Journal of the Saudi Heart Association

Volume 32 | Issue 1 Article 22

2020

Thrombus in transit through a patent foramen ovale, an unusual cause of cardiac embolism

Recommended Citation

Minguito-Carazo, Carlos; Benito-Gonzalez, Tomas; Echarte-Morales, Julio C.; Rodríguez-Santamarta, Miguel; Castano-Ruiz, Mario; and Fernandez-Vazquez, Felipe (2020) "Thrombus in transit through a patent foramen ovale, an unusual cause of cardiac embolism," *Journal of the Saudi Heart Association*: Vol. 32 : Iss. 1 , Article 22.
Available at: https://doi.org/10.37616/2212-5043.1021

CASE REPORT

Thrombus in transit through a patent foramen ovale: An unusual cause of cardiac embolism

Carlos Minguito-Carazo [a,*], Tomás Benito-González [a], Julio Cesar Echarte-Morales [a], Miguel Rodríguez-Santamarta [a], Mario Castaño-Ruiz [b], Felipe Fernández-Vázquez [a]

[a] Department of Cardiology, University Hospital of Leon, Leon, Spain
[b] Department of Cardiac Surgery, University Hospital of Leon, Leon, Spain

Abstract

A 78-year-old woman with a history of transient ischemic attack was admitted for sudden aphasia. In order to assess the potential cardioembolic source an echocardiogram was performed, which revealed a large mass consistent with a thrombus in transit through a patent foramen ovale. Because of the high risk of systemic embolism, emergent surgical thrombectomy was performed with the intention to discharge the patient safely without any new embolic events. This case report highlights the importance of echocardiography in the evaluation of cardioembolic stroke and the requirement of an emergent approach in case of impending paradoxical embolism.

Keywords: Echocardiography, Patent foramen ovale, Thromboembolism

1. Introduction

A thrombus in transit through a patent foramen ovale (PFO) with impending paradoxical embolism (IPE) is an extremely rare event with very few cases reported in the literature. Because of the high risk of pulmonary and systemic embolism, it requires an emergent approach including medical treatment with oral or intravenous anticoagulation, thrombolysis, or surgical thrombectomy. Nevertheless, the optimal management remains unknown because of its rarity.

2. Case report

A 78-year-old women with a history of hypertension was referred to the emergency department for sudden aphasia. She had suffered a transient ischemic attack approximately 1 year before, with no evidence of atrial fibrillation or other cardioembolic arrhythmia during monitoring and with complete posterior neurological recovery. At presentation, her initial heart rate was 83 bpm, blood pressure was 147/95 mmHg, and O_2 saturation was 96%. Symptoms started 7 hours before admission and the first neurological examination revealed dysarthria with no other motor or sensitive disorder. Physical examination revealed the presence of signs of chronic venous insufficiency without clinical evidence of lower extremity deep vein thrombosis.

The electrocardiogram showed sinus rhythm. A cranial computed tomography was performed (Fig. 1A), and no acute hemorrhagic lesions were found; therefore, the patient was admitted to the neurology department with the diagnosis of ischemic stroke. Subsequently, a cranial magnetic resonance imaging was performed, which demonstrated multiple punctate foci in both hemispheres, suggesting embolism from a proximal source (Fig. 1B). During admission, she remained in sinus rhythm and a transthoracic echocardiogram (TTE)

Received 15 November 2019; revised 29 November 2019; accepted 2 December 2019.
Available online 17 April 2020

* Corresponding author at: Department of Cardiology, Altos de Nava Street, SN, University Hospital of Leon, 24080 Leon, Spain.
E-mail address: carlosminguito@hotmail.es (C. Minguito-Carazo).

https://doi.org/10.37616/2212-5043.1021

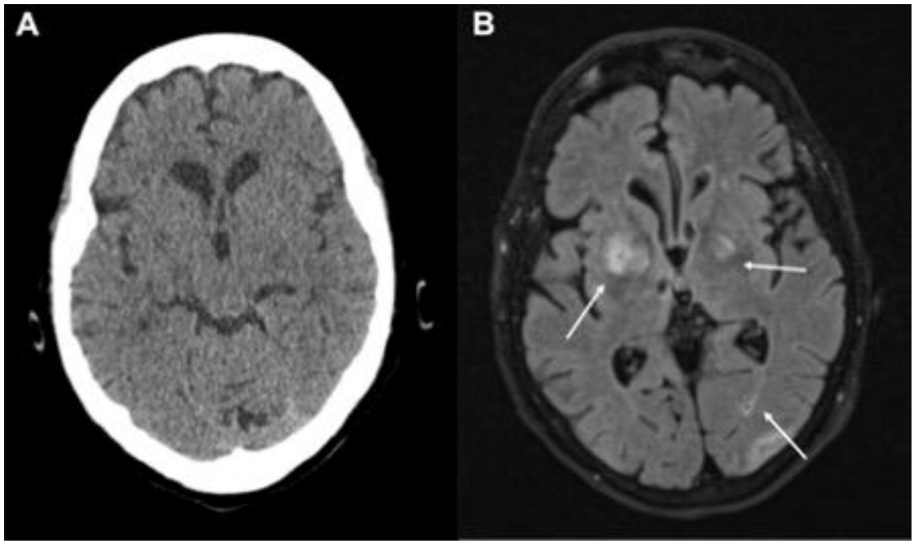

Fig. 1. (A) Cranial computed tomography at presentation and (B) cranial magnetic resonance after 5 days since admission. No acute hemorrhagic lesions were observed (A). Multiple punctate foci in both hemispheres (white arrows) suggest embolism from a proximal source (B).

was requested to identify the potential cardioembolic source that could have caused the symptoms. TTE showed normal left and right ventricular systolic function without significant valve disease. However, a large serpiginous structure in the right atrium extending to the left atrium and passing through mitral valve was observed (Fig. 2), which was moving along the left ventricular outflow tract during systole and through the mitral annulus in diastole. The study was completed with a transesophageal echocardiogram (TEE) that showed a large mass consistent with thrombus coming from the inferior vena cava and passing through a PFO to the left atrium and the left ventricle (Fig. 3). Because of the high suspicion of a thrombus in transit through a PFO associated with paradoxical embolism and the extreme risk of recurrent systemic and pulmonary embolism, the patient was taken urgently to the operating room, and cardiac thrombectomy with closure of the PFO was performed without complications (Fig. 4).

Finally, a color doppler ultrasound of lower extremities was performed, revealing signs of deep vein thrombosis in the left femoral vein, which is the most probable source of the migrated thrombus. After 15 days of hospitalization she was discharged safely and started long-term treatment with acenocoumarol. To the best of our knowledge, at the time of this writing, the patient has not suffered any embolic events and is still alive.

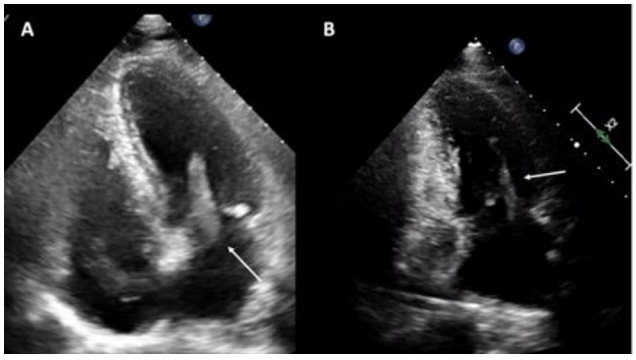

Fig. 2. Transthoracic echocardiogram: (A) four-chamber view and (B) two-chamber view (B). Large serpiginous structure in the right atrium extending to the left atrium and passing through the mitral valve (white arrows).

3. Discussion

Despite the reported prevalence of PFO of approximately 26% in the general population, the presence of a migrated thrombus in transit across it, also called IPE, is an extremely rare event with a diverse clinical presentation which varies from being asymptomatic to massive pulmonary or systemic thromboembolism [1,2]. Since the first case diagnosed by TTE and confirmed by surgery was reported in 1985 [3], there had been few more cases published in the literature and little is known about the optimal therapeutic approach. Nevertheless, it is important to highlight that it commonly presents as an emergent situation and has a high overall mortality rate. The most exhaustive systematic review included 174 cases of confirmed IPE (Impending Paradoxical Embolism) from 1964 to 2008 and

Journal of the Saudi Heart Association
2020;32:118–122

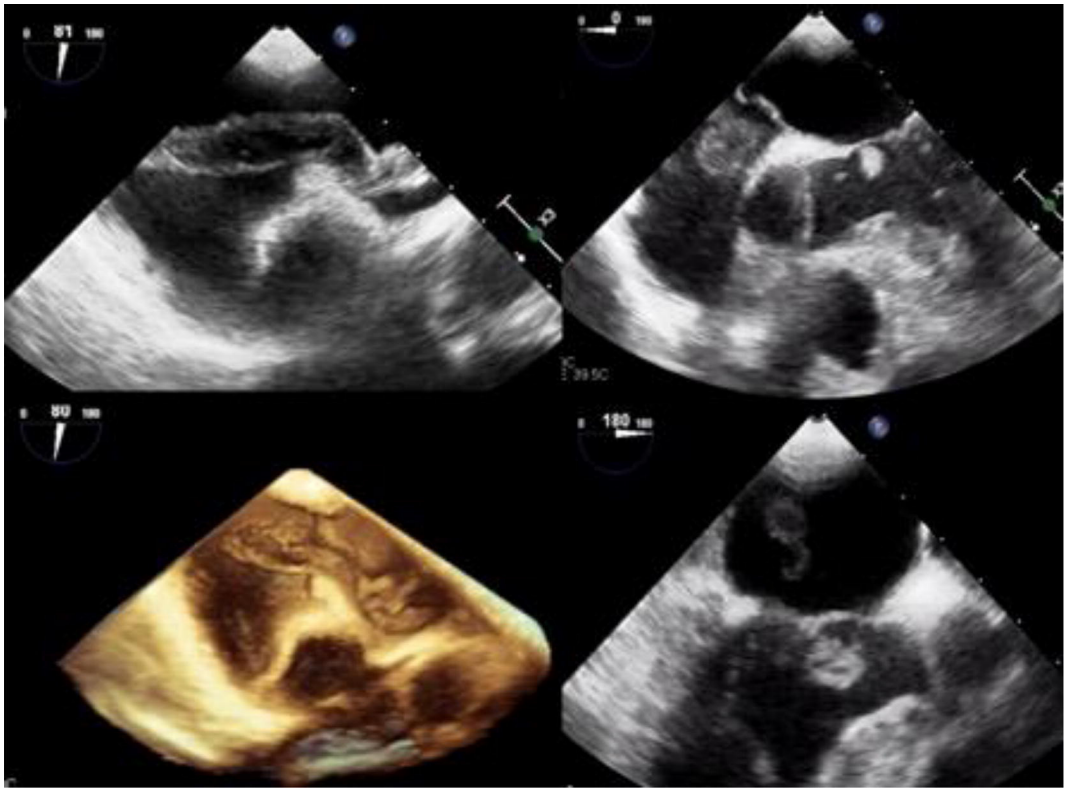

Fig. 3. Transesophageal echocardiography (TEE) and 3D-TEE. A large mass consistent with thrombus coming from the inferior vena cava and passing through a patent foramen ovale to the left atrium and left ventricle.

reported a 30-day mortality of 18.4% with two-thirds of the deaths occurring within the first 24 hours after diagnosis [4]. In this study, pulmonary embolism was the most common form of presentation; however, half of the patients suffered a systemic embolism as well.

Because of its clinical presentation, IPD is likely to be underdiagnosed. Patients with systemic embolism, especially elderly with a cerebrovascular accident, are not routinely studied, assuming a thrombosis or embolism associated with large vessel atherosclerosis. Nevertheless, cardioembolic stroke accounts for 15–30% of ischemic strokes and is more disabling than those with a no-embolic mechanism [5]. In this regard, both TTE and TEE play a central role in the detection of cardioembolic sources for stroke. TEE is the gold standard for the diagnosis of a PFO because of its accuracy and it provides quality images for cardiologists and surgeons in case of IPE [6]. However, cases of IPE diagnosed by computer tomography have also been reported in the literature [7].

Although an emergent approach is needed since diagnosis, the optimal management remains unclear. Surgical embolectomy has been proposed as the treatment of choice, as it seems to be associated with lower systemic embolism, although it does not reduce mortality significantly compared with thrombolysis or anticoagulation [4,8]. By contrast, thrombolysis could be the best option in hemodynamically unstable patients with massive acute pulmonary embolism, and a conservative approach with oral anticoagulation would be preferred in patients at an unacceptable surgical risk.

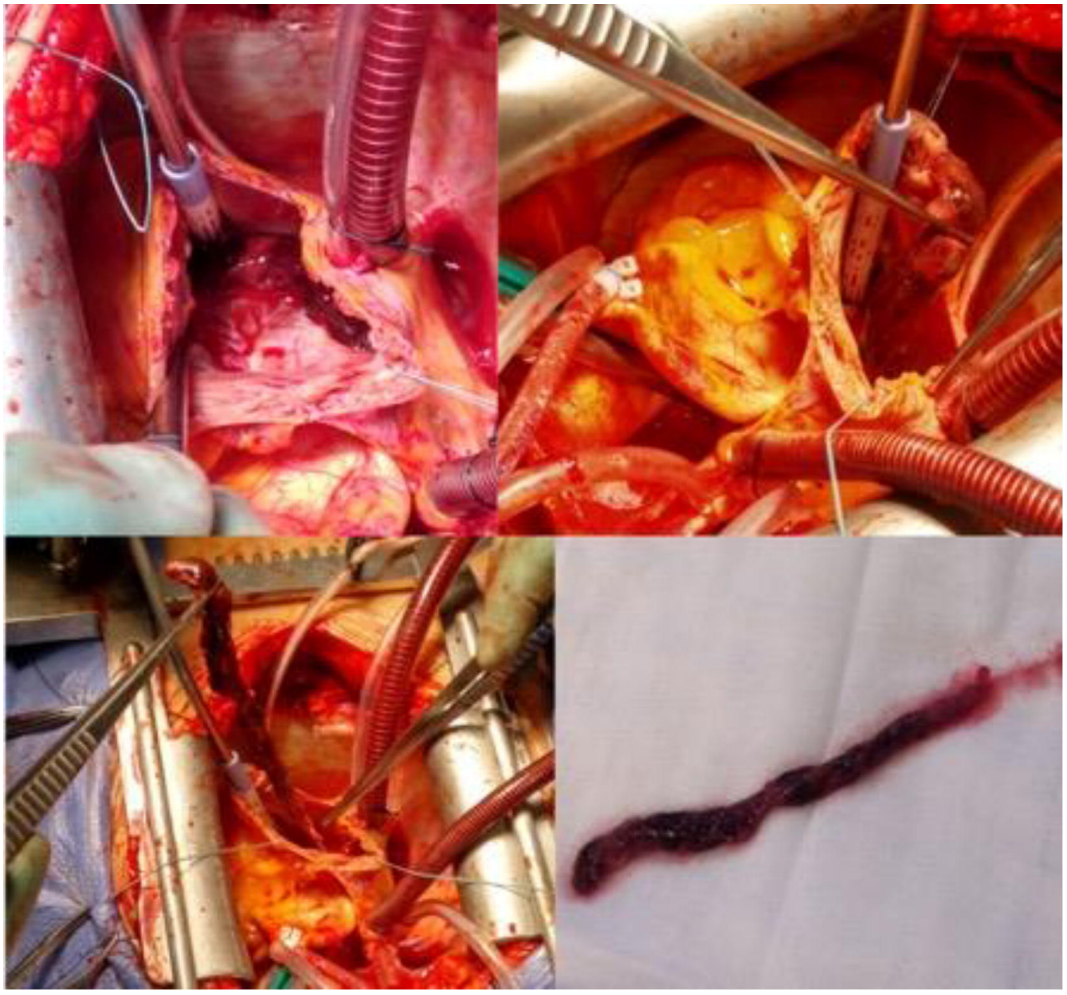

Fig. 4. Emergent surgical procedure. Surgical cardiac thrombectomy with closure of the patent foramen ovale was performed without complications.

4. Conclusion

This case report highlights the importance of the echocardiogram, both TTE and TEE, in the study of a potentially cardioembolic source and in the identification of interatrial defects that could explain a paradoxical embolism. Furthermore, an IPE is an extremely rare situation with a wide clinical expression that requires an emergent approach because of its high mortality.

Conflicts of interest

The authors declare no conflicts of interest.

Acknowledgments

The authors acknowledge the whole Department of Cardiac Surgery and the section of Cardiac Image of the Department of Cardiology of the Hospital of Leon for their help with the acquisition of the images presented in this case report. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. The authors confirm that written consent for submission and publication of this report including images and associated text has been obtained from the patient in line with COPE (Comitte on Publication Ethics) guidelines.

References

[1] Meier B, Lock JE. Contemporary management of patent foramen ovale. Circulation 2003;107:5–9.
[2] Nam SB, Kim CM, Cho S-A, Chung S, Shim YH. Thrombus entrapped by patent foramen ovale in a patient with pulmonary embolism: a case report. Korean J Anesthesiol 2015;68:70–3.
[3] Nellessen U, Daniel WG, Matheis G, Oelert H, Depping K, Lichtlen PR. Impending paradoxical embolism from atrial thrombus: correct diagnosis by transesophageal

Journal of the Saudi Heart Association
2020;32:118–122

echocardiography and prevention by surgery. J Am Coll Cardiol 1985;5:1002–4.
[4] Myers PO, Bounameaux H, Panos A, Lerch R, Kalangos A. Impending paradoxical embolism. Chest 2010;137:164–70.
[5] Ferro JM. Cardioembolic stroke: an update. Lancet Neurol 2003;2:177–88.
[6] Nakanishi K, Homma S. Role of echocardiography in patients with stroke. J Cardiol 2016;68:91–9.
[7] Villanueva Campos AM, Delgado Sánchez-Gracián C, Utrera Pérez E. Imminent paradoxical embolism diagnosed by computed tomography. Rev Española Cardiol (English Ed) 2017;70:664.
[8] Faustino A, Costa G, Providência R, Paiva L. Impending paradoxical embolism with a thrombus crossing a patent foramen ovale. BMJ Case Rep 2012;2012. bcr2012006662.