

# Free floating clot in inferior vena cava with extension to Right Heart: What is the best treatment?

M.H.Ghafarinejad MD; Sh. Mali MD\* ; K. Raisi MD; R.Ghafari MD

## Abstract:

We present a 35 years old man with diagnosis of a free floating clot in his inferior vena cava, extended to right side of heart after an electrophysiological study for evaluation of supra ventricular tachycardia. Because of high probability of pulmonary embolism, surgical intervention was chosen and conducted successfully.

**Key words:** right heart clot; inferior vena cava clot; surgical removal

**1.Introduction:** Free floating clot in right heart is a rare event, especially when the pulmonary embolism has not been developed at the time of diagnosis (1-5). When pulmonary embolism occurs, the mortality rate is high (6,7,8). There are some options for management of this condition(9). Here we report a case with right sided free floating clot, extended from inferior vena cava, which was removed surgically.

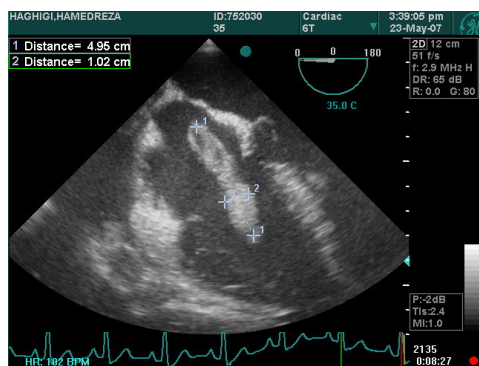
**2.Case report:** A 35 year old man with previous history of paroxysmal supra ventricular tachycardia (PSVT) attacks from many years ago, referred with dyspnea (functional class II) and palpitation. The patient was admitted for management of arrhythmia. The PSVT arrhythmia finally responded to administration of adenosine 12mg and DC shock (50 J).

For better evaluation of the cause of dysrhythmia, electrophysiological study(EPS) was performed and the result was: a multi focal atrial tachycardia, most probably originating from left atrial appendage and medical therapy and follow up was recommended.

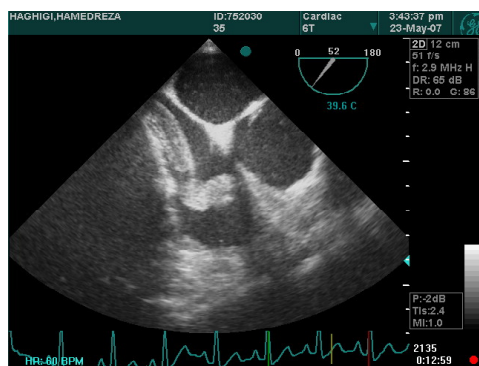
After EPS, about 24 hours later, echocardiography was performed and showed a worm like long, hyper mobile

mass/ clot in inferior vena cava (IVC) and right atrium (RA), which was prolapsing into the right ventricle (fig 1-A&B and video of TEE evaluation) (other findings were unremarkable).

After mid sternotomy and routine canulation, cardio pulmonary bypass started and cooling performed till the core temperature reached to 25 degree centigrade. Then with total circulatory arrest (with duration of 6 min) the RA opened and a long organized clot (about 35 cm long) was removed (Fig 2) which was extended from RA into the IVC . Post op course was satisfactory and control echocardiography was unremarkable.



A



B

**Figure 1-A & B:** TEE showed a long prolapsing clot from IVC into the heart



**Discussion:**

Overall, right heart thrombosis (R.H.T) is an uncommon condition and usually is associated with pulmonary embolism (1-5).

Free floating clot in right heart is a rare event, especially when the pulmonary embolism has not developed at the time of the diagnosis. When pulmonary embolism occurs,, mortality rate is high (40%) (6,7).

The development of RHT is an emergency condition and there are some (see below) options for management of them. Free clots can be embolized at any moment and thus require emergency treatment.



**Figure 2:** a long free clot removed surgically from the inferior vena cava via right atriotomy

The first step in the management of a clot in the right heart is the diagnosis, which is usually performed by trans thoracic echocardiography (TTE) or trans esophageal echocardiography (TEE).

The most important point in this presented case is incidental finding of the clot after EPS study.

We can conclude that after any incidental intervention, especially via the right heart, it is advisable to perform a control echocardiography.

Sometimes the differential diagnosis of a free RHT may be difficult (8). Other diagnoses, for instance: congenital structures such as chiari network, persistent Eustachian or tebesian valves or atrial septal aneurysm or acquired conditions such as intra cardiac tumors or devices and vegetations need to be considered. An IVC (inferior vena cava) clot may be due to tumors of ovary, pelvic organs,

kidney and breast or may be due to emboli from lower extremities.

With any suspicion, TTE or TEE for diagnosis and investigations for the source of the thrombus should be performed. But the diagnosis of the source of the thrombus, doesn't modify the therapeutic strategy for this emergency condition, and so, additional investigations may be postponed (8).

Four options have been discussed for management of RHT (8):

- 1- surgical embolectomy during cardiopulmonary bypass (CPB)
- 2- intravenous thrombolysis with recombinant tissue plasminogen activator (rTPA).
- 3- Intravenous heparin, alone.
- 4- Interventional techniques.

The intravenous procedures has been used when surgery and thrombolysis are initially contra indicated (8). Intravenous heparin is not a thrombolytic agent and is only anti thrombotic agent, so in this emergency condition it seems not to be an optimal management.

The most challenging options in this condition are immediate surgery versus thrombolysis. Thrombolytic therapy has numerous theoretical advantages (9,10). It accelerates thrombus lysis and pulmonary reperfusion and reduces pulmonary hypertension in the cases of pulmonary embolism (PE), and associated free RHT. Moreover, thrombolysis may dissolve the clot in 3 locations at the same time: Intra cardiac thrombus, pulmonary embolus and venous thrombus, and so it may improve survival (8). But thrombolytic therapy has some disadvantages: incomplete dissolution of the clot may embolize fragments into the pulmonary artery. The patients are usually unstable and worsening of their hemodynamic status may be possible,. However, there are 3 lytic drugs which have been approved by FDA in the case of PE (Urokinase, Streptokinase and rTPA), but only rTPA allows faster hemodynamic improvement (10) and does not contraindicate surgical embolectomy, when hemodynamic status continues to worsen (because of its fibrin specificity and its short half life). Unfortunately, rTPA is not available in some institutes and it is more expensive than other agents.

Surgical embolectomy with exploration of right chambers under CPB is the classic treatment(3). In rare cases of free floating clot in right heart without any evidence of PE, it seems to be better to remove the clot surgically because

of the high possibility of embolization of the fragments during thrombolytic therapy.

#### **4. Conclusion:**

Right heart free floating clot is a rare condition which is a true emergency situation because of the high possibility of PE.

Echocardiography is the most helpful screening test for this condition, especially after invasive procedures in right side of the heart.

After the diagnosis of a free clot in the heart without any evidence of PE, the best treatment may be surgical removal of the clot.

Other modalities such as catheter device removal, may be attractive alternatives in patients with contraindications to thrombolysis and surgery.

#### **References**

1. Francesco Greco, Giovanni Bisignani, Oscar Serafini, Domenico Guzzo, Angela Stingone, Franco Plastina. Successful treatment of right heart thromboemboli with IV plasminogen activator during continuous echocardiographic monitoring. *Chest* 1999,116:78-82.
2. Kasper W, Meinertz T, Henkel B, et al. echocardiographic findings in patients with proved pulmonary embolism. *Am heart J* 1986; 54:1284-1290.
3. Chapoutot L, Nazeyrollas P, Metz D, et al. floating right heart thrombi and pulmonary embolism: diagnosis and therapeutic management. *Cardiology* 1996,87:169-174.
4. Casazza F, Bongarzone A, Centoze F, et al. Prevalence and prognostic significance of right sided cardiac mobile thrombi in acute pulmonary embolism. *Am J Cardiol* 1997,79:44-46.
5. Franzoni P, Cuccia C, Zapa C, et al. thromboemboli migrante nelle cavita cardiache destre in corso di embolia pulmonare. *G Ital Cardiol* 1989,19:7-16.
6. Torbicki A. the RAMT Outcome Registry Contributors. Therapeutic preference and outcome of various treatment of venous clots trapped in the right atrium: preliminary results of a European registry. *Eur Heart J* 1996; 17 (suppl), 244.
7. Farfel Z, Shechter M, Vered Z, et al. review of echocardiographically diagnosed right heart entrapment of pulmonary emboli-in-transit with emphasis on management. *Am heart J* 1987,133:171-178.
8. Ludvic Chartier, Jerome Bera, Mazence Delomez, Philippe Asseman, Jean-Paul Beregi, Jean-Jacques Bauchart, henri Warembourg, Claud They. Free floating thrombi in the right heart: Diagnosis, management and prognostic indexes in 38 consecutive patients. *Circulation* 1999,99:2779-2783.
9. Levine MN. Thrombolytic therapy in acute pulmonary embolism. *Can J Cardiol* 1993, 92:882-888.
10. Goldhaber SZ. Thrombolysis for pulmonary embolism. *Prog Cardiovascular Dis* 1991,34:113-134.