

Thrombus entrapped in a patent foramen ovale

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Abstract

Background. Patent foramen ovals are very common in the population. Thrombus entrapped in a patent foramen ovale is very rare and can cause paradoxical embolism with a high mortality rate. We present the case of a patient diagnosed with a massive pulmonary embolism and a huge thrombus stuck over the interatrial septum.

Case presentation. An 83-year-old female patient was admitted to our Coronary care unit with the diagnosis of massive pulmonary embolism confirmed by contrast-enhanced chest CT scan. At admission, the patient complained of chest pain and shortness of breath for the last 24 hours. Transthoracic echocardiography (TTE) showed the presence of a thrombus entrapped in a patent foramen ovale and floating in both atria. Transesophageal echocardiography was done as well to confirm the diagnosis. Deep vein thrombosis was diagnosed by duplex ultrasonography. After discussing the risks and benefits of surgical versus medical treatment, the patient was treated with unfractionated heparin during hospitalization and rivaroxaban on discharge. Seven days later, follow-up TTE showed no clot in the heart.

Conclusion. Although rare, the thrombus stuck in patent foramen ovale presents a clinical emergency so early diagnosis and treatment is mandatory.

Key-words

patent foramen ovale, thrombus, pulmonary embolism

Case presentation

We present the case of a patient diagnosed with massive pulmonary embolism and huge thrombus stuck over the interatrial septum. A 83-year old female patient was admitted to our Coronary care unit with the diagnosis of massive pulmonary embolism confirmed by contrast-enhanced chest CT scan (**Figure 1**). At admission the patient complained of chest pain and shortness of breath for last 24 hours. She also complained of syncope on the day of admission to the hospital. Her medical history revealed the diagnosis of arterial hypertension. Physical findings on admission were tachycardia, dyspnea with blood oxygen saturation level of 85%, accentuated second heart sound on heart auscultation and blood pressure of 130/75mmHg. ECG showed sinus tachycardia with negative T waves in precordial leads. Transthoracic echocardiography (TTE) showed the presence of a thrombus entrapped in a patent foramen ovale and floating in both atria (**Figure 2**). Also TTE found right ventricular enlargement and hypokinesis of the free wall with estimated right ventricular systolic pressure of 100mmHg. To confirm diagnosis transesophageal echocardiography was done as well (**Figure 3**) and revealed huge thrombus entrapped in a patent foramen ovale. Deep vein thrombosis was diagnosed by duplex ultrasonography. After a discussion of the risks and benefits of surgical versus medical treatment, the patient was treat-



Figure 1. CT pulmonary angiography showing the presence of the emboli in both the left and right main pulmonary arteries



Figure 2. TTE showing the presence of the emboli entrapped in a patent foramen ovale and floating in both atria



Figure 3. TEE showing huge thrombus entrapped in a patent foramen ovale

ed with unfractionated heparin administered by continuous infusion adjusted to achieve activated partial thromboplastin time (APTT) greater than 1.5. Seven days later, follow-up TTE did not show any clot in the heart and significantly reduced right ventricular systolic pressure of 55mmHg on discharge. Oral anticoagulation with rivaroxaban was started on the seventh day.

Discussion

The fossa ovalis is an oval depression located in the lower part of the interatrial septum, above and to the left of the inferior vena cava. The fossa ovalis is analogous to the foramen ovale of the fetus through which blood passes from the right atrium to the left during intrauterine development. After birth, due to the increased blood flow to the left atrium, the pressure in it increases, which causes the foramen ovale to close functionally and then anatomically.

Patent foramen ovale is very common in the population. The prevalence of PFO in the general population is thought to be about 25-34%¹. If there is a transient increase in pressure in the right atrium so that it exceeds the pressure in the left atrium (e.g. during coughing or Valsalva maneuver) or if the pressure in the right atrium chronically overcomes the pressure in the left (due to pulmonary embolism or lung disease), then right-to-left passage of blood or thrombus through the interatrial septum can occur with consequent systemic embolization. Thrombus entrapped in a patent foramen ovale is very rare and can cause paradoxical embolism with high mor-

tality rate. Data from the literature reveal that the mortality rate associated with a paradoxical embolism secondary to a thrombus-in-transit was 18% and 66% of patients died within 24 hours². Considering the high mortality of a thrombus-in-transit, early diagnosis and treatment is mandatory. Transthoracic and transesophageal echocardiography should be done to identify the location and size of thrombus.

Possible treatment strategy includes embolectomy, thrombolysis, or anticoagulation but the best management is still controversial. However, there is high risk of either fragmentation or complete embolization in patients with a large thrombus-in-transit within a PFO when anticoagulation and thrombolysis are treatment of choice^{3,4}. Rose et al. reviewed 177 cases of right heart thromboembolism and pulmonary thromboembolism during a 34-year period and showed that thrombolytic therapy was associated with an improved survival rate when compared either to anticoagulation therapy or surgery⁵.

Conclusion

Our patient was hemodynamically stable and she was 83 years old. The patient's PE showed extensive bilateral involvement and deep vein thrombosis was diagnosed by duplex ultrasonography. Therefore, we chose anticoagulation treatment and the patient achieved a good effect with no thrombus in PFO at discharge. The treatment of our patient achieved great result but it may not be applicable to every patient.

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Sažetak

Zaglavljen tromb u foramen ovale – prikaz slučaja

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Uvod. Otvoreni foramen ovale je veoma čest u populaciji. Tromb zarobljen u otvorenom foramenu ovale je veoma redak i može izazvati paradoksalnu emboliju sa visokom stopom mortaliteta. Predstavljamo pacijenta sa dijagnozom masivne plućne embolije i ogromnog tromba zaglavljeno u interatrijalnom septumu.

Prikaz slučaja. Pacijentkinja stara 83 godine primljena je u našu koronarnu jedinicu sa dijagnozom masivne plućne embolije koja je potvrđena CT skenerom grudnog koša sa kontrastom. Prilikom prijema, pacijent se žalio na bol u grudima i otežano disanje u poslednja 24 sata. Transtorakalna ehokardiografija (TTE) je pokazala prisustvo tromba zaglavljeno u otvorenom foramenu ovale plutajućim u obe pretkomora. Za potvrdu dijagnoze urađena je i transezofagealna ehokardiografija. Duboka venska tromboza je dijagnostikovana dupleks ultrasonografijom. Nakon diskusije o rizicima i prednostima hirurškog u odnosu na medicinski tretman, pacijent je lečen nefrakcionisanim heparinom tokom hospitalizacije i rivaroksabanom po otpuštanju. Sedam dana kasnije, kontrolni TTE nije pokazao ugrušak u srcu.

Zaključak. Iako retko, tromb zaglavljen u otvorenom foramenu ovale predstavlja hitnu kliničku situaciju, tako da su rana dijagnostika i pravovremeno lečenje obavezni.

Ključne reči: patent foramen ovale, tromb, plućna embolija