

A stuck haemodialysis central venous catheter: a rare complication

Karina Lopes, Carlos Botelho, Nuno Afonso, Ana Belmira Santos, Armando Carreira

Department of Nephrology, Centro Hospitalar de Coimbra. Coimbra, Portugal.

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■ ABSTRACT

Central venous catheters for haemodialysis should be used for limited periods. However, tunneled haemodialysis catheters are also used as permanent vascular access in patients who have poor quality vessels that are unsuitable for creation of arteriovenous fistula or placement of arteriovenous grafts. Although many complications of tunneled haemodialysis catheters have been documented, the phenomenon of the stuck catheter is seldom described. We report a case of a 79-year-old woman on chronic haemodialysis through a permanent right internal jugular vein catheter since 1999. In June 2009, inadequate blood flow was detected that failed to improve with intraluminal thrombolytic therapy. We attempted to remove the catheter by dissection of the cuff and tunnel region with local anaesthesia. Unfortunately, the catheter could not be removed following the dissection. The thoracic computed tomography angiogram revealed obliteration and fibrosis of the right internal jugular vein, right brachiocephalic vein and superior vena cava. Given the patient's advanced age and deteriorated general condition, the catheter was managed conservatively. The lines were cut as proximally as possible, ligated, and enclosed in fascial layers.

This type of complication is rare and usually described in patients with catheters implanted for several years. We present this case for its rarity, the exuberance of the adhesions found that prevented the excision of the catheter, and also for

the severity of the vascular changes existing in the venous circulation.

Key-Words:

Adherence; cuffed tunneled venous access; haemodialysis; stuck catheter.

■ INTRODUCTION

Haemodialysis (HD) requires reliable and durable vascular access. A well-functioning access is fundamental to receive adequate dialysis treatment¹. The first choice is a primary native arteriovenous fistula (AVF), with prosthetic bypass grafts as a second option. In recent years a growing number of HD patients have become dependent upon central venous catheters for long-term vascular access. These catheters play an essential role in providing permanent access in patients in whom all other access options have been exhausted.

■ CASE REPORT

We present a 79-year-old female patient with end-stage renal disease, secondary to hypertension. She started HD in January 1999, using a temporary catheter in the right internal jugular vein (RIJV). This catheter was exchanged through guidewire for a tunneled cuffed dual catheter (Tesio® type). The patient refused the construction of any other permanent

vascular access. This catheter worked well for 10 years, with no infections or other complications.

In June 2009, she was transferred to our unit as the catheter presented poor flow despite multiple trials of intraluminal instillation of thrombolytic agent, tissue plasminogen activator (Alteplase).

On physical examination, the patient presented an exuberant collateral venous circulation over the upper hemithorax, with no oedema of the face or the cervical region. We decided to remove the catheter under local anaesthesia in June 2009.

We dissected the cuff and subcutaneous tissue, but despite pulling hard, deep adherences made it impossible to mobilise the catheter. We planned to remove the catheter under fluoroscopic control. The fluoroscopy demonstrated that the arterial and venous tips were free in the right atrium. The catheter was probably adherent to the subcutaneous tissues or to the RIJV or the superior vena cava (SCV). It was deemed too dangerous to force removal. We performed a phlebography of the upper limbs that revealed a complete stop flow at the axillary vein, with venous drainage being carried through venous collaterals developed at the anterior chest wall (Fig. 1).

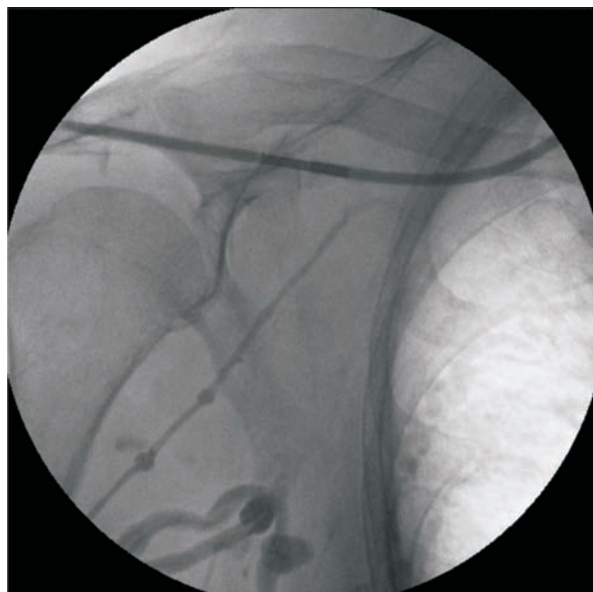


Figure 1
Phlebography of the upper limbs.

The cervical and thoracic computed tomography (CT) angiogram revealed obliteration and fibrosis of the RIJV, right brachiocephalic vein and SVC, as well as decreased size of the left brachiocephalic vein. This imaging exam showed marked collateral venous circulation at the intercostal, lumbar, thoracic wall and diaphragmatic veins draining to the right atrium via the inferior vena cava (Fig. 2).



Figure 2
The cervical and thoracic CT angiogram.

With this evidence we considered that only a major surgical procedure would allow the removal of the catheter. Given the advanced age of the patient, her deteriorated general condition and the inherent risks of major surgery, we decided to keep the catheter in place. The lines were cut as close as possible to the entry into the internal jugular vein (Fig. 3). The remnants of the lines were ligated and buried in fascial layers (Fig. 4). A tunnelled haemodialysis catheter (TDC) was placed in the right femoral vein to continue HD. The patient was prescribed low-dose aspirin (100 mg qd) which she continues to receive to date. In the immediate postoperative period, prophylactic antibiotics cefazolin (2 g IV) and ceftazidime (2 g IV) were administered after each HD session for two weeks. After this period, the dose of antibiotic was reduced to cefazolin 1 g IV and ceftazidime 1 g IV after each HD session to this date, almost 18 months later. The patient remains well, with no problems related to the retained catheter segments, such as sepsis.



Figure 3

Two Tesio remnants entering the right atrium via the RIJV and the distal tip at the thoracic outlet.



Figure 4

The protruding remnant of the catheter was enclosed in a fascial pocket.

DISCUSSION

Complications associated with long-term use of TDC include infection, thrombosis and central venous stenosis². Traction and dissection techniques can

successfully remove TDC in most patients. However, these methods may be unsuccessful in patients with catheters that are tethered or attached to the central vein or the atrium. The inability to remove a TDC is a rare complication that has received little attention from the vascular access community. In our case, it was impossible to remove the catheter with local anaesthesia due to intravascular adhesences. The removal of TDC by application of traction could lead to catheter breakage with subsequent retention of the broken piece and a potential risk of vascular and atrial wall avulsion. As such, we decided to manage the catheter conservatively. We cut and ligated the lines of the catheter and enclosed the remains in fascial layers, in order to reduce risk of infection. Reports of entrapped catheters in the literature are scarce. We found 18 cases of retained HD catheters³⁻⁹. Ten patients were female and eight male. In terms of catheter location, eight were in the RIJV, six in the left internal jugular vein, two in the right subclavian vein, one in the left subclavian vein and one in the right external jugular vein. These catheters had been in place for an average of 46.9 months (ranging from two to seven years).

In our case, the patient had the TDC in situ for a considerable duration of time, ten years.

The mechanisms by which catheters become stuck are unknown. A possible explanation could be the formation of an encapsulating fibrin sheath around the catheter that may become adherent to the vein wall⁵. It would appear that the longer the lines remain within the vein, the greater the risk of adhesion to the vessels³⁻⁵.

Given the data, it is possible that prophylactic line exchange could prevent adhesions and entrapment of the catheters. However, the risks *versus* benefits of this measure should be weighed, given the complications associated with the insertion of the catheter. Also, we do not know the best moment to perform this. The stuck catheter is a rare complication, with few reported cases, meaning formal recommendations regarding prophylactic catheter exchange cannot be issued. There is a slight predominance of female patients with entrapped catheters. The female gender could be another risk factor, since women have smaller vein calibres³. The most frequent location for catheter placement is the RIJV, perhaps because this location is preferable as the first choice for insertion.

In some cases the lines were removed successfully by thoracotomy performed by experienced cardiothoracic surgeons⁶. In our case, this solution was not undertaken, given the advanced age of the patient and her deteriorated general condition. There is a novel technique for removal of stuck catheters using laser sheath. Carrillo *et al.* published three cases of tethered catheter that underwent laser sheath extraction successfully⁹.

When it is not possible to remove all fragments of the catheter, internalisation of the lines can be considered a suitable option^{3,4}. Another concern is the risk of infection or colonisation of the retained lines, raising the question of prophylactic antibiotics. In our case, a long course of antibiotic therapy with cefazolin and ceftazidime was instituted, and there were no recorded infectious events related to the stuck catheter. There are no recommendations regarding antibiotic therapy to prevent infection related to the lines that have been left in situ.

It is difficult to estimate the size of the problem of stuck central lines and associated complications as there are few reported cases. Appropriate management of the stuck catheter has rarely been discussed and is not much described in the medical literature. Clearly, the primary risk factor for having a stuck catheter seems to be how long the catheter remains in place. We hope this case contributes to raising awareness of this complication. Once again all efforts must be made to minimise how long central venous catheters remain in patients.

Conflict of interest statement. None declared.

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Correspondence to:

Dr Karina Lopes
 Department of Nephrology, Centro Hospitalar de Coimbra
 Quinta dos Vales, S. Martinho do Bispo
 3041-853, Coimbra, Portugal
 karinalopes17@gmail.com