

# RIGHT ATRIAL THROMBUS POST HEMODIALYSIS CATHETER: CASE REPORTS

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## ABSTRACT

Haemodialysis catheters are frequently used in patients with end-stage renal failure prior to the formation of an arterio-venous shunt. Right atrial thrombus can developed in some patients receiving haemodialysis through indwelling central line venous catheter (CVC). Thrombus formation can developed in response to intraluminal clot formation or endothelial damage in the right atrium caused by the constant friction between catheter and right atrial wall. Three patients developed right atrial thrombus after undergoing haemodialysis due to end stage renal failure. Out of three cases of RAT, one of them was infected. The three cases managed medically. No surgical intervention was required. The indication for routine echocardiographic screening in patients with hemodialysis catheter might be an option to detect RAT earlier; however, its role will remain controversial due to the cost reasons.

**KEY-WORDS:** Thrombus; Right Atria; Post Haemodialysis Catheter

## Introduction

Haemodialysis catheters are frequently used in patients with end-stage renal failure prior to the formation of an arterio-venous shunt. Notwithstanding the advancement in the manufacturing of catheter design, complications in the form of thrombosis still can occur particularly in the right atrium. Clot formation and thrombosis can developed in response to intraluminal clot formation or endothelial damage in the right atrium caused by the constant friction between catheter and right atrial wall.

## Case Reports

### CASE 1

A 59 -year old female with history of type 2 diabetes, hypertension, hepatitis C, and end stage renal disease (ESRD) on haemodialysis via left brachio-cephalic arterio-venous (AV) fistula since 2006 was presented in April 2012 due to blockage in the AV fistula. Careful assessment suggested that no vessels suitable for second AV fistula. Tunneled split catheter was inserted and dialysis was carried on. Six months later, patient presented to the emergency room with fever, chills, and progressive dyspnoea. Examination showed her

to have a temperature of 38 and soft ejection systolic murmurs. A chest radiograph showed right sided chest consolidation and the catheter tip was high in the right atrium. Blood and catheter tip cultures were negative. Transthoracic echocardiography (TTE) showed large highly mobile mass of 2.5 X 1.4 cm in the right atrium. Another small mobile mass is also detected at the free wall. Further investigations were carried on to exclude sources of bacteremia other than RAT.

Despite the therapeutic dose of anticoagulation, patient continued to have several episode of pleuritic chest pain and loss of consciousness. Decision was taken to stop Warfarin and to continue with anticoagulation intravenous heparin. Dialysis was continued using a new Jagular catheter. Three days later, repeated TTE confirmed the presence of small highly mobile mass in the right atrium with deterioration of the left ventricular function. The previously large mass was not detected.

Despite the appropriate treatment with the therapeutic dose of anticoagulation, and the empirical dose of broad spectrum antibiotics patient continued to deteriorate and died later on.

## CASE 2

A 68 -year old female with history of type 2 diabetes, hypertension, hyperlipidaemia, and end stage renal disease (ESRD) started on dialysis in April 2012 via curved right temporary internal jugular catheter. Since patient was refusing AV fistula, temporary catheter was left in situ and converted to tunnelled split catheter in June 2012. Eight weeks after catheter insertion, she presented with fever, chills, and arthropathy for two weeks duration. Examination showed her to have a temperature of 38 C. Blood and catheter tip cultures grew gram positive Enterococci. Transthoracic echocardiography (TTE) showed right atrial mass of 2 X 1.7 cm possibly attached to the dialysis catheter. Trans-esophageal Echocardiography TEE was recommended and it showed an echogenic mass 2.7 X1.7 cm attached and covered the tip of the catheter. Small masses also were seen covering the dialysis catheter in the superior vena cava (SVS) and the right atrium.

The catheter was removed and patient was treated with therapeutic anticoagulation and antibiotics. TTE was repeated three weeks later and it showed complete resolving of the thrombus from the right atrium.

## CASE 3

A 62 -year old female with history of type 2 diabetes, hypertension, ischemic heart disease (IHD), and end stage renal disease (ESRD) on haemodialysis via right temporary haemodialysis catheter for the past five weeks was presented in her routine scheduled dialysis with high grade fever, chills, and progressive dyspnoea. Patient started on dialysis, fifteen minutes later she developed sever hypotension with dropping in the oxygen saturation level. Investigation in the form of CT chest was performed and it showed right hydro pneumothorax with fluid level which was managed by chest drain insertion. Pulmonary embolism was not detected. Transthoracic echocardiography (TTE) showed two of right atrial thrombus, one measured 3 X 2 cm in diameter which was attached to the posterior wall of the right atrium and a second highly mobile mass measured 1X1cm. TEE was carried on and confirmed the findings. The catheter was

removed and anticoagulation therapy was started. Six weeks later, TTE repeated and it showed completely resolving of the thrombus. Patients remained well and continued the dialysis with left brachio-axillary A-V graft.



Figure-1: Transthoracic Echocardiography (TTE)

## Discussion

Right atrial thrombus (RAT) was reported in number of patients receiving haemodialysis through indwelling central line venous catheter (CVC).<sup>[1,2]</sup> With use of cuffed central venous catheter, Shah et al, reported 5.4% incidence of developing RAT.<sup>[3]</sup> Other studies reported that early formation of mural thrombosis with the use of Hickman catheter was associated to the position of the tip in the right atrium.<sup>[4]</sup> The mechanism underling the thrombus formation include the following, intraluminal clot elongation, mechanical irritation of the free wall of the RA<sup>[5]</sup>, and the location of the tip of the catheter which is located in the area of separation or stagnation of blood flow<sup>[6]</sup>.

**Table-1: The Main Clinical Findings of the Three Patients**

No.	Sex/Age	Reason for Admission	Medical History	Time to Diagnosis	Clot Size (cm)	Infected Clot	Blood Culture	Treatment	Outcome
1	59/F	Fever, Chills	Type 2 DM, HT	6 Months	2.5 × 1.4	No	-	Medical	Died
2	68/F	Fever, Chills	Type 2 DM, HT	8 Weeks	2.7 × 1.7	Yes	S. aureus, Enterococcus	Medical	Good
3	62/F	Fever, Chills	Type 2 DM, HT	5 Weeks	3.0 × 2.0	No		Medical	Good

DM = diabetes mellitus, HT = arterial hypertension

Most thrombus can developed between one to eight weeks. Timsitb et al, found in 55 patients who were evaluated by TEE, that thrombus in the RA developed in patients within one week if the catheter was placed in the RA. In contrast, patients with catheter situated at the RA-SVC junction or within the SVC, no thrombus was detected.<sup>[6]</sup> Gilon et al. reported in 55 patients that 12.5% developed RAT from 6-8 weeks.<sup>[4]</sup>

RAT can transform from non-infected status to an infected one. An infected RAT is not very common but it was reported in the literature with the presence of CVC. It can be potentially lethal if not treated and in many cases it required surgical intervention.<sup>[7]</sup> Bacteremia related to infected RAT has been reported as a complication of dialysis CVCs and therefore many dialysis centers have replaced traditional heparinized catheter to antiseptics including different concentrations of antibiotics and citrate in heparin solution.<sup>[8]</sup>

RAT can be diagnosed by different modalities. TEE was described as the first imaging technique used in evaluating masses in the right atrium.<sup>[9]</sup> It is used also to confirm if the RA thrombus associated with CVC were adherent to the atrial wall or to the CVC itself which will reflect later on the treatment options.<sup>[10]</sup>

## Conclusion

We presented three cases of RAT, were one of them was infected. The three cases managed medically. No surgical intervention was required. Two of them survive and one patient died. The indication for routine echocardiographic screening in patients with haemodialysis catheter might be an option to detect RAT earlier; however, its role will remain controversial due to the cost reasons.

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