

Paradoxical Coronary Embolism Causing Unstable Angina in an Octogenarian

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Abstract

Acute coronary syndrome resulting from paradoxical coronary embolism is a known and dreaded entity. It should be suspected in all patients who present with acute coronary syndrome with normal coronary arteries on angiography, irrespective of age. We report a case of an 80 year old male with unstable angina with atrial septal defect and 95% acute thrombotic occlusion of the right coronary artery with rest of the coronaries being normal on coronary angiography.

Keywords: Paradoxical embolism; Coronary embolism; Acute coronary syndrome

Introduction

Paradoxical embolism to systemic circulation is a well-known entity. It most commonly is manifested as ischemic stroke. Patent foramen ovale or atrial septal defects are the commonest intracardiac shunts responsible for paradoxical embolism. Coronary embolism causing angina or myocardial infarction accounts for 3% of acute coronary syndrome cases and that occurring through an intracardiac shunt is a rare presentation. We here present a case of paradoxical embolism to the right coronary artery causing its 95% ostial stenosis resulting in an unstable angina in an 80 year old with an atrial septal defect.

Case

An 80 year old male presented to us with the complaint of unstable angina for last 10 days. There were no complaints of dyspnoea on exertion, hemoptysis or cough with expectoration. There was no associated trauma or any drug intake. He was a known hypertensive for last 15 years on medications, non-diabetic, non-smoker and had no family history of coronary artery disease.

On physical examination, vital signs were stable. His cardiovascular examination revealed a 2/6 ejection systolic murmur in pulmonary area. No other murmurs were heard. The respiratory system examination and rest of the systemic examination was unremarkable. His chest X-ray and laboratory results were normal. His electrocardiogram revealed right bundle branch block with right axis deviation in sinus rhythm with 1st degree heart block. His echocardiography revealed a 20 mm ostium secundum atrial septal defect (OS-ASD) with deficient inferior and aortic margins with left to right shunt (Qp:Qs was 1.9:1), normal left ventricular systolic function without any regional wall motion abnormality. His coronary angiography revealed ostial 95% thrombotic occlusion of the right coronary artery (RCA) (Figure 1).



Figure 1: Coronary angiogram of the right coronary artery showing 95% thrombotic ostial occlusion.

Rest of the coronary arteries was normal (Figure 2). The patient was advised for surgical closure of ASD with single bypass grafting to RCA. The patient was not a suitable candidate for the device closure of the ASD as its inferior and aortic margins were deficient. However, the patient and his attendants refused for the surgery and opted for stenting with drug eluting stent to RCA (Figure 3) and the surgical closure was postponed for the later date. The patient was discharged on aspirin (75mg per day) and warfarin. After 6 months of follow-up the patient was asymptomatic and had no angina.

Discussion

Paradoxical embolism to the coronary artery is a rare phenomenon and accounts for 10–15% [1] of all paradoxical emboli, and 25% of acute coronary events in patients less than 35 years of age [2]. Paradoxical embolism was first reported by Cohnheim in 1877 and is known to cause cerebral, peripheral arterial, and in rare instances coronary artery occlusion [3].

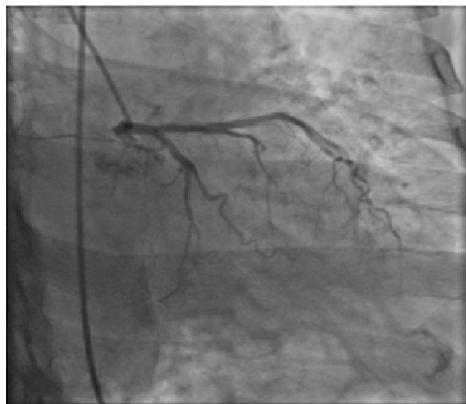


Figure 2: Normal left coronary arterial system.



Figure 3: Timi iii flow restored in the right coronary artery after stenting.

It is a rare clinical entity and definite ante-mortem diagnosis is made very rarely. In a study at Johns Hopkins Hospital on autopsy-studied infarcts over a 10-year period, embolic infarcts were seen in 13% of their cases and paradoxical embolism to the coronary arteries was very rarely reported [4]. Recently, Kleber et al. [5] performed a retrospective and prospective study and found 0.45% incidence of presumed paradoxical coronary embolism causing acute myocardial infarction in their retrospective data on 4848 patients and 0.67% in their prospective study on 1654 patients with acute myocardial infarction. Shibata et al. [6] in their retrospective analysis proposed a scoring system for definite or probable coronary embolus (Table 1). Our case fulfills the criteria of definite diagnosis with presence of one major and two minor criteria. The presence of the thrombus in the ostium of RCA with <25% atherosclerotic changes in rest of the coronaries or other vessels and presence of the ASD supports this diagnosis. There are few case reports of paradoxical coronary embolism [7] but none of them was seen in a patient at 80 years of age with ASD. Raphael and colleagues [8] suggests management of patients with coronary embolism with warfarin or a novel anticoagulant instead of antiplatelet agents for at least 3 months in absence of any risk factors for recurrent coagulation. However, for patients who received coronary

stent, it's a complex decision either to use triple therapy or an anticoagulant with a single antiplatelet agent.

Major Criteria

Angiographic evidence of coronary embolism and thrombosis without atherosclerotic components

Concomitant coronary artery embolization at multiple sites

Concomitant systemic embolization without left ventricular thrombus attributable to acute myocardial infarction

Minor Criteria

<25% stenosis on coronary angiography, except for the culprit lesion

Evidence of an embolic source based on transthoracic echocardiography, transesophageal echocardiography, computed tomography, or MRI

Presence of embolic risk factors: atrial fibrillation, cardiomyopathy, rheumatic valve disease, prosthetic heart valve, patent foramen ovale, atrial septal defect, history of cardiac surgery, infective endocarditis, or hypercoagulable state

Definite Coronary Embolism

Two or more major criteria, or One major criterion plus ≥ 2 minor criteria, or Three minor criteria

Probable Coronary Embolism

One major criterion plus 1 minor criterion, or Two minor criteria

Table 1: Proposed diagnostic criteria for coronary artery embolism (As adapted from Shibata et al. [1]).

Conclusion

In summary, acute coronary syndrome (ACS) resulting from the paradoxical coronary embolism is a dreaded entity. It should be suspected in all patients who present with acute coronary syndrome with normal coronary arteries on angiography, irrespective of age. The management of ACS due to paradoxical embolism is same as standard management of ACS except that an anticoagulant has to be added and patient should be given an option of device or surgical closure of ASD in the same sitting, if co-morbidities allow risk-benefit ratio in favor of ASD closure.

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