Case Report

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Successful Treatment of Catheter-Related Sepsis and Extraluminal Catheter Thrombosis with Vancomycin and Fraxiparin without Catheter Removal

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Key Words

Catheter-related sepsis

Extraluminal catheter thrombosis

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Introduction

The main complications associated with the use of central venous catheters for hemodialysis are infections and thrombosis [1-3]. Both may be the reason for undesired catheter removal. In a previous study we showed that catheter-related sepsis may be diagnosed and treated successfully without removing it, provided the infection was not associated with a catheter thrombosis. We report a patient who suffered from catheter-related sepsis complicated with an extraluminal distal catheter thrombosis and who was successfully treated with fraxiparin and systemic and local antibiotic therapy, with the catheter being maintained in place.

Case Report

A 31-year-old woman with chronic renal insufficiency secondary to a diabetic nephropathy was admitted to another hospital because of fever and malaise. She had been on hemodialysis for 5 months through an internal jugular catheter implanted surgically (Perm-cath®). Blood cultures were positive for *Staphylococcus epidermidis* and the patient was treated with intravenous cloxacillin (2 g/4 h). No echocardiographic study was done. After a 2-week antibiotic treatment, the clinical response was good and blood cultures became negative. Two months later, the patient was feverish and blood cultures were positive for *S. epidermidis* again. She was treated with two doses of vancomycin (15 mg/kg i.v.) administered every 7 days. Two weeks later, she still had fever and was referred to our hospital.

The patient was in good general condition, and the physical and complementary investigations did not evidence an infective site. The blood cultures and serologic studies for *Brucella melitensis*, *Salmonella typhi*, cytomegalovirus, herpesvirus, *Legionella pneumophila*, *Chlamydia*

psittaci, Mycoplasma pneumoniae and Coxiella burnetii were all negative. A transesophageal echocardiogram (fig. 1) showed a 7-cm-long extraluminal thrombus at the distant tip of the catheter situated in the right atrium. The systemic treatment with vancomycin was maintained, and a local endoluminal treatment with vancomycin was given, according to a previously described method [2, 4]. In addition, treatment with subcutaneous fraxiparin (15,000 U/12 h) was started. Two days later, the patient was afebrile. During treatment the number of platelets did not change, whereas the levels of D-dimer (Fg fraction) were remarkably reduced (600 ng/ml initially vs. 286 ng/ml on the 7th day of treatment). On the 10th day of fraxiparin treatment, a control transesophageal echocardiogram showed the disappearance of the thrombus (fig. 2) and the treatment with vancomycin and fraxiparin was discontinued. A perfusion lung gammagram showed no image of pulmonary embolism. Two weeks later, blood cultures were negative and the patient was discharged from the hospital. Twelve months later, the patient had a functioning vascular access and the catheter was removed. Its culture was negative. During a 3-year follow-up we have not observed any new infectious episode.

Discussion

In hemodialysis patients, the association of catheter infection with local thrombosis is a common cause of either resistance to antibiotic treatment or infection relapse, which frequently leads to the undesired catheter removal

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Fig. 1. Transesophageal two-dimensional echocardiogram (parasternal short-axis view) showing the free tip of the jugular catheter in the right atrium (RA) surrounded by a 7-cm extraluminal thrombus (arrow). AO = Aorta; LA = left atrium.

Fig. 2. Transesophageal two-dimensional echocardiogram (parasternal short-axis view) after fraxiparin therapy, showing the disappearance of the extraluminal catheter thrombus (arrow). RA = Right atrium; LA = left atrium; AO = aorta.

[2]. In the case reported here, the patient was treated initially only with intravenous antibiotics and was still feverish. This made us look for a site or complication maintaining the infection. As the thrombus might act as a reservoir of *S. epidermidis*, and in keeping with the experience of other authors [4], we decided to start a treatment with subcutaneous fraxiparin at doses having profibrinolytic activity (15,000 U/12h) with a good clinical response. The decrease of D-dimer serum levels seems to show that an increase in the fibrinolytic activity was obtained with the dose given [4]. The same outcome might be accomplished in a shorter time by systemic thrombolysis using urokinase [5]. However, at that moment a systemic thrombolytic treatment was considered strictly contraindicated because the patient had uncontrolled arterial hypertension and a surgical vitrectomy had recently been performed. Although the normal practice would be to change the catheter over a guidewire, a procedure that can be done in an outpatient setting [6], in this case catheter removal was not considered indicated because of the high risk of pulmonary embolism [3].

As we showed previously [2], catheter-related sepsis may be effectively treated by combining local endoluminal and systemic antibiotic treatment without catheter removal, provided the patient's clinical condition allows it and there are no additional complicating factors. In addition to our previously published data [2], we wish to point out that the presence of a thrombus

complicating catheter sepsis should not be considered as an absolute contraindication to try endoluminal and systemic treatment maintaining the catheter in place, especially in patients with no other vascular hemodialysis access. Prospective studies may be useful to address the effectiveness of fraxiparin on treating central venous thrombotic events complicating the use of hemodialysis catheters in patients with a formal contraindication to systemic thrombolytic treatment.

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