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INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/18796

DOI URL: <http://dx.doi.org/10.21474/IJAR01/18796>



RESEARCH ARTICLE

MYOCARDIAL INFARCTION SECONDARY TO PARADOXICAL EMBOLISM THROUGH PATENT FORAMEN OVALE : SURGICAL MANAGEMENT

Reda Mounir, Houda Mokhlis, Fouad Nya, Aniss Seghrouchni, Ayoub Dahioui, Nouredine Atmani, Abdessamad Abdou and Youness Moutakiallah

Manuscript Info

Manuscript History

Received: 28 March 2024

Final Accepted: 30 April 2024

Published: May 2024

Abstract

Patent foramen ovale (PFO) is most often asymptomatic, but it can cause manifestations with varying degrees of severity. Paradoxical embolism, a condition associated with PFO, requires multidisciplinary management. Acute coronary syndrome (ACS) resulting from paradoxical coronary embolism should be suspected in all patients presenting with ACS who have normal coronary arteries on angiography, regardless of age. Our case illustrates a proven paradoxical coronary embolism through a PFO.

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Introduction:-

Paradoxical embolism is most often manifested by an ischemic event; it is secondary in most cases to abnormalities of the oval foramen and the interatrial septum responsible for a right-to-left shunt that occurs during a transient reversal of the interatrial pressure gradient.

The occurrence of an acute myocardial infarction in the absence of coronary artery disease is estimated between 1% [1] and 6% [2]. Paradoxical coronary embolism is rare, but it is more frequent in patients under 35 years of age [3]

We present the case of a paradoxical coronary embolism complicated with a LV dysfunction, in a 35-year-old patient with PFO.

Case report:

We report the case of a 35-year-old patient with a history of occasional smoking. Who has been reporting stage II NYHA dyspnea associated with atypical chest pain neglected by the patient for 6 months.

On the day of his admission to the ICU; he presented an angina pain radiating to the jaw associated with vomiting and profuse sweating.

The EKG registers in regular sinus rhythm with a frequency of 68 bpm, Q wave of necrosis in inferobasal leads, and negative T waves in apico-septal and lateral leads.

A transthoracic echocardiography was performed showing the appearance of probably ischemic DCM (dilated cardiomyopathy) with a dilated LV (69/61mm); segmental kinetic disorders and alteration of systolic function (FEVG = 37%), interatrial septum aneurysm with no visible shunt at the Doppler.

Corresponding Author:- Reda Mounir

The transesophageal echocardiography showed interatrial septum aneurysm with a mobile fringed thrombus covering its left atrial side and enclaved in a PFO. (figure 1, figure 2)

A coronary angiography was performed showing healthy coronary arteries.

The patient was put under standard heparin and VKA (vitamin K antagonist) for 21 days, and the echocardiogram checkup showed the persistence of a small moving length.

Faced with the risk of embolization, we decided to operate the patient as soon as possible.

A right atriotomy was performed; the thrombus trapped in the PFO was removed, followed by resection of the interatrial septum aneurysm and closure of the ASD (atrial septal defect) by a simple suture and then we explored the left atrium and auricle which were free. (figure 3)

Postoperative course was uneventful; a post-operative echocardiogram was performed on Day 7 showing a dilated LV with systolic dysfunction (LVEF = 33%), no residual inter-atrial shunt. The patient was discharged at Day 15 with a treatment based on platelet aggregation inhibitors.

Discussion:-

Paradoxical embolism was first described by Cohnhein in 1877 [4] which could lead to occlusion of the cerebral arteries, peripheral arteries, and in rare cases coronary arteries.

Paradoxical coronary embolism is rare and accounts for 10 to 15% of all paradoxical embolisms [5] and 25% of acute coronary events in patients under 35 years of age [6].

As proposed by Johnson, the diagnosis of paradoxical embolism can be: 1) definitive - when made at autopsy or when a thrombus is seen crossing an intracardiac defect during echocardiography in the presence of an arterial embolus;

2) presumptive - when there is systemic arterial embolus in the absence of a left-sided cardiac or proximal arterial source plus a right-to-left shunt at some level plus venous thrombosis and/or pulmonary embolus;

3) possible - only arterial embolus and PFO detected [7].

Chronic pulmonary hypertension, Valsalva maneuver, coughing with transient reversal of inter-atrial pressure gradient, and positive ventilation [8] may facilitate the occurrence of paradoxical embolism.

The advent of echocardiography, and in particular transesophageal echocardiography, has made it easier to diagnose paradoxical embolism in the antemortem, but direct imaging of a thrombus trapped in the PFO, called impending paradoxical embolism, remains extremely unusual.

A study conducted by Crump and colleagues [9] in patients with acute myocardial infarction history and angiographically healthy coronary arteries to determine if the incidence of PFO would be higher in this population. They found no increase in PFO levels in these patients compared to healthy age-matched control rates (28% in each group). An important limitation of this study was the use of transthoracic echocardiography, which is less sensitive to PFO detection compared to transesophageal echocardiography.

Recently, Kleber et al [10] conducted a retrospective and prospective study and found an incidence of 0.45% of suspected paradoxical coronary embolism causing acute MI in their retrospective data on 4848 patients and 0.67% in their prospective study of 1654 patients with acute MI.

Paradoxical coronary embolism therapeutic options include oral anticoagulation, thrombolysis alone or associated with inferior vena cava filter implantation (which may be considered in patients with chronic anticoagulation contraindication or recurrent pulmonary embolism) and surgical thrombectomy. Surgical closure of the PFO is associated with improved results [11], [12], while percutaneous closure of the PFO has not been studied in cases of paradoxical coronary embolism [13].

In summary, although PFO is a usually silent malformation, patients with this pathology should be monitored regularly to avoid potentially serious complications, as in the case of our patient who presented a paradoxical coronary embolism complicated by severe LV dysfunction.

Thus, these patients must be carefully evaluated tfo select the most appropriate treatment and follow-up protocol.



Figure 1:- Transesophageal Echocardiography four-cavity cross-section centered on the interatrial septum showing an AIS aneurysm (10x19 mm) with dehiscence between septum primum and septum secundum.



Figure 2:- Transesophageal Echocardiography Images showing a thrombus with moving bands lining the inter atrial septum on its left atrial side and faded on a very likely PFO.

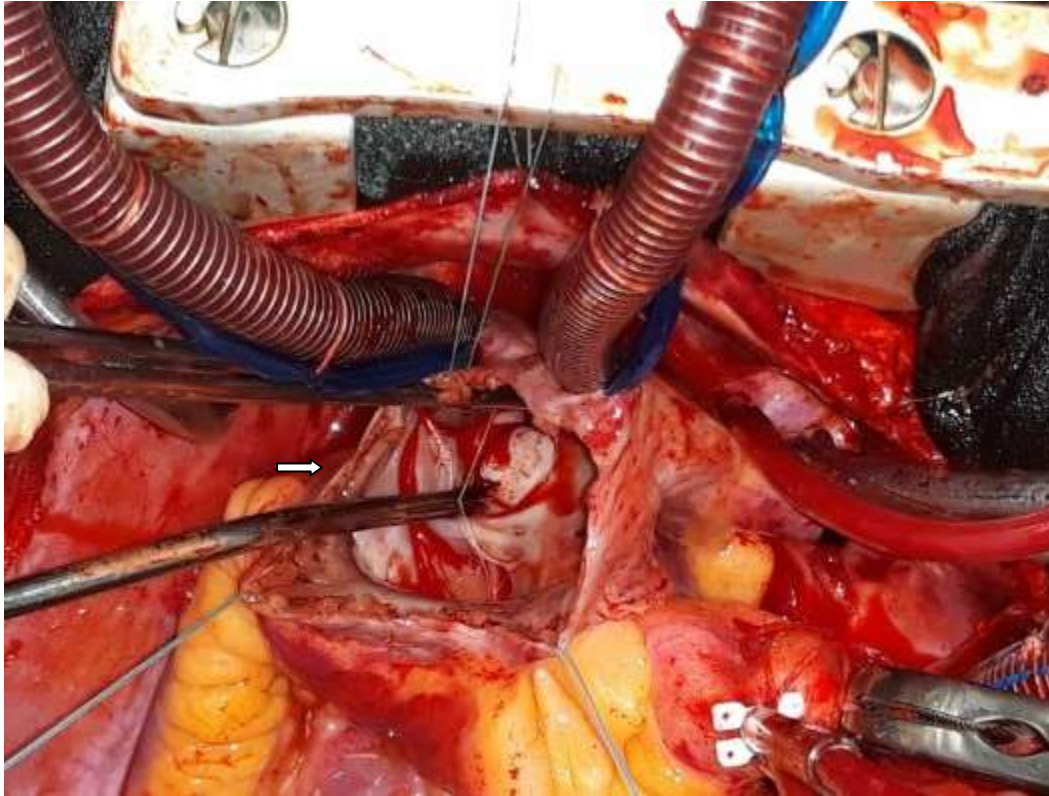


Figure 3:- Surgicalviewafter patent foramen ovalclosure.

Références:-

- [1] « Arnett EN, Roberts WC. Acute myocardial infarction and angiographically normal coronary arteries: an unproven combination. *Circulation* 1976;53:395– 400. »
- [2] « Pasternack RC, Braunwald E, Sobel BE. Acute myocardial infarction. *Heart Disease*, 3rd ed. Philadelphia: WB Saunders, 1988:1222–1313. »
- [3] « Duygu H. Paradoxical coronary embolism as a cause of non-atherosclerotic acute coronary syndrome. *Int J Cardiol* 2015;191:225–6. »
- [4] « Cohnheim J. Thrombose und Embolie. In: *Vorlesungen Über Allgemeine Pathologie*. Berlin: Hirschwald; 1877. p. 134. »
- [5] « Wachsmann DE, Jacobs AK. Paradoxical coronary embolism: A rare cause of acute myocardial infarction. *Rev Cardiovasc Med* 2003;4:107-11. »
- [6] « Velebit V, al-Tawil D. Myocardial infarct in a young man with angiographically normal coronary arteries and atrial septal defect. *Med Arh* 1999;53:33-6. »
- [7] « Johnson BI. Paradoxical embolism. *J Clin Pathol*. 1951; 4:316---22. »
- [8] « Ward R, Jones D, Haponik EF. Paradoxical embolism: an underrecognized problem. *Chest*. 1995;108:549-558. »
- [9] « Crump R, Shandling AH, Van Natta B, Ellestad M. Prevalence of patent foramen ovale in patients with acute myocardial infarction and angiographically normal coronary arteries. *Am J Cardiol* 2000;85:1368-70. »
- [10] « Kleber FX, Hauschild T, Schulz A, Winkelmann A, Bruch L, et al. (2017) Epidemiology of Myocardial Infarction Caused by Presumed Paradoxical Embolism via a Patent Foramen Ovale. *Circ J* 81: 1484-1489. »
- [11] « Meacham RR III, Headley AS, Bronze MS, Lewis JB, Rester MM. Impending paradoxical embolism. *Arch Intern Med*. 1998;158:438- 448. »
- [12] « Aboyans V, Lacroix P, Ostyn E, Cornu E, Laskar M. Diagnosis and management of entrapped embolus through a patent foramen ovale. *Eur J Cardiothorac Surg*. 1998;14:624-628. »
- [13] « Hakim FA, Kransdorf EP, Abudiab MM, Sweeney JP. Paradoxical coronary artery embolism - A rare cause of myocardial infarction. *Heart Views* 2014;15:124-6 ».