

Is Routine Echocardiographic Examination Necessary for All Deep Venous Thrombosis? For a Recurrent Paradoxical Embolism Case

Her Derin Ven Trombozunda Rutin
Ekokardiyografik İnceleme Gerekli midir?
Bir Tekrarlayan Paradoks Emboli Vakası Nedeniyle

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ABSTRACT Although patent foramen ovale (PFO) is always considered as a benign embryonic defect, especially in patients with deep venous thrombus (DVT), it may lead to catastrophic results with its complications. In order to prevent dramatic consequences in patients with DVT or thrombus in inferior vena cava, cardiac investigation of these patients may be useful for diagnosing this clinical entity that gives late symptoms. A 43-year old female patient with chronic DVT and previous pulmonary emboli for two times hospitalized to implant vena cava filter. During hospital stay, one cerebral embolism and one coronary embolism attack observed, therefore an echocardiographic investigation was performed eventually PFO diagnosed. The aim of this article is to remind paradoxical embolism-an almost forgotten entity- with a recent case. We also want to emphasize that echocardiography may be useful to investigate the presence of right-to-left shunt in patients with DVT.

Key Words: Foramen ovale, patent; venous thrombosis; embolism, paradoxical

ÖZET Patent Foramen Ovale (PFO) benign bir embriyolojik defekt olarak düşünülmesine rağmen, özellikle derin ven trombozu (DVT) olan hastalarda komplikasyonları nedeniyle katastrofik sonuçlara yol açabilir. DVT'lu yada vena kava inferiorunda trombusu olan hastalarda dramatik sonuçları önlemek amacıyla bu hastaların kardiyak yönden araştırılması, bu klinik durumun semptomları ortaya çıkmadan tanınmasına yardımcı olabilir. İki kez pulmoner emboli geçirme öyküsü ve kronik DVT'lu olan 43 yaşındaki kadın hasta vena kava filtresi yerleştirmek amacıyla hospitalize edildi. Hastanede kaldığı süre zarfında bir kez koroner embolizm ve bir kez de serebral embolizm atağı geçirdi ve bu sebeple yapılan ekokardiyografik incelemesinde PFO tespit edildi. Bu yazının amacı, unutulmaya yüz tutmuş paradoks embolizmi, yakında ortaya çıkan bu vaka nedeniyle hatırlatmaktır. Aynı zamanda, DVT'lu hastalarda ekokardiyografik incelemenin, sağdan sola geçişin varlığını araştırmak amacıyla yapılmasının yararlı olacağı kanaatindeyiz.

Anahtar Kelimeler: Oval foramen, kalıcı; venöz tromboz; embolizm, paradoksik

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Even if we are aware of the complications and risk factors for deep venous thrombosis; incidence is still high. Paradoxical Embolism is rare than 10%, that originate from the lower extremity deep venous system. At the same instance, high prevalence of PFO among the young patients who had a stroke is showing us the importance of paradoxical embolism.¹ At the article of Lausanne et al., paradoxical embolism is announced for the origin of the strokes at younger age patients with an incidence of 3.8%.² Low incidence rates are consolation however, prognosis for these patients are catastrophic. Today, deep venous thrombosis and thromboem-

bolism are well-defined disorders with risk factors and treatment options. Combination of DVT and PFO may lead to serious clinical conditions with fatal outcomes.

CASE REPORT

43 years old, female patient who had former pulmonary embolism disease for twice, hospitalized with chronic deep venous thrombosis that was including IVC also. We planned to perform a cavagrapy and insert a V.C. Filter to her at the same session. To prepare her for this procedure, we stopped warfarin treatment and began to give her light molecular weighted heparin. On the third day of her medical treatment, while she defecated; she became unconscious and lost her motor functions suddenly. Then we transferred her to our ICU. On our first examination, we found out that she had motor aphasia, right hemiplegia and somnolence. By the following days, on her brain CT we discovered infarcts and after the anti-edema therapy she was completely conscious. We couldn't find any clues for the origin of her stroke with the Carotid Duplex-USG. At her Transthoracic Echocardiography (TTE), there were some images that made us suspicious about the existence of PFO (Figure 1). After the Transesophageal Echocardiography (TEE), diagnosis of PFO was confirmed (Figure 2). We assembled the medical treatment (warfarine) and sent her to a physical therapy unit for the hemiplegia rehabilitation. We also warned her about the possibility of recurrent embolism according to the PFO.

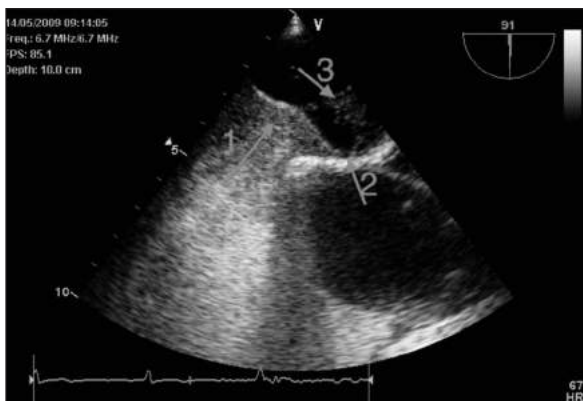


FIGURE 1: 1) The bulged septum after the Valsalva maneuver; 2) PFO; 3) Opaque in the left atrium.



FIGURE 2: The transition channel.

We advised her to avoid herself from the provocative maneuvers that could increase the venous pressure, just like carrying heavy objects, coughing, constipation etc. At this physical therapy clinic, they also succeeded to implant her V.C. Filter.

Two months after she was discharged from the hospital, she applied to our emergency room with a chest pain. On her blood test, high troponin levels detected. Therefore, she began to be followed by the acute coronary syndrome diagnosis. We avoided performing a coronary angiography because of her stable hemodynamic and high INR levels.

At the clinical controls, we discovered some ischemic ST-T abnormalities. By the TTE, we found out normal left ventricular functions, eccentric mitral valve efficiency and pulmonary artery pressure <30 mmHg. She was discharged after medical treatment for one week. On her first, third and sixth month follow-ups, she had no such problems.

DISCUSSION

Paradoxical embolism is the obstruction of a systemic artery by an embolus that can occur in the venous system and reaches the arterial system through a septal defect or an open foramen of the heart. According to the literatures, there are four different criteria for the certain diagnosis of the paradoxical embolism: The absence of cardiac or proximal arterial embolism source, abnormal shunts between left and right circulations, verification of venous thrombosis or pulmonary embolism, pressure gradient between left and right atrium.³

In 1934, Homans described the relationship between deep vein thrombosis (DVT) and pulmonary embolism (PE). Since then, thromboembolism has been well recognized as a major public health problem in the West. A study performed in the United Kingdom found that 0.9% of all patients admitted to hospital had fatal pulmonary embolism. The prevalence of DVT in surgical patients is 10% to 80%, depending on the type of surgery and individual patient risk factors.⁴

The most common reason of paradoxical embolism is PFO.⁵ Normally right atrium pressures are higher than left atrium pressures. Also valve mechanisms prevent right to left shunt and PFO is closed by this mechanism. Most of the patient with PFO can not be symptomatic for a lifetime. However, increased right circulation pressure can cause paradoxical embolism by opening the PFO (Pulmonary Pressure ≥ 30 mmHg).⁶ This augmentation can be permanent or temporary. For our patient this augmentation at right circulation pressure was temporary. We could not determine raised right circulation pressures at her follow-up TTE's. TEE can be more helpful in estimating the likelihood of PFO. Cardiac right-to-left shunts can also be identified by Transcranial Doppler Ultrasound with the use of saline or galactose based contrast agents and provocation methods. By using this procedure, we can establish the appearance of contrast bubbles in the middle cerebral artery. It's 90% sensitive and specific procedure. However, it's insufficient for diagnosing the exact localization of right-to-left shunt.

Long term anti-coagulant medication is the gold standard for the treatment and also patients have to use this therapy as long as they have same risks for paradoxical embolus.⁷ If the patient diagnosed as deep venous thrombosis, implanting VC filters in addition to the anti-coagulation therapy have the less recurrence incidence.

Patients could be informed about avoiding maneuvers that could raise right heart pressures. There is no certain necessary of repairing PFO after paradoxical embolism if we're suspicious about raised right atrium pressure and right-left shunt might be temporary.^{6,7} In some cases, although a thrombus entrapped in a PFO was shown, in our cases we did not show a thrombus in the right atrium.^{8,9}

Deep vein thrombosis is well known as easy treatable disease by medical doctors. Pulmonary embolism is also considered for complications. On the other hand, doctors might miss the diagnosis of paradoxical embolism as a complication. Under a suspicious perspective, patients must be assessed for an intracardiac right-left shunt during provocative maneuvers with the use of TTE or contrast TEE.

CONCLUSION

By announcing this specific case report, we aimed to remind paradoxical embolism once more. As a conclusion, we should examine our patients with deep venous thrombosis specifically for cardiac pathologies like PFO. Because of its catastrophic results for the patients, we could not take the risk of missing a paradoxical embolism case.

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