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Hemodialysis Catheter Malposition Induced by a Brachiocephalic Vein Stenosed Stent

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Abstract

Malposition of a central venous hemodialysis catheter, mainly due to central vein stenosis or thrombosis, is not an uncommon complication. Herein, we present a rare cause of a left external jugular vein hemodialysis catheter, malpositioned into the ipsilateral internal jugular—subclavian venous route, due to a stenosed stent that has been placed into the ipsilateral brachiocephalic vein.

Keywords: catheter, hemodialysis, internal jugular, malposition, stent

INTRODUCTION

Malposition of a central venous hemodialysis catheter is a relatively common complication (4%), requiring appropriate management (catheter’s position correction, replacement, or removal).¹ Malposition of a hemodialysis catheter inserted through a vein distally to brachiocephalic vein is mainly due to hypoplasia/absence,² stenosis,³ or thrombosis¹ of the vein. We present a rare cause of malposition, the first reported in literature, regarding a hemodialysis catheter which was inserted through the left external jugular vein route, due to restenosis of a stent that has been placed into the ipsilateral brachiocephalic vein.

REPORT OF THE CASE

A 64-year-old female with end-stage renal disease, due to hypertensive nephrosclerosis, was undergoing chronic hemodialysis treatment 3 times per week for 36 months. Her medical history included only arterial hypertension for the last 12 years, for which reason she was receiving antihypertensive therapy keeping the blood pressure levels to nearly normal values. She was admitted to our surgical department for the management of a dysfunctioning brachio-axillary graft with sustained venous hypertension. Her vascular-access (V-A) history included repeated insertions of temporary hemodialysis catheters through the subclavian and internal jugular veins, bilaterally. The performed native or synthetic graft V-As had a short-time only function due to right brachiocephalic vein thrombosis and left brachiocephalic vein stenosis. Thirteen months ago, the patient was submitted to a percutaneous transluminal angioplasty (PTA) with stenting of the left brachiocephalic vein (Figure 1). V-A function was improved, for 11 months. However, sustained venous hypertension led to venography which revealed in-stent stenosis (Figure 2) that was managed at the same time by balloon dilatation. The access venous hypertension diminished gradually in the next 2 months, but a newly performed venography showed in-stent restenosis (Figure 3). After that, under local anesthesia, a long-term, dual lumen, cuffed, hemodialysis catheter (MedComb, diameter: 14.5 Fr, step tip, cuff to tip 23 cm) was inserted through the left external jugular vein, tunneled subcutaneously at the left subclavian area. During the catheter’s function test, the patient felt the saline flowing stream to her left ear. The blood flow was found to be less than 250 mL/min. The routinely performed X-ray examination revealed that the catheter’s route was directed from the left external jugu-
lar vein to the junction of subclavian and internal jugular veins and then to internal jugular vein, as it could not pass through the stent stenosis (Figure 4). The catheter was removed and a long-term hemodialysis catheter was inserted through the left great saphenous vein.

**DISCUSSION**

Central venous stenosis or obstruction in hemodialysis patients is largely due to the use of central venous devices, temporary or permanent. Fibrosis of the venous endothelium, due to its contact with the catheter and catheter sheath formation, may lead to venous stenosis or occlusion. The prevalence of stenosis following subclavian vein cannulation has been found in 40–50% of the cases and stenosis resulting from cannulation of internal jugular vein in 0–10% of the cases. Placement of multiple catheters, longer location, location in subclavian vein, and placement on the left-hand side of the neck seems to predispose to central vein stenosis development.

Stenosis can be present without clinical symptoms and can be triggered by changes in the hemodynamic conditions, as after the creation and functioning of a vascular access.

Treatment of symptomatic central venous obstructions is imperfect, with about 20–30% of angioplasty procedures failing to adequately treat the obstruction. Stents improve the technical outcome following angioplasty but have poor primary patency, with reported one year primary patency 14–73% and a cumulative patency around 50%, since restenosis within a stent is a commonly observed phenomenon. Most symptomatic central venous obstructions will require repeated interventions to alleviate symptoms. In our patient, postprocedural antiplatelet therapy was not prescribed because its effectiveness is not documented as any
thrombus that forms is typically platelet-poor, while the cause of restenosis was intimal hyperplasia. As more stents are placed, new and unusual complications are encountered due to inadvertent migration and folding of a previously deployed subclavian stent, resulting from the attempt to place a dialysis catheter through the stented vessel.

For these reasons, the insertion of hemodialysis catheter through a stented vessel is gradually used more often. It would appear prudent that if such a combination is unavoidable, the catheter’s tip should be placed either proximal of the stent or completely through it into the right atrium. For patients with central venous stenosis or occlusion and those who need a hemodialysis catheter, its insertion can be reliably achieved immediately after endovascular recanalization with acceptable technical and long-term success rates.

The left brachiocephalic stent stenosis causes regression of venous hypertension of a functioning vascular access in the ipsilateral upper extremity, as it had happened in our case. There are reports of hemodialysis catheter misplacement when insertion was attempted through a vein distally to left brachiocephalic vein that was hypoplastic, stenosed, or thrombosed. A case of malposition of central venous catheter in the left internal jugular vein is reported by Khajavi and Sedighi. However, the misplacement of a hemodialysis catheter which was inserted through the left external jugular and was malpositioned into the ipsilateral internal jugular vein because of restenosis of a stent of the ipsilateral brachiocephalic vein is the first reported in bibliography.

**CONCLUSION**

Long-term hemodialysis catheters are inserted usually through the major veins of the superior vena cava system, by placing their tip, ideally, into the right atrium. Catheter’s misplacement is caused usually by central venous stenosis or occlusion. However, in the presence of a brachiocephalic venous stenosed stent, ipsilateral insertion of a hemodialysis catheter can result easily in catheter’s malpositioning.

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**REFERENCES**


