IMPENDING PARADOXICAL EMBOLISM IN
A PATIENT WITH PULMONARY EMBOLISM
(THROMBUS ENTRAPPED WITHIN A PFO)

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Female patient 36 years old, single, Obese, no previous history of medical problems, Presented to with shortness of breath

Conscious oriented
C/P  BP 100/60, pulse rate 110b/m, SPO₂ 95% room air
CT chest showed pulmonary embolus in main pulmonary artery branches,

Doppler study revealed deep venous thrombosis in right femoral vein.

Transthoracic echocardiography
Transesophageal echocardiography
TEE, extension in left side
3D echo from Rt atrial side
Dilated RV severely impaired RV function, dilated RA and pulmonary arteries, thrombus seen in both atria

Biatrial thrombus snake like extending from RA across a PFO straddling atrial septum, with large extension into LA, mobile dropping into left ventricle during diastole
IV heparin infusion started immediately
Heart team discussed thoroughly thrombolytic therapy versus surgical embolectomy, and clinical condition explained to the patient and the family
Thrombolytic therapy given, tPA 100mg IV infusion over two hours.

No major complication, apart from cutaneous hematoma, that resolved within few days (from previous attempt of venous insertion).
After thrombolytic therapy
TTE 45 days later
Follow up echocardiography, disappearance of most of thrombus, apart from small residuals in right atrial appendage and right pulmonary artery, with partial recovery of right ventricular function

Follow up after 45 days, TTE showed complete recovery of RV function
PFO with a massive PE increases the risk of death (RR 2.4), ischemic stroke (RR 5.9), peripheral arterial embolism (RR 15), and a complicated hospital course (RR 5.2).
Patients with a PFO and PE are more likely to have a paradoxical embolism and increased risk of silent brain infarct (33%) compared with those without a PFO (2%).

Screening PE patients for PFO (a bubble study) increases the detection of impending paradoxical embolism (ie, bialtrial thrombus entrapped within a PFO)
For those patients, aggressive therapeutic options, e.g. catheter-based techniques, surgical embolectomy (particularly if intracardiac thrombus is identified), and antithrombotic therapy.

Optimal treatment for patients with impending paradoxical embolism remains unclear

Surgical thrombectomy may result in the lowest rate of stroke

Thrombolysis may be associated with the highest mortality compared with surgery or medical treatment with heparin
In 2008, Fauveau E conducted a PubMed search for articles published between 1985, when the first TSFO was reported, and 2007 (93 cases) comparing medical vs surgical treatment:


Thrombectomy most frequently chosen treatment in the published literature and justified in the prevention of paradoxical embolism

Heparin used as a second option in patients with frequent comorbidities and strokes

Thrombolysis reserved for patients with an unstable status, who cannot wait for Surgery, and linked to the highest mortality, explained by the severity of the patient’s initial presentation.


IN 2010 Myers et al, studied 154 cases,

Thirty-day mortality was 18.4%

Surgical thromboembolectomy had a nonsignificant improved survival & significant reduced systemic embolism, compared with anticoagulation.

Thrombolysis, on the other hand, had the opposite effect, although not significant.
Recommendations on PFO in the Face of a PE

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1. For patients with massive or submassive PE, screening for PFO with an echocardiogram with agitated saline bubble study or transcranial Doppler study for risk stratification may be considered (Class IIb; C).
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2. For patients with any type of PE found to have impending paradoxical embolism (thrombus entrapped within a PFO), surgical embolectomy may be considered (*Class IIb; C*).

Important questions remain currently unanswered

1. **How** PFO presence should change management of DVT and PE,

2. **When** to consider PFO closure in pts with concomitant paradoxical embolism & PE

3. **How** to stage the timing of IVC filter placement and PFO closure in patients with paradoxical embolism and PE.
THANK YOU