

Case report

A rare complication of a permanent venous catheter implantation to a patient on regular haemodialysis

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Introduction

Central venous catheters (CVC) play an important role in the treatment of acute renal failure^{1,2}. They are used for immediate vascular access in cases of urgently needed haemodialysis. Permanent venous catheters (PVC) are used for haemodialysis of intermediate duration and even for chronic haemodialysis in patients where peripheral arteriovenous access is problematic or impossible. Recently, subcutaneous port devices have been developed, suggesting that in the near future central venous access might become an acceptable alternative to a functioning arteriovenous fistula or to an arteriovenous prosthesis^{3,4}. In subclavian-vein cannulation a 10% rate of severe acute complications were registered such as haematoma, arterial puncture with haemothorax and pneumothorax^{5,6}. Moreover, when a venous catheter remains in place for more than 2 or 3 weeks, there is a 40-50% risk of subclavian-vein stenosis or occlusion⁷⁻⁹. Chronic obstruction of a subclavian vein will complicate later the construction of a future arteriovenous access on that arm. The occlusion of both subclavian veins will require major reconstructive surgery or a thigh access. Therefore, a subclavian haemodialysis access should not be selected as long as other central veins can be punctured^{10,11}. The right internal jugular vein is described as the ideal vein for haemodialysis access. It runs straight down to the superior vena cava, which reduces the risk of malposition of the catheter and also of central venous obstruction¹⁰⁻¹². A left internal jugular-vein catheter makes two right angles running down to the vena cava superior. This will occasionally cause problems during implantation. Moreover, with every movement of head and neck, a left internal jugular vein catheter will rub on the endothelium of the left subclavian vein. Wall-adherent thrombi and central-venous stenosis or occlusion and a high frequency of catheter dysfunction will be the consequences¹³⁻¹⁵.

Cannulation of the external jugular vein is possible in most patients because of its superficial position. On both sides it opens into the subclavian vein almost at a right angle. This complicates implantation of stiff, large-

bore CVC^{15,16} and in the long term use will provoke subclavian-vein stenosis and thrombosis.

Venous access in the common femoral vein avoids the potential risks of pneumothorax, haemothorax, cardiac arrhythmia, and pericardial tamponade. It can easily be achieved during cardiopulmonary resuscitation and in dyspnoeic patients who are not able to lie flat. In comparison to mediastinal-vein cannulation, the frequency of bacteraemia is obviously higher even when tunnelled catheters are used^{12,17}. High rates of blood recirculation are registered when the catheter tip is located in the iliac vein. This problem can be solved with long catheters (20 cm or longer) so that the catheter tip should be located in the inferior vena cava^{13,17,18}. Most PVC for haemodialysis come with a complete implantation set including a Seldinger guide-wire, a tissue dilator and a 'peel-away' tool for catheter insertion. Surgical implantation should be considered after multiple previous cannulations or after neck surgery¹⁹.

Presentation of the case

Having a long time experience in almost all types of the above mentioned catheterisations, we present a rare complication of a left subclavian venous catheter implantation in a patient with impossibility for further peripheral arteriovenous access. The patient was 28 years old male, he had posttraumatic paraplegia of his legs and chronic pyelonephritis and anaemia since 1998, and chronic renal failure since 1999. At the beginning of 2002 year he has started regular haemodialysis, but because of the lack of permanent vascular access (a few attempts have failed) in May 2002 he has transferred to peritoneal dialysis. Unfortunately in October 2002 a severe peritonitis (*Candida albicans*) forced us to remove the peritoneal catheter and after an adequate antifungal treatment a permanent catheter in right jugular internal vein has been placed. Two years later it has been removed because of a severe septicemia. Before peritoneal dialysis and before implantation of the permanent catheter a few temporary subclavian and jugular vein catheters have been implanted. The result has been proved by angiography - a stenosis in the

place of right subclavian-jugular bifurcation. That is why our choice was to implant a left permanent catheter. Our first attempt to put the permanent catheter in internal jugular vein was failed and then we successfully placed a permanent catheter "Gambro", 21 cm long, a few centimeters up in the same vein. The implantation was made against a little resistance, the blood flow was good when we aspirated by syringe, but the patient had a pain about the sternum in case of serum rinsing. The x-ray showed an atypical position of the catheter in a dilated collateral vein (fig. No 1). The situation was discussed with radiologists and vascular surgeons and they all could not localized exactly the vessel. (We really could not define the vessel where the catheter was placed, but we could suppose that it was a collateral vessel of left subclavian vein and we could not give the vein's name as it is well known that the collaterals have no name). The catheter was explanted and a temporal catheter was implanted in left subclavian vein for continuing haemodialysis procedures.



Discussion

Non-tunnelled CVC allows an effective vascular access in patients with urgent need of haemodialysis. The high frequency of early and late complications, however, should be a serious reason for the exercise of great care with respect to indication, implantation, and surveillance^{1,14}. Unfortunately it is not always clear which catheter material and design is best for haemodialysis access.

In case of emergency, the femoral vein should be preferred. Whenever possible, the right internal jugular vein should be preserved for early implantation of a tunnelled, cuffed catheter, which should be considered as soon as it becomes clear that haemodialysis will be necessary for more than 1 or 2 weeks^{1,5,20}. In patients with terminal renal failure requiring long-term haemodialysis, a peripheral arteriovenous access should be created at the time when a vascular catheter is inserted^{2,3,7}. From the aspect of catheter and patient survival, 'permanent catheter' is a contradiction in terms. Haemodialysis via CVC is less effective and reliable than via an arteriovenous access. A CVC reduces the success rates of later arteriovenous access proce-

dures, enhances the risk of infection, vascular obstructions and as a result of these problems reduces the patient's life expectancy^{17,18,20}. When the catheterization could not be escaped, to minimize the complications, especially in cases of problematic patients, we recommend (as do most of the other authors as well) a visual method as radiography or sonography to be used during the implantation.

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