

Post Myocardial Infarction Submitral Aneurysm Causing Stroke in an Elderly Patient- A Rare Case Report

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Abstract Left ventricular aneurysms are a frequent and serious complication following acute myocardial infarction and are most commonly located at the ventricular apex. The majority of these patients presents with severe mitral insufficiency, congestive heart failure, systemic embolism and sudden cardiac death. Giant aneurysms occurring in a submitral position between anterior and posterior papillary muscles on the lateral ventricular wall constitute a minor entity and those leaving the mitral apparatus intact are extremely rare. Herein, we report the case of a 70 years old male patient with a past history of inferior wall myocardial infarction 1 year back, now presented with right hemiparesis due to cardio-embolic stroke caused by thrombus present in submitral left ventricular aneurysm. Despite the size of the aneurysm and its close relationship to the posterior mitral annulus the mitral apparatus was intact with a competent valve and normal left atrial size. To the best of our knowledge there are only few case reports in the literature where a patient develops large submitral LV aneurysm after myocardial infarction.

Keywords: submitral aneurysm, post myocardial infarction, thrombus, stroke

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1. Introduction

True left ventricular aneurysms are widely recognized as a common and serious complication following total occlusion of coronary arteries [1,2,3,4] with a prevalence of approximately 12% of acute transmural myocardial infarctions according to a series of 508 autopsies performed by Abrams et al. in the Micheal Reese Hospital and Medical Center, Chicago, Illinois [5]. According to the available scientific literature [5] the apex and the posterior wall are the most common sites of aneurysm formation (31.7% and 23.8%, respectively). The anterior wall and the intraventricular septum are less frequently involved (9.5% and 7.9%, respectively). As few as 1% of ventricular aneurysms affect the lateral wall of the ventricle and are usually not extensive. One proposed explanation for the relative lack of anterior LV pseudoaneurysm is that anterior rupture may be more likely to result in hemopericardium and death than posterior rupture. [6] Ventricular aneurysm is a serious disorder with a varied clinical presentation depending on size, location and valvular involvement, making this etiology difficult to diagnose. Large aneurysms profoundly change cardiac geometry, impair systolic and diastolic function, result in dyskinesia or do have arrhythmic potential. Distortion of the mitral and aortic annulus produces incompetence of these valves while compression of a coronary artery may

cause coronary insufficiency or occlusion [7]. An altered endocardial morphology may further predispose to systemic embolism secondary to mural thrombi that form in the aneurysmal sac and fatal ventricular rupture.

2. Case Report

A 70 years old male patient was admitted in medical ward with complaints of motor aphasia and right hemiparesis. Patient had a history of inferior wall myocardial infarction one year back, not thrombolysed at that time because of late presentation. Managed conservatively and echocardiography at that time showed akinesia of inferior wall and ejection fraction was 40%. Patient refused for further evaluation so discharged on medical management (Asprin, clopidogrel, ACE inhibitors, beta blockers and nitrates). Patient left treatment after 3 months. After that he had no complaints regarding angina and dyspnoea. His cardiac risk factors were significant for tobacco abuse (50 pack years), essential hypertension, unhealthy diet and physical inactivity. The electrocardiogram showed normal sinus rhythm with rate of 88 beats/min and deep Q-waves in leads II, III and aVF consistent with a old inferior wall myocardial infarction. Cranial computed tomography was immediately done and revealed a large left frontotemporal and right parietal hypodense area consistent with cerebral infarction. The patient was started on high molecular weight heparin. Patient was referred to

cardiology department for echocardiographic examination to rule out any cardiac source for embolic stroke. Apical four chamber view on echo showed a normal mitral valve (Figure 1) and a large left ventricular (LV) aneurysm at submitral region measuring 4 cm wide and 9 cm long and containing large thrombus along with dense spontaneous contrast in aneurysmal sac (Figure 2, Figure 3). Despite the huge size of the aneurysm the mitral valve was

competent due to the fact that the neck of the aneurysm which extended from the base of the heart to the apex and was located exactly in-between the anterolateral and posteromedial papillary muscles. This way the submitral apparatus was spared from any tethering and necrosis. The left ventricular (LV) ejection fraction was 35% with an akinetic inferior and lateral wall.

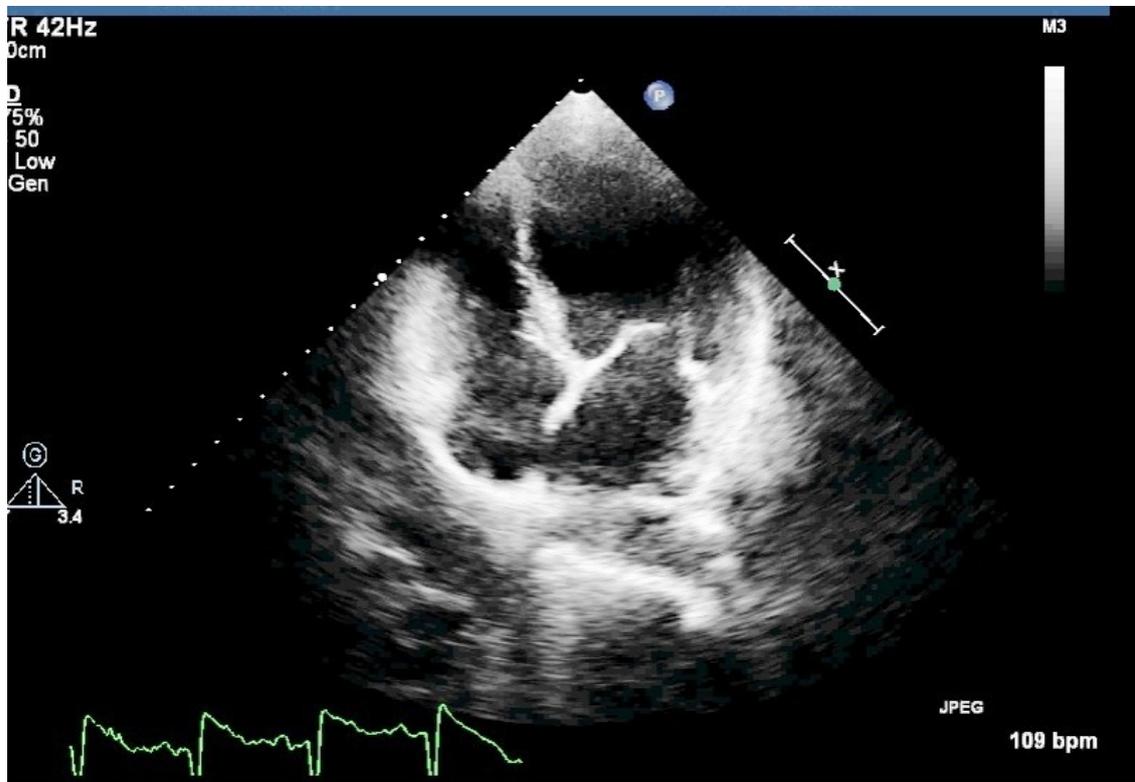


Figure 1. Apical four chamber view on echocardiography showing intact mitral valve

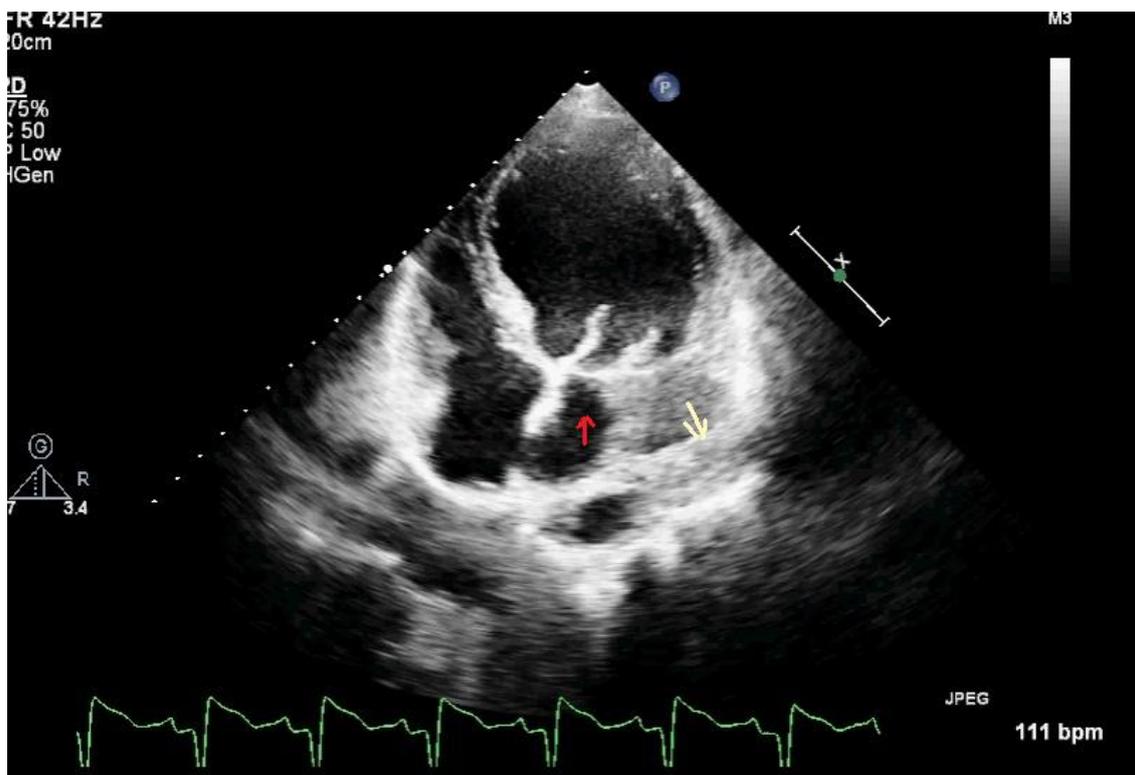


Figure 2. Apical four chamber view on echocardiography showing Left atrium (red arrow) and submitral aneurysm with thrombus (yellow arrow)

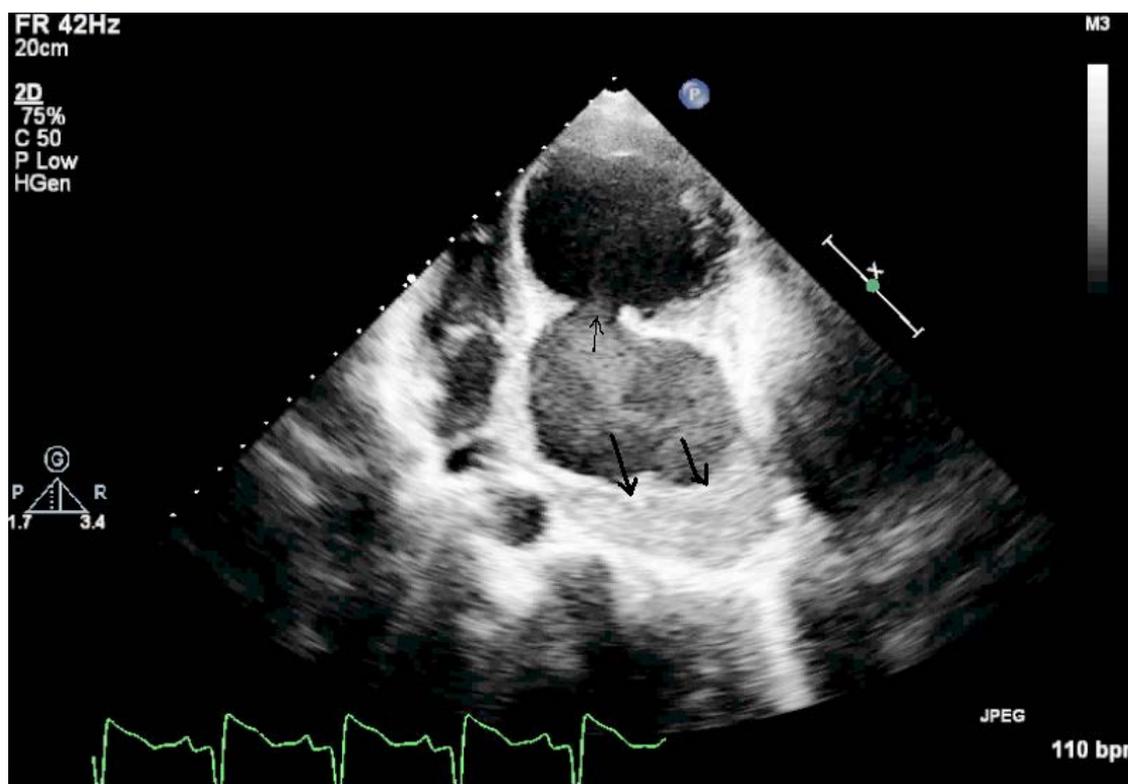


Figure 3. Apical four chamber view showing large submitral aneurysm with thrombus(black double arrow) and neck of submitral aneurysm(thin arrow)

So, he was diagnosed with a giant left ventricular submitral aneurysm one year after his myocardial infarction, patient refused for surgical treatment suggested by Cardiothoracic surgeon and discharged on Aspirin, warfarin, diuretics, ACE inhibitors, beta blockers and nitrates. In this case as the thrombus detected in aneurysmal sac and patient had stroke, so warfarin was advised for life long. Role of newer anticoagulants were not evaluated in these type of cases in literature.

3. Discussion

The recognition of ventricular aneurysms is of great importance due to the numerous complications that can potentially occur. These complications consist primarily of intractable congestive heart failure, systemic embolism secondary to mural thrombi in the aneurysmal sac and ventricular rupture. In the case presented herein the neurological deficit was the first symptom of giant left ventricular aneurysm secondary to transmural myocardial infarction. The concept of excluding the akinetic aneurysmal portion of the ventricle derives from the fact that when a portion of the ventricular wall is transformed into scar tissue and starts to dilate due to the high intraventricular pressure, the loss of function is higher than estimated by the loss of contractile tissue alone [8,9,10]. This is due to change in the ventricular geometry and loss of synchronization of muscle contraction that fundamentally alters the mechanics of the ventricular ejection phase [11]. It was noted that excluding that portion by resection could improve cardiac function by restoring ventricular geometry. Cooley described a resection and linear closure of aneurysms in 1958; Jatene described a technique of septal imbrication in 1985 and Cooley described a technique for septal exclusion in 1988.

It was not, however, until Dor in 1985 that the concept of preservation of left ventricular geometry after such resections/exclusions became clear [11]. A timely diagnosis and early surgical treatment is vital inpatient management to prevent fatal cardiac rupture and to prevent a decrease of cardiac function beneath a threshold where surgery would not be beneficial for patient outcome. Perioperative ejection fraction is an important determinant for survival. Patients with a preoperative EF > 30% had a 77% 5-year survival while patients with an EF < 30% had a 64% survival chance [12]. The overall 5 year survival rate following the Dor procedure is 69%, patients younger than 70 years of age had a 5-year survival of 70%, while older patients had only a 59% actuarial survival [13,14]. The Dor procedure has a perioperative mortality rate of 5.6% and requires a hospital stay of approximately 8 days which is only one day longer than for CABG [13]. Because the Dor procedure restores the left ventricle to its correct, elliptical shape it results in a mean ejection fraction increase of 12.5% [13]. This number continues to improve over the patient's lifetime and life expectancy is estimated to increase by 4–10 years [14]. In the present case patient refused for any surgical management, so discharged on medical management.

4. Conclusion

The recognition of ventricular aneurysms on echocardiographic examination is of great importance due to the numerous complications that can potentially occur. These complications consist primarily of intractable congestive heart failure, systemic emboli secondary to mural thrombi in the aneurysmal sac and ventricular rupture. In the case presented herein the neurological

deficit was the first symptom of giant left ventricular aneurysm secondary to transmural myocardial infarction.

Statement of Competing Interests

Authors have no competing interests.

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