Left Ventricular Aneurysmorrhaphy

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Abstract Left ventricular aneurysm are commonly secondary to coronary artery disease. A postinfarction left ventricular aneurysm is a well delineated transmural fibrous scar, virtually devoid of muscle, in which the characteristic fine trabecular pattern of the inner surface of the wall has been replaced by smooth fibrous tissue. In such areas, the wall is usually thin and both inner and outer surfaces bulge outward. During systole, the involved wall segments are akinetic or dyskinetic.

Patient with history of myocardial infarction with 2 dimensional echocardiography suggestive of left ventricular aneurysm was evaluated with cardiac computerised tomography scan and underwent surgical correction accordingly. We followed this in post-operative period in terms of cardiac computerised tomography scan and improvement in NYHA functional class. Pre-operative cardiac tomography scan proves valuable in planning surgical intervention and surgery done at right time after medical stabilisation proves to be beneficial for the patient.

Keywords Left ventricular aneurysm; Aneurysmorrhaphy

Introduction

Left ventricular (LV) aneurysms have long been described during autopsies. However, it was not until 1881 that they were associated with coronary artery disease. The first angiographic diagnosis of a LV aneurysm was made in 1951 (Mills et al., 1993).

The main cause of aneurysm formation, in up to 95% cases, is coronary artery disease, the rest of the cases being due to congenital or traumatic causes, Chaga’s disease, and sarcoidosis, in exceptional cases, due to diverticula of the left ventricle (Davila et al., 1965; Silverman et al., 1978; Grieco et al., 1989; De Oliveira, 1998).

We evaluated a patient with history of myocardial infarction and 2 dimensional echocardiography suggestive of left ventricular aneurysm. Cardiac computerized tomography scan suggestive of posterior basal aneurysm (Figure 1). We followed the patient in post-operative period in terms of cardiac computerised tomography scan. Earlier intervention seems beneficial in improving NYHA functional class.

Case details

45 years old male patient, known case of diabetes mellitus and hypertension who had complains of dyspnoea on exertion, NYHA class III for two months with history of myocardial infarction two months back. He was admitted for treatment of congestive cardiac failure. On examination he had bilateral crepitations, pedal oedema. He was stabilised with medicine and evaluated with 2 dimensional echocardiography which was suggestive of left anterior descending and right coronary artery territory hypokinesia and left ventricular ejection fraction (LVEF) 20 to 25%, partially thrombosed left ventricular postero-basal aneurysm about 65 x 55 mm² with neck of it around 23 mm; cardiac computerised tomography scan confirmed the findings with aneurysm measuring about 74 x 72 x 67 mm³ and neck of it measuring 54 x 38 mm³, left anterior descending and ramus intermedius artery appeared diffusely narrow in calibre with faint contrast visualisation (Figure 1).

Surgery performed was left ventricular aneurysmorrhaphy with coronary artery bypass grafting anastomosing aorta to saphenous vein to left anterior descending artery. Aneurysm was arising from posterior basal part and attached to diaphragmatic surface. Aneurysm was opened vertically, all scared
tissue removed. Both papillary muscles were exposed (Figure 2). Aneurysm was repaired with tafilon felt and 40 prolene suture. Part of sac was sutured over the felt. Main concern while repairing the sac was to maintain mitral valve apparatus in normal situation (Figure 3). Patient was extubated on 2nd post-operative day and had good hemodynamics on moderate inotropic support which were tapered off gradually after 24 hours. Post-operative echo was s/o LVEF: 30%, LAD territory hypokinesia while post-operative computerised tomography scan showed good left ventricle morphology with left ventricle cavity measuring about 53 x 57 x 59 mm³ (Figure 4) with saphenous graft to left anterior descending artery patent. Discharged uneventfully on POD 8th in NYHA class I.

Discussion
Johnson and colleagues defined aneurysm as “a large single area of infarction (scar) that causes the LV ejection fraction to be profoundly depressed (to approximately 0.35 or lower)” (Johnson and Draggett, 1980).

The history of LV aneurysm begun in 1944, when Beck described fascia lata plication to treat a left ventricular aneurysm (Beck, 1944). Then, in 1955, Likoff and Bailey successfully resected an aneurysm through thoracotomy, using a special clamp, without cardio-pulmonary by-pass (Likoff and Bailey, 1955). The modern treatment area begun in 1958 when Cooley performed a linear repair, using cardio-pulmonary by-pass (Cooley et al., 1958). Since then, all the techniques aim to achieve a good left ventricular anatomy, as close to the normal heart as possible.

In the early stages after the intervention, the mortality rate is dependent on the surgical technique; the lowest mortality (3-7%) is associated with patch or linear closures (Baciewicz et al., 1991; Komeda et al., 1992; Dor, 1997). Other important early stage mortality risk factors include age, high class NYHA heart failure, female gender, EF<30%, pulmonary mean pressure > 33 mmHg, serum creatinine >1.8 mg/dl and failure to use the internal mammary artery for CABG (Couper et al., 1990; Baciewicz et al., 1991; Komeda et al., 1992; Stahle et al., 1994).

Long term prognosis is dependent on the adequacy of the residual left ventricular function, patients with severe left ventricular dysfunction having higher mortality rates (Couper et al., 1990).
is to maintain LV geometry to near normal for post-operative myocardial function and avoiding post-operative mitral regurgitation.

We addressed both the problems which resulted in improvement in post-operative NYHA class and LVEF. However long term follow up of such patients is required because they are more prone for cardiac arthritias.

**Conflict of Interest** – None declared.

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