Catheter Related Atrial Thrombus: Diagnosis and Treatment - Time for Consensus?

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Catheter related thrombosis

- Catheter thrombosis
  - Intraluminal
  - Extraluminal
- Physiological process starts with endothelial damage during insertion
- Propagation of inflammatory and coagulation cascade
- Inadequate and improper flushing during dialysis
- Inadequately filling of the lumen with anticoagulant

Intraluminal Thrombus

- Often due to improper handling and care during dialysis
- Higher incidence in femoral CVC than UJ CVC
- Effect of gravity and difference in viscosity between heparin and blood leads to leakage
- Leakage of heparin is more in catheters with multiple side holes

Superior Vena Cava Thrombosis

- Multiple hardware as in patients with cardiac rhythm device
- SVC stenosis

Central vein thrombosis associated with underlying stenosis

Extraluminal thrombus

- Central vein thrombus
- Right atrial thrombus
- Presence of CVC can lead to thrombus formation in the central vein
- Central vein thrombus is generally asymptomatic
- Incidence reported in literature – 2-64%
- Two common associated risk factors
  - Duration of CVC
  - Infection

Vachharajani TJ, Mosaaei S, et al!
Central vein hardware: cannot live with it, cannot live without it.
Semin Dial 2009
**Central Vein thrombosis**

Incidence is higher with left sided catheters


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**Right Atrial Thrombus**

- Relatively uncommon
- Detected on angiography
- Large thrombus defined as >2cm
- Additional studies such as TEE required for diagnosis
- CVC malfunction because tip is embedded in the thrombus
- Serious complication such as hemoptysis
- High mortality – 27%


Courtesy of Aslam Pervez, MD

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**Management of thrombosis**

- Intraluminal thrombosis
  - Prevention
  - Catheter lock solution
  - Treatment
  - Thrombolytics
  - Exchange over a guide wire

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**Management of right atrial thrombus**

- Removal of CVC
- Systemic anticoagulation for at least 6 months
- Low risk patients - surgical thrombectomy
- High risk patients - appropriate management not established
- Weekly monitoring with echocardiography is recommended

Right atrial thrombi complicating haemodialysis catheters. A meta-analysis of reported cases and a proposal of a management algorithm.

Stavroulopoulos A et al.

- 71 cases of CRAT in dialysis patients
  - Overall mortality was 18.3% (13/71) and significant predictors were advanced age, presence of complications and non-removal of the catheter. Nine patients received no treatment, except for catheter removal and antibiotics, four of them died.
  - Systemic thrombolysis was administered in eight patients but was successful only in two with pulmonary embolism, the remaining required further treatment.
  - 37 patients received anticoagulation and 23 underwent surgical thrombectomy (one percutaneous intravascular removal of the thrombus). Mortality was 16.2% (6/37) and 13% (3/23), respectively, P=NS

Summary

- Optimal management of a dialysis catheter-associated atrial thrombus remains unclear.
- Catheter removal followed by 3 month of anticoagulation, or in the case of small (less than 2 cm) thrombi, 6 months of anticoagulation, and catheter removal only if there is no resolution of the thrombus.
- A repeat echocardiogram to test for resolution of the thrombus is also warranted.
- Consensus guidelines should be instituted and more rigorous studies