Clinical History:

A 55-year-old male patient with history of percutaneous transluminal coronary angioplasty done to left anterior descending artery presented with massive heart attack and collapsed. Cardiopulmonary resuscitation was performed. Repeat angiogram showed totally blocked stent. The patient was managed conservatively and discharged on medications. One month later, the patient presented with heart failure.

Imaging Findings:

Frontal radiograph of the chest was done which showed an outward bulge from the left cardiac border (Fig. 1). Subsequently CT angiogram was done which showed a lobulated saccular pseudoaneurysm causing disruption of basal anterior septal and basal anterior myocardium of left ventricle and projecting superiorly parallel to the main pulmonary artery (Fig. 2, 3). There was a small defect in the interventricular septum with resultant communication of the aneurysm with right ventricle (Fig. 4). Thus the aneurysm had a communication with both ventricles (Fig. 4a, b). No peripheral thrombus was seen within the aneurysm. There was subendocardial infarct involving the left ventricular apex.

He underwent surgical repair under cardioplegic arrest. Right Ventricular (RV) opening was about 1.5 x 1.5 cm (Fig. 5) and LV opening was about 4 x 4 cm. A single bovine pericardial patch was used to close both openings with RV opening buttressed in continuous suture prolene 4-0.

Discussion:

Ventricular septal rupture (VSR) is a devastating complication seen in patients with acute myocardial infarction (MI) due to LAD occlusion as it supplies the septal wall occurring in early post-MI period (2-8 days) [1]. Left ventricle (LV) pseudoaneurysm is a late mechanical complication presenting within few months of myocardial infarction with contained myocardial rupture limited by pericardial adhesions and organized thrombus. It lacks a myocardial wall making it susceptible to rupture. It should not be confused with left ventricular aneurysm which has a scarred myocardium as its wall.

The occurrence of VSR after acute MI has decreased due to introduction of reperfusion therapy, the incidence being
1-3% in the era before thrombolytic therapy [2]. VSR has equal frequency in anterior and non-anterior infarctions [3]. Inferior wall MI is associated with rupture of base of heart whereas anterior wall MI is associated with rupture of apical septum [2].

LV pseudoaneurysm is seen in patients having cardiac infection, MI and following cardiac interventions and trauma; MI being the most common cause [4]. Patients may have congestive heart failure, mitral regurgitation, ventricular tachyarrhythmia, systemic thromboembolism, cardiac rupture or compression of adjacent vascular structures [4, 5].

Transthoracic Echocardiography (TTE) is an excellent non-invasive screening imaging modality as it can assess function of both ventricles, valvular regurgitation and diagnose post infarction pseudoaneurysm and ventricular septum rupture. However, small VSR or apical defects can be missed on TTE alone [6]. CT Angiogram is the most promising upcoming imaging modality due to its high spatial resolution and faster scan acquisition. It can delineate the extent of pseudoaneurysm, define its connections, assess cardiac and non-cardiac structures [7, 8], extent of coronary artery disease and patency of stents. Cardiac MRI can delineate the anatomy, location and size of ventricular septum rupture and pseudoaneurysm as well as quantify the shunt size across the interventricular septum and characterize the peri-infarct zone [1]. Invasive ventriculography is the gold standard to confirm left to right shunts, however, imaging modalities like TTE, CT Angiogram and cardiac MRI are far better in defining the exact size and morphology of the ventricular septal rupture as well as delineating the LV pseudoaneurysm and its connections.

All patients with VSR should be considered for urgent surgical intervention to reduce the end organ damage [6]. Conservative approach is considered in asymptomatic cases of pseudoaneurysm, small aneurysms < 3 cm and stable dimension during regular follow up [5].

**Differential Diagnosis List:** Post-myocardial infarction left ventricular pseudoaneurysm with biventricular communication, Post-intervention ventricular septal rupture with pseudoaneurysm formation, Post-infection cardiac pseudoaneurysm

**Final Diagnosis:** Post-myocardial infarction left ventricular pseudoaneurysm with biventricular communication

**References:**


**Description:** Frontal radiograph of chest showing an outward bulge from the left cardiac border. **Origin:** Department of Radiology, Medanta-The Medicity, Gurgaon, Haryana, India
Description: CECT axial section showing a lobulated saccular giant LV pseudoaneurysm parallel to the main pulmonary artery. Origin: Department of Radiology, Medanta-The Medicity, Gurgaon, Haryana, India
Figure 3

Description: CECT sagittal reformation showing giant left ventricular pseudoaneurysm causing disruption of basal anterior septum and basal anterior myocardium of left ventricle and projecting superiorly. Origin: Department of Radiology, Medanta-The Medicity, Gurgaon, Haryana, India
**Figure 4**

**Description:** CECT sagittal section showing biventricular communication of LV pseudoaneurysm.

**Origin:** Department of Radiology, Medanta-The Medicity, Gurgaon, Haryana, India
Description: CECT axial section showing biventricular communication of LV pseudoaneurysm. Origin: Department of Radiology, Medanta-The Medicity, Gurgaon, Haryana, India.
Figure 5

Description: Intraoperative image showing Right Ventricular opening of LV pseudoaneurysm

Origin:
Description: VRT image showing lobulated saccular giant LV pseudoaneurysm. Origin: Department of Radiology, Medanta-The Medicity, Gurgaon, Haryana, India
Description: VRT image showing giant LV pseudoaneurysm. Origin: Department of Radiology, Medanta-The Medicity, Gurgaon, Haryana, India