

CT findings after dialysis catheter removal-catheter remnant or fibrin sheath: a case report

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ABSTRACT

There is a vast amount of literature on complications related to dialysis catheters, particularly with regards to catheter related sepsis, stenosis, thrombosis and occlusion. There is an equally large number of corresponding radiological descriptions of the above complications. Fibrin sheaths though common¹, are an under-recognised complication of dialysis catheters. We report a case of a patient with a fibrin sheath that was detected on computed tomography and interpreted as a catheter remnant which potentially could have led to the inappropriate investigations and management of this patient.

CASE

A 50-year-old male Trinbagonian of African descent with a previous medical history of hypertension and stage 5 chronic kidney disease, presented with a malfunctioning, cracked dialysis catheter. The catheter had been in situ for two years with the patient receiving dialysis through the catheter without event. There was no clinical evidence of superior vena cava obstruction.

A decision was made to admit the patient as a day case for a catheter exchange. Intraoperatively, a thick, white, and dense fibrin sheath was noted surrounding the catheter, extending the entire length of the catheter that was within the vein from the distal to the proximal end. The catheter with the mildly adherent sheath was successfully dissected and removed with minimal difficulty. The entire catheter was extracted and examined to ensure that no catheter fragments were left in situ, especially in view of the unusual finding of the extensive fibrin sheath. Given this finding, a decision was made to place a femoral permanent catheter as a temporary solution, until a more definitive vascular access could be placed. Additionally, a CT venogram of the chest and neck was ordered to assess the integrity of the internal jugular vein and the superior vena cava (SVC) to ensure there was no thrombosis or stenosis for future catheter placement or vascular access.

The patient underwent the CT venogram seven months later and the scan was reported by the radiologist as follows: "There is the presence of a high-density tubular structure, approximately 3.4 cm in length, adherent to the walls of the superior vena cava (SVC). There are no filling defects, stenosis, or occlusion observed. The structure might be a catheter remnant or a fibrin sheath or calcified material rather than a thrombus or stenotic lesion" (Figure 1).



Figure 1: Coronal view of CT chest with IV contrast illustrating the thickened calcified fibrin sheath

An angiogram and vascular surgical review were recommended. On referral to the Interventional Radiologist for consideration of an angiogram, the case and CT findings were reviewed with the conclusion that the finding was indeed a fibrin sheath and no further intervention was necessary.

DISCUSSION

The fibrin sheath is a common complication in patients with long-term central venous catheters, often leading to catheter dysfunction by causing partial occlusion or adherence to surrounding structures.² The literature suggest that the occurrence of fibrin sheaths range from 50% to 100%.^(3, 4) Though the pathogenesis is unclear, it is thought to be a layer of connective tissue that forms a layer on the intravascular tract of the catheter.³ Fibrin sheaths develop very quickly and are probably present in most catheters which remain in place for more than 7 days.⁵ They usually confer insignificant clinical and pathophysiological consequence, although tunnelled-cuffed dialysis catheter malfunction has been reported potentially due to fibrin sheaths.⁶ Management in most cases would be the removal of the dialysis catheter.

Fibrin sheaths may undergo calcification and therefore remain detected radiologically many months after catheter removal.⁷ In chronic kidney disease patients, abnormalities of calcium and phosphate metabolism may lead to increased calcification of the fibrin sheath.⁸ A residual calcified fibrin sheath can be misinterpreted as a catheter fragment with few in the literature.^(9,10,11)

CONCLUSION

Fibrin sheaths are a common but under recognised complication of dialysis catheters. Calcification of these sheaths are particularly common in chronic kidney disease patients with mineral bone disease. This case highlights that such radiological findings can be erroneously interpreted as a catheter remnant, leading to unnecessary and potentially harmful investigations and interventions. This can easily be avoided by recognition of this complication, combined with thorough record keeping of procedures. In the case of this patient, examination of the catheter to ensure that it was intact was most likely prompted by the extensive adherent catheter fibrin sheath seen on removal of the catheter. The observation of an intact catheter with an adherent fibrin sheet in turn supported the diagnosis that the CT finding was a calcified

fibrin sheet rather than a catheter remnant thereby preventing unnecessary further intervention.

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