter (Permi Cath) in the operation room by the department of radiology under sonographic and fluoroscopic guidance.

## Procedure

The last color Doppler ultrasonography showed thrombosis of the left and right internal and external jugular veins, both femoral and subclavian veins, which was then proved by venograms (Fig. 1). After adequately explaining the procedure to the patient and obtaining a written informed consent, we decided to perform transhepatic dialysis catheter as one of the last remaining alternatives.

After preparing the patient, 1 gram of ceftriaxone was given as the prophylactic antibiotic intravenously (IV). Under conscious sedation, access to the right hepatic vein was done (under sonography and fluoroscopic guidance) with a 21 gauge Chiba needle. A 0.01'' guide wire was then passed to the right atrium, and after that the support guide wire was introduced with further dilatation of the hepatic parenchyma for sheath and catheter introduction (Hemo-cath® Med comp, USA 12.5 French, 28 cm) (Fig. 2). Creation of the subcutaneous tunnel was performed at the level of the medial axillary line. The catheter was placed and fixed with its tip at the level of the right atrium, flushed with 5000IU/ml heparin solution and locked (Fig. 3).

In the immediate postoperative period, the patient was referred to the hemodialysis section, with proper catheter functioning. After the first hemodialysis, the

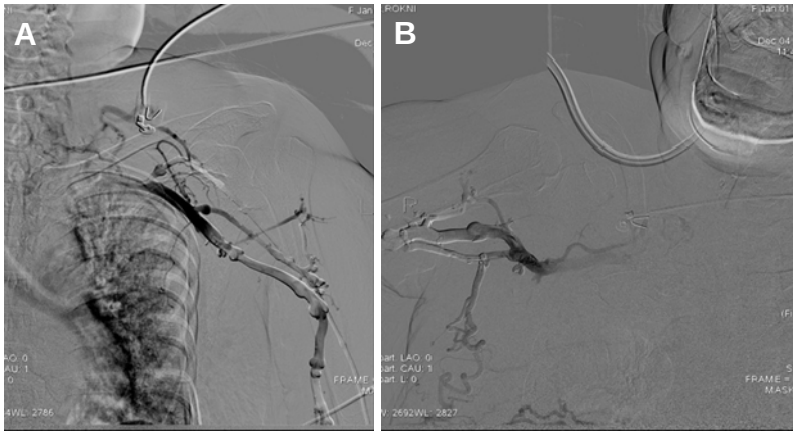


**Fig. 1.** A 59-year-old woman on chronic hemodialysis.
**A.** Left upper extremity venogram in this patient shows bilateral subclavian vein thrombosis.
**B.** Right upper extremity venogram in this patient shows bilateral subclavian vein thrombosis.

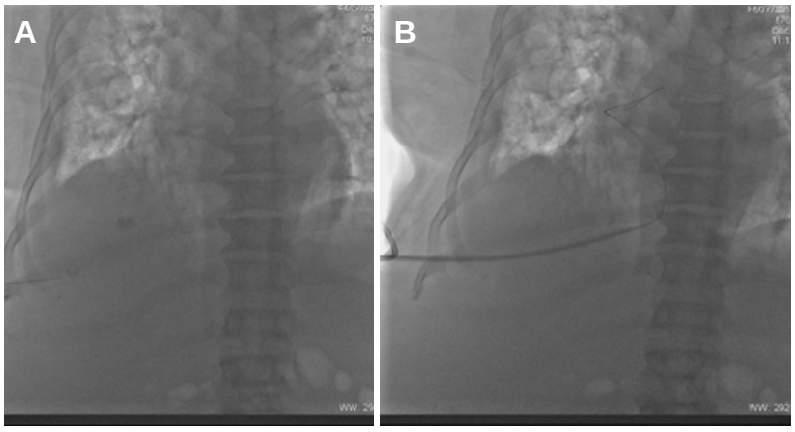


**Fig. 2.** A 59-year-old woman on chronic hemodialysis and occlusion of all extremity and neck veins.
**A.** Right hepatic vein access under fluoroscopic guidance with 21 gauge Chiba needle.
**B.** Peel away sheet in the right hepatic vein. Guide wire tip is in the right atrium.

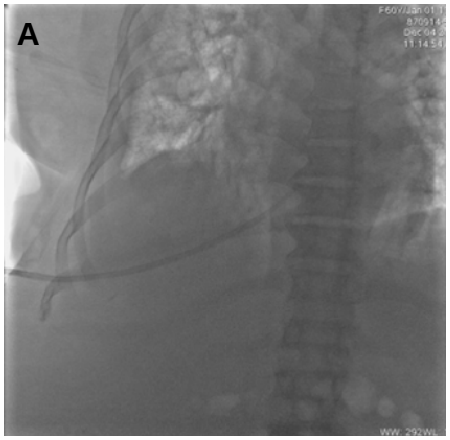


**Fig. 3.** Fluoroscopic image of the hemodialysis catheter (Hemo-cath® Med comp,USA 12.5 French, 28 cm) with its tip fixed at the level of the right atrium.

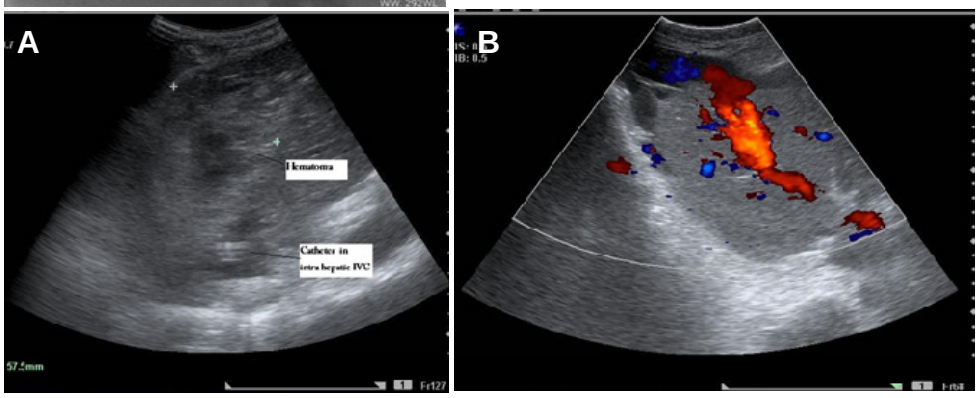


**Fig. 4. A.** Sonography shows some hematomas around the liver, also note catheter in the inrahepatic IVC. **B.** Color Doppler shows abnormal flow from the right hepatic vein to the liver surface.

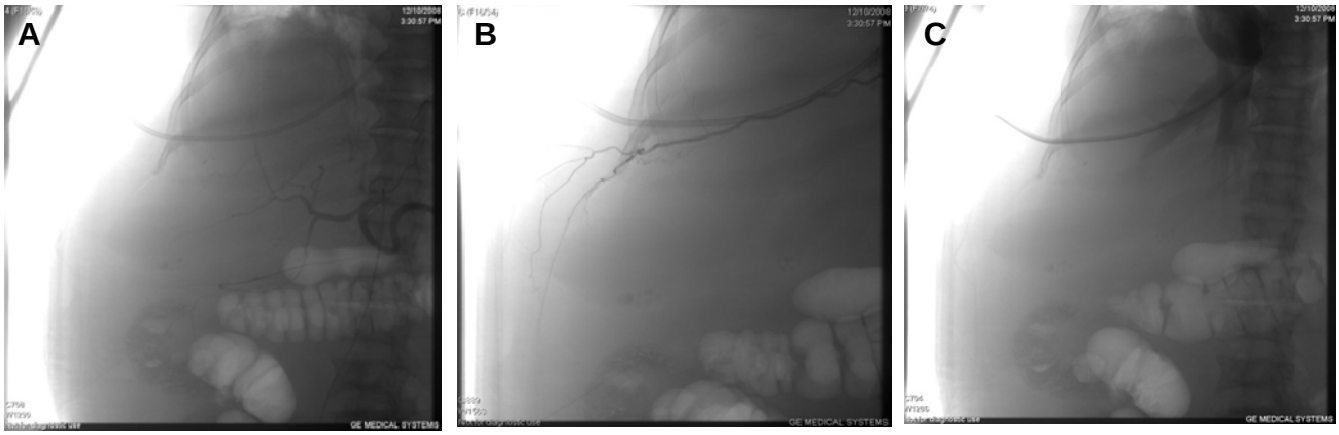


**Fig. 5. A.** Control angiography of the celiac trunk, right intercostal arteries **(B)** and direct trans-catheter injection **(C)** shows no extravasation of contrast.

patient complained of abdominal pain, and the hemoglobin level dropped from 9 to 7gr/dl. Control sonography showed some hematoma around the liver in catheter insertion site and moderate sized free fluid which was bloody in sono-guided aspiration (Fig. 4). Two units of packed cells were ordered, and emergent angiography of hepatic and intercostal arteries was performed, but after transcatheter contrast injection, no active bleeding was depicted (Fig. 5).

The patient was transfered to the ward with stable condition, and after one week, ascitic fluid and perihepatic hematoma was resolved completely. Catheter was working very well, and adequate dialysis was achieved until the patient's death. Unfortunately, the patient died in December 2008 after cardiorespiratory arrest due to opium overdose.

## Discussion

Po et al. reported the first transhepatic catheter placement and concluded that the transhepatic route was sufficient for adequate dialysis. The technique for placement of transhepatic dialysis catheters is like percutaneous transhepatic cholangiography with

drainage and also the placement of tunneled dialysis catheters in other sites. The contraindications to placement are coagulopathy and ascites.[1]

Transhepatic catheter access for hemodialysis is an alternative way in patients with limited options.[3,4] Those with obstruction of all peripheral venous sites due to past cannulation by temporary or permanent vascular routes could benefit from that, although the complication rate (29%) is significantly higher than jugular and other peripheral venous accesses. Bleeding is the most common post procedure complication, which we also noted in our case and it is the main cause of procedure related death.[1]

Stavropoulos et al.[2] also noted the significant high rate of catheter thrombosis in transhepatic catheter access and recommended to consider this access to be used as the last resort. The patency of transhepatic route for dialysis was reported longer than 120 days in more than 50% of patients and over 7 to 12 months in some cases.[1,5]

To our knowledge, this is the first reported case of transhepatic catheter access for hemodialysis in our country, and this would be an option for interventional radiologists to help the clinicians in difficult situations for managing patients with no vascular access for hemodialysis.

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