CASE REPORT

Right Atrial Mass Related to Indwelling Central Venous Catheters in Patients Undergoing Dialysis

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Central venous catheters are used for the administration of fluids, drugs, blood products, total parenteral nutrition and for haemodynamic measurements. In patients with renal failure planned for dialysis, indwelling central venous catheters are used prior to forming an arterio-venous shunt. Infected right atrial thrombus is a rare phenomenon in adults and particularly unusual in patients undergoing dialysis. We describe two patients, undergoing dialysis for short periods, with indwelling central venous catheters and a right atrial mass, suspected for infected right atrial thrombus, detected by transoesophageal echocardiography.

Introduction

Central venous catheters are used commonly for the administration of fluids, drugs, blood products, total parenteral nutrition and for haemodynamic measurements. In patients with renal failure planned for dialysis, indwelling central venous catheters are used prior to forming an arterio-venous shunt. In children with central venous catheters, right atrial thrombus formation, with or without infection, is a known complication[1]. This complication is rarely reported for adults. We describe two patients, undergoing dialysis for short periods, with indwelling central venous catheters and a right atrial mass, consistent with infected right atrial thrombus, detected by transoesophageal echocardiography.

Case 1

A 65-year-old female, debilitated to bed for 3 years after a major cerebrovascular accident, was hospitalized due to fever and chills. Three months prior to hospitalization, dialysis was started for end-stage renal disease. Before dialysis a double lumen silicone rubber central haemodialysis catheter was inserted through her right internal jugular vein. Investigation of fever included transoesophageal echocardiography that revealed a large (10 × 8 mm), well-defined mobile echogenic mass attached to the right atrial free wall. Transoesophageal echocardiographic image from 90° demonstrated the central line, directed from the superior vena cava into the mass (Fig. 1). The catheter was withdrawn. Methicillin-resistant Staphylococcus aureus was isolated from several blood cultures. The patient was treated with vancomycin and gentamycin, but passed away 3 weeks later, from sepsis and cardiac arrest.

Case 2

An 86-year-old male was treated with regular haemodialysis for 3 years. Two weeks prior to hospitalization his arterio-venous shunt occluded. Therefore, a Permocath® central line catheter for dialysis was inserted through his right internal jugular vein. High fever with chills developed 9 days later. The patient was hospitalized. Blood cultures grew Klebsiella and the central line was withdrawn. Investigation of fever included transoesophageal echocardiography that revealed a 10 × 13 mm mass bulging from the right atrial free wall (Fig. 2). The patient was treated with antibiotics for 4 weeks, with an uneventful course.

Key Words: central venous catheters; dialysis; echocardiography; right atrium; mass.
In adults, infection of a right atrial thrombus is a very rare complication of central venous catheters\(^2\)–\(^4\). The clinical presentation is non-specific, and usually consists of fever with bacteraemia or fungaemia. In most cases the catheter was withdrawn and antibiotics were administered. Two of the 14 patients presented in the literature died as a direct consequence of this complication.

Silicone rubber central venous dialysis catheters are used to provide vascular access in acute renal failure patients, and in chronic dialysis patients in whom conventional vascular access cannot be achieved or maintained. There is only one report on infected right atrial thrombus caused by a subclavian vein catheter, in a patient undergoing dialysis\(^5\).

Cohen et al.\(^5\) evaluated the superiority of transoesophageal echocardiography to image intracardiac masses in 19 patients with central venous lines. Trans-thoracic echocardiography suggested the presence of a mass in only five patients (26%). Transoesophageal echocardiography is superior to transthoracic echocardiography, particularly in masses located in or near the superior or inferior vena cava or in the right atrial appendage. Transoesophageal echocardiography better defined the size, mobility, and site of attachment of right atrial masses.

Gilon et al.\(^6\) studied 55 patients by transoesophageal echocardiography within 1 week and after 6–8 weeks after Hickman catheter implantation. In the baseline study, 13 had the tip placed in the right atrium, eight at the superior vena cava-atrium junction, and 27 in the superior vena cava. An abnormal mass, consistent with a thrombus, was found in 12.5% of the patients, all in the group with the Hickman catheter tip placed in the right atrium.

We presented two cases of a rare complication of central venous catheter placement, in patients undergoing dialysis. In both patients the mass was located in the right atrial free wall, facing the superior vena cava entry into the right atrium. Regarding the location of the mass, in patients with sepsis and normal sinus rhythm we may assume that the mass is consistent with infected right atrial thrombus generated at the contact point of the central line with the right atrial wall.

One of our patients died from sepsis despite the removal of the catheter and intensive antibiotic therapy. Placing the central line tip in the vena cava, and not in the right atrium, may decrease the rate of thrombus formation and infection. This report suggests that patients with dialysis, central venous catheter, unexplained fever and bacteraemia should be considered for investigation by transoesophageal echocardiography.

**References**


