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Case Report

Peritoneal dialysis (PD) is a successful treatment after complete haemodialysis (HD) blood access failure complicated with superior vena cava syndrome (SVCS)

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Abstract

SVCS constitutes a serious clinical problem and often represents a definitive loss of vascular access for haemodialysis (HD). The patients must suffer numerous interventions in order to obtain a permanent vascular access for HD. Treatment of SVCS requires endovascular intervention or complex surgical revascularization. We present three patients with SVCS associated with central indwelling catheters for HD who were switched to peritoneal dialysis (PD) due to complete HD blood access failure, and discuss the evolution on PD.

Keywords: peritoneal dialysis; superior vena cava syndrome

Introduction

The use of permanent tunnelled catheters has progressively increased among haemodialysis (HD) patients throughout the last decade. Older patients, diabetics or patients who have been on HD for a long period of time are the main recipients of these catheters. The increased usage of HD and increased survival of patients on dialysis contribute to the growing observation of an increase in complications such as jugular, subclavian or superior vena cava stenosis or thrombosis [1].

Superior vena cava syndrome (SVCS) can produce a clinical picture comprising face, neck, thorax and arm engorgement. SVCS constitutes a serious clinical problem and often represents a definitive loss of vascular access for HD. Its diagnosis requires a high level of suspicion. Meanwhile, the patients must suffer numerous interventions in order to obtain a permanent vascular access for HD. Treatment of SVCS requires endovascular intervention or complex surgical revascularization. We present three patients with SVCS associated with central indwelling catheters for HD who were switched to peritoneal dialysis (PD) due to complete HD blood access failure, and we discuss the evolution of PD.

Patients and methods

We reviewed the medical records of three patients (two female and one male) with a mean follow-up on HD of 47 ± 18 months who presented with a typical SVCS after multiple central catheters. SVCS was diagnosed according to clinical and radiological signs. All patients were transferred to PD when it was considered nearly impossible to obtain an adequate vascular access for HD. A straight silicone Tenckhoff catheter was implanted in all cases. Automated PD was prescribed to all patients with icodextrin 7.5% for the long-dwell exchange. Length of hospitalization was recorded in days due to problems related to vascular access on HD or due to problems related to PD technique. Other medical causes for hospitalization such as diarrhoea, pneumonia, etc. were not considered for the analysis.

Clinical cases

Case 1

A 64-year-old man, with chronic renal failure secondary to polycystic kidney disease started HD in May 2005 through a tunnelized right jugular catheter. In the following months, problems related to vascular access for HD occurred repeatedly. Thus, three arteriovenous fistulae, four permanent tunnelled catheters and three short-term central catheters were successively implanted (Table 1). In December 2006, he presented with facial engorgement. Both arms and the trunk were also engorged (Figure 1). A diagnosis of SVCS was made, and a computed tomography angiography was performed showing thrombosis of the internal jugular veins, innominate vein thrombosis and thrombosis of the brachiocephalic left trunk. A thrombus in the superior caval vein was observed. In view of multiple vascular access problems for HD, in January 2009, transfer to PD was proposed to the patient. He required numerous hospitalizations related to vascular

Table 1. Case report data

Patient	Sex	Age	Time on HD (months)	Time on PD (months)	AVF (*n*)	STC	LTC	Hospitalization days on HD	Hospitalization days on PD
Case 1	M	67	48	12	3	3	5	77	9
Case 2	F	73	64	30	6	4	5[a]	103	23
Case 3	F	77	18	25	3	3	3	29	17

AVF, arteriovenous fistula; STC, short-term catheter in jugular or subclavian vein; LTC, long-term catheter in jugular or subclavian vein (tunnelled).
[a]Case 2 also had a permanent pacemaker.

access problems. Total length of hospitalization was 77 days. PD was started in May 2009. Since then, the peritoneal dialysis has been performed without problems. Signs of SVCS totally disappeared after 3 months.

Case 2

A 73-year-old woman with diabetic nephropathy started HD in January 2002. From February 2003 to May 2007, she was admitted to the hospital on several occasions in order to resolve problems of her vascular access for HD. In total, she was hospitalized for 103 days. She received six arteriovenous fistulae, four short-term catheters and five tunnelled long-term catheters (Table 1). In November 2005, she presented with signs of SVCS. An angiography demonstrated an 80% occlusion of the superior caval vein (Figure 2). It is worth noting that the patient was blind and that a permanent cardiac pacemaker had also been implanted through her left jugular vein in November 2003. In May 2007, she was definitively switched to PD. Her husband assisted her with the PD exchanges. SCVS disappeared in 3 months. She was treated with PD for 30 months without relevant problems associated to SVCS. In November 2009, she died after being admitted to the hospital because of pneumonia.

Case 3

We report the case of a 77-year-old woman with diabetic nephropathy and treatment with HD from July 2005 to November 2006 when she was transferred to PD because of the impossibility of obtaining a valid vascular access. Thus, three arteriovenous fistulae, three short-term catheters and three tunnelled catheters were implanted without success. A long severe stenosis of the superior caval vein was observed on phlebography. The patient was successfully treated with PD for 25 months without any reappearance of clinical signs of SVCS. She suffered a sudden death at home in January 2009.

Results

As a whole, the three patients received the following tunnelled long-term catheters: eight right jugular catheters, three left jugular catheters and two right subclavian catheters. One left jugular permanent pacemaker was also implanted in one patient. In addition, 12 arteriovenous

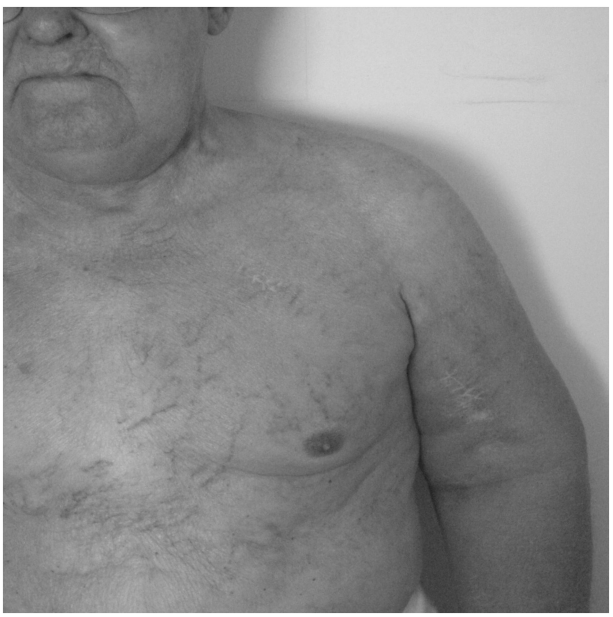

Fig. 1. Patient 1 presented with facial, neck, thorax and arm engorgement. Numerous collaterals were also present.

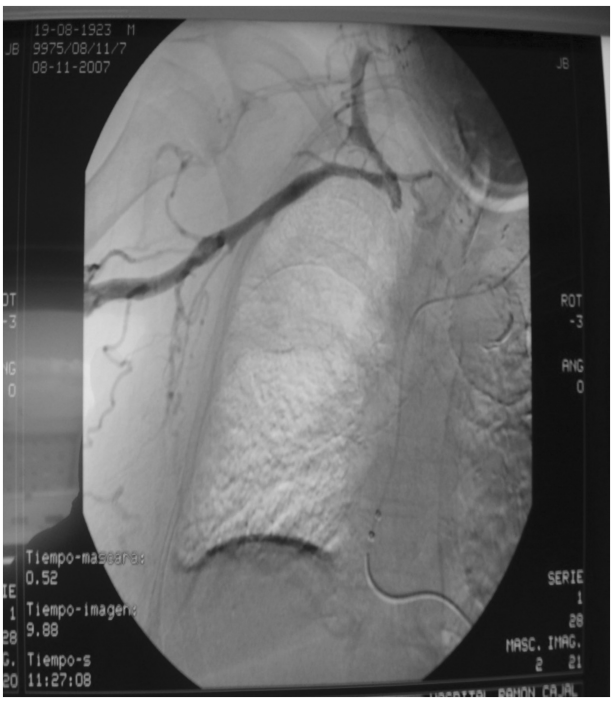

Fig. 2. An angiography demonstrating occlusion of the superior caval vein. A pacemaker wire can be viewed through left internal jugular vein.

fistulae failed in these patients (Table 1). Thirteen jugular or subclavian short-term catheters were also implanted.

The mean follow-up on PD was 23±9.3 months. PD ultrafiltration was higher than 1000 mL/24 h for each patient (mean 1133 ± 57 mL/24 h), and Kt/V was >2 in all three subjects (mean 2.23 ± 0.25). Clinical signs of SVCS were corrected in all of the patients soon after initiating PD, and there was no relapse in the follow-up. All patients were anuric. Volume overload was not observed in any patient after 6 months of having started PD. Length of hospitalization with HD and after starting PD was 69.6±37.5 vs. 16.3±7 days.

Discussion

Central vein stenosis is a well-known complication of indwelling intravascular devices for HD. Short-term and long-term haemodialysis catheters, as well as pacemaker wires, have been associated with vein stenosis [1–3]. Placement of multiple catheters, longer duration, location in the subclavian vein and placement on the left-hand side of the neck seem to predispose to the development of central vein stenosis. Endothelial injury, size and material of the catheter, barotrauma suffered by high pressure during the HD session, and infections, added to the hypercoagulable state of some of these patients, justify the stenosis and thrombosis. In addition, an increased venous pressure caused by arteriovenous fistula or graft can produce the clinical picture of SVCS. Treatment of central venous stenosis requires complex, expensive and usually repeated vascular intervention [4] in order to obtain a definitive access for HD. The repeated manipulation of the vascular access, catheter or fistula, increases the risk of infection. Furthermore, vein stenosis and the use of short-term catheters can produce access recirculation and result in inadequate dialysis dose.

PD is a modality of dialysis which, in terms of efficacy and survival, can be favourable compared with HD. In the last few years, PD has been proposed as the first-line dialysis treatment. The better preservation of residual renal function, better outcome after renal transplantation, better quality of life, low rate of hepatitis B and C virus, the possibility to continue working or travelling and the lower cost compared with HD are the main arguments in support of the use of PD as the initial dialysis treatment [5]. The preservation of vascular access is another strong advantage of PD. Nowadays, this issue is very important since many patients initiating dialysis are elderly, diabetic and atherosclerotic, and the possibility of performing a good vascular access is limited. However, PD remains an underutilized technique, even in patients with failed vascular access [6,7].

Our three patients are good examples of the current situation concerning dialysis candidates. They were older patients, and two of them were diabetic. Attempts to perform a good vascular access failed in all of them. A good number of central catheters (short-term and cuffed) were implanted, and the patients suffered a number of surgical interventions without success. Finally, central vein stenosis developed followed by SVCS, and they were transferred to PD. This dialysis modality was performed without problems and allowed them to enjoy an uneventful follow-up.

Modality of prescribed PD deserves some comments. The three patients were anuric with a marked tendency to develop trunk engorgement due to SVCS. Icodextrin was prescribed to guarantee an adequate daily ultrafiltration. Automated PD was prescribed to minimize the number of connections and therefore lower the risk of peritonitis.

Conclusion

We propose PD as a simple and cost-effective solution for patients with SVCS associated to HD blood access failure. In patients with problems in obtaining a good HD access, PD must be initiated early in order to avoid unnecessary interventions. Furthermore, PD must be considered the first-line treatment for end-stage renal disease in patients who start non-programmed dialysis in order to avoid the complete exhaustive process of vascular accesses.

Conflict of interest statement. None declared.

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