

Tunneled haemodialysis catheter-related right atrial thrombi: a case report

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ABSTRACT

Type of vascular access is an important determinant of morbidity and mortality in patients receiving haemodialysis. Though arterio-venous fistula is the optimum choice, yet patients often require central venous catheters for temporary use or sometimes as a breezing option. Central venous catheters may be complicated by sepsis, one of the most common and dreadful complications; intra-atrial thrombus formation is not uncommon and in many instances remain asymptomatic and hence unrecognized. Here, we report a case of intra-atrial thrombi complicating a young boy receiving haemodialysis through central venous catheter, who was managed successfully with combination of anti-coagulation, intravenous antibiotics and catheter removal.

Key words: central venous catheter, complication, haemodialysis, thrombus.

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INTRODUCTION

With the improved quality of care for patients with chronic kidney disease (CKD), increasing numbers of CKD patients are likely to reach end-stage renal disease (ESRD) and demand renal replacement therapy. Haemodialysis still remains as the most prevalent modality of renal replacement therapy though-out the world and the type of vascular access often determines morbidity and mortality in such cohorts.^{1,2} Here, we report a case of intra-atrial thrombi formation in an ESRD patient, who had been receiving haemodialysis through tunneled central venous catheter.

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CASE REPORT

A 20-year-old boy, diagnosed with type 1 diabetes mellitus, hypertension, ESRD on maintenance haemodialysis through tunneled cuffed catheter in right internal jugular vein, got admitted with a 7-day history of high grade, intermittent fever along with pain and swelling at the exit site of permanent catheter for the preceding two days. He did not have any history of cough, rash or joint pain and he denied any contact with known tuberculosis patient.

The boy was looking very sick, he was anaemic and there was no lymphadenopathy. His temperature was 102°F, pulse 120 beats/min and blood pressure was 135/75 mm Hg. The exit site of permanent catheter was erythematous and tender but there was no discharge. Systemic examination findings revealed no abnormality except findings suggestive of diabetic peripheral neuropathy and diabetic retinopathy.

There was anaemia (haemoglobin 8.2 gm/dl), neutrophilic leukocytosis (total white cells was 32,850/cmm of blood with 85.1% neutrophils) and high erythrocyte sedimentation rate (89 mm in 1st hour), C-reactive protein (110 mg/L, ref. <6) and procalcitonin (3 ng/ml). Blood cultures from peripheral sites did not reveal any growth, while that from the central venous line grew *Pseudomonas* spp. sensitive to meropenem and colistin. A chest radiograph revealed enlarged heart and showed

catheter in situ. Transthoracic echocardiography revealed an echogenic mass of mixed density measuring 10 mm X 6 mm in right atrium attached to inter-atrial septum (Figure 1) and there was no other vegetation. Trans-oesophageal echocardiography confirmed catheter line with a small thrombus at fossa ovalis and another one in the right atrial cavity without any vegetation (Figure 2).

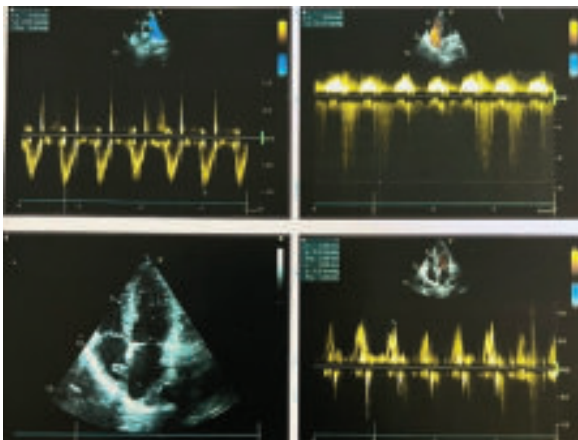


Figure 1 Transthoracic echocardiography revealed an echogenic mass of mixed density measuring 10 mm X 6 mm in right atrium attached to inter-atrial septum

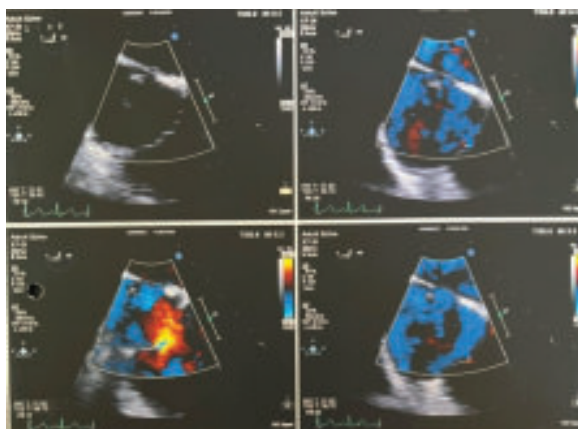


Figure 2 Trans-oesophageal echocardiography revealed central venous catheter line with a small thrombus at fossa ovalis and another one in the right atrial cavity

He was started with enoxaparin, warfarin, meropenem and vancomycin along with his ongoing regular medications. Repeat echocardiography after 10 days revealed that the thrombus is regressing in size (5 mm X 5 mm). His permanent catheter was removed, another

central venous catheter was placed through the left femoral vein for continuation of haemodialysis, a left brachio-cephalic arterio-venous fistula was constructed and he was enlisted to the transplantation program.

DISCUSSION

Arterio-venous fistula remains as the optimum option for vascular access in patients receiving haemodialysis; most patients in developing countries and many, even in developed countries, need to start haemodialysis through central venous catheters, because of late presentations or as an emergency or breezing procedure.^{3,4} Central venous catheters may be complicated by catheter related blood stream infection, exit site infection, abscess formation, intra-atrial thrombus formation⁵ and central venous stenosis.

Intra-cardiac thrombus formation is a well-recognized complication of central venous catheter placement but definitely under-recognized and under-reported.⁶ The catheter tip is placed within the right atrium, which is prone to frequent friction and any injury of endocardium rapidly invites platelet aggregation and likely to result in thrombus formation.⁷ ESRD patients are immunocompromized and prone to infection. Frequent needling for haemodialysis further exposes haemodialysis patients to infection and the sterile thrombus may be complicated as an infective one⁸ as presumed in the present case, though surgical removal of the thrombus, its histopathology and cultures were not performed.

The clinical presentation of intra-cardiac thrombus depends on size, location, haemodynamic stability, presence of embolization and infection. Small, sterile intra-cardiac thrombi may remain asymptomatic and may be picked at routine echocardiography performed for some other reason⁶ while larger ones may cause obstructive symptoms and may present with dizziness and arrhythmia. Patients may present with life-threatening pulmonary or systemic embolism but small emboli may pass unnoticed. Fever is a common presentation in case of infected thrombi⁸ and infective endocarditis and intra-dialytic hypotension may hint towards an underlying occult sepsis and merit investigation.

Blood cultures from peripheral veins and also from the catheter are needed. *Staphylococcus* is the typical infective agent followed by *Pseudomonas* spp. as was in the present case. Trans-thoracic echocardiography

may find thrombi and vegetations.⁹ Trans-oesophageal echocardiography may identify smaller ones that might be missed by trans-thoracic approach. Neutrophilic leukocytosis and increased inflammatory markers are common findings.⁸

Treatment options include initial intravenous antibiotics covering both Gram positive and Gram negative bacteria and need to be tailored according to growth and their antibiotic sensitivity patterns. Most cases merit catheter removal, systemic anti-coagulation is often needed and surgical thrombectomy in selected cases.^{5,6} In the absence of definite guidelines, clinical practice largely depends on individual patient basis. If the thrombus is attached to the catheter tip, catheter removal increases the chance of dislodgment and embolization of the thrombus and is discouraged. We managed our patient by applying the first three and surgery was not needed.

In conclusion, as intra-cardiac thrombus is a common and under-recognized complication of central venous catheter in haemodialysis patients, a high index of suspicion is needed in such cases and if suspected, they should be investigated promptly.

Authors' contribution: FH, TAC, MAA, MAR, SI managed the case. FH drafted the manuscript. All authors revised the manuscript critically and approved for submission.

Consent: Informed written consent was taken from the patient for publication of this case report and any accompanying images.

Conflicts of interest: Nothing to declare.

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