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Huge Left Ventricular Aneurysm in a Young Patient Diagnosed with a 4 Slice CT Scanner at University of Gondar Hospital; a Case Report and Review of Literature

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Author's contribution

The sole author designed, analyzed and interpreted and prepared the manuscript.

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Case Study

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ABSTRACT

A case of huge left ventricular aneurysm of submitral type in a 21 year old Ethiopian patient is presented. This rare type of LVA is reported in young black Africans in Nigeria and South Africa but never in East Africa. The patient presented with cough and chest pain of two months whose posteroanterior chest radiograph showed nonspecific cardiomegally. Cardiac ultrasound and cardiac computed tomography (CT) showed a huge left ventricular aneurysm localized in the submitral posterolateral wall of the left ventricle. This is a first case of submitral left ventricular aneurysm reported from Ethiopia.

Keywords: Ventricular aneurysm; cardiac ultrasound; CT scan of the heart.

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ABBREVIATIONS

CHF: Congestive Heart Failure; CT: Computerized Tomography; CXR: Chest x ray; EKG: Eelectrocardiogram; LVA: Left Ventricular Aneurysm); LVPA: Left Ventricular Pseudoaneurysm); MI: Myocardial Infarction; MRI: Magnetic Resonance Imaging); NYHA: New York Health Association; PA: Peudoaneurysm; UOG: University of Gondar; VA: Ventricular Aneurysm.

1. INTRODUCTION

Left Ventricular Aneurysm (LVA) is defined as a circumscribed, thin-walled, non-contractile out pouching of the left ventricle. The majority of LVAs occurs after myocardial infarction. Occasionally, LVA is associated with normal coronary artery [1]. Myocardial infarction (MI) in the youth can rarely occur by coronary embolisation, spontaneous coronary artery dissection and myocardial bridges [2]. Other rare aetiologies that have been described include trauma, rheumatic carditis, syphilitic myocarditis, tuberculosis, interstitial myocarditis, and mycotic infection, congenital and post cardiac surgery. Congenital LVA is usually annular subvalvular type reported in Nigerian, South Africa, and brazil all in black patients [2]. However, whatever the etiology, LVA in young person is rare [3]. The recognition of such aneurysms is important as prophylactic measures may prevent complications. Furthermore, they are a surgically treatable cause of heart failure and arrhythmias [4].

The presentation of left ventricular (LV) aneurysm and pseudoaneurysms is often atypical. While the diagnosis is usually established by left ventriculography, the recent improvement in the quality of CT and magnetic resonance imaging (MRI) scans has allowed for non-invasive detection [2]. Cardiac ultrasound, cardiac CT and MRI are the noninvasive modalities whereas coronary arteriography and left ventriculography are invasive modalities used for the diagnosis [4].

Rupture of the free wall of the LV is a catastrophic complication occurring in 4% of patients after MI and in 23% of those who die of MI. Rarely the rupture is contained by an adherent pericardium creating a pseudo-aneurysm. Differentiation between PA and VA remains difficult. Clues with CT include size of the collar, site of aneurysm, visible myocardium, pericardial calcification and lack of contractility [5]. Other complications include thrombosis, arrhythmia, and cardiac dysfunction [1]. Herein I present a case of LVA diagnosed with CT scan and review of relevant literature.

2. CASE PRESENTATION

A 21year-old male patient presented with a history of cough and chest pain of 2 months. He denied a history of past cardiac illness, history of trauma to the chest, tobacco use, hypertension, or diabetes. On physical examination, he was hemodynamically stable, in no apparent distress, and no audible murmur. EKG and a complete series of cardiac enzymes was normal. PA CXR showed gross non specific cardiomegally. Two dimensional B mode cardiac ultrasound reveled a focal out pouching bulge at the posterolateral wall of the left ventricle adjacent the mitral valve with focal decrement of wall motion suggestive of left ventricular aneurysm (Figs. 1,2). Intravenous contrast enhanced CT scan of the patient was done with a 4 slice spiral CT scan and showed a left ventricular postrolateral wall focal big out pouching filled with contrast communicating with a wide collar (Figs. 3,4). It also showed intact but thin myocardial wall and no sign of ventricular rupture which is diagnostic of LVA (Fig. 5). Both the ultrasound and the CT localized the site of the aneurysm to be posterolateral below the posterior mitral leaflet giving the appearance of annular sub mitral LVA. The CT also showed bilateral pleural effusion which is suggestive of congestive heart failure (CHF) New York Health Association (NYHA) class I (Fig. 5). The patient is treated with diuretics with which he got symptom improvement and referred to cardiac centers for further workup and surgical intervention. Left ventriculography, coronary angiography was the expectation on further evaluation of this patient. The patient couldn't get much further workup and was sent back with conservative management and followed in our side for one year and remained in good health status.

3. DISCUSSION

The incidence of LVA is about 5% to 10% of all patients with acute myocardial infarction. LVA mainly occurs after myocardial infarction. LVAs occurring in the absence of coronary artery disease are rare 0.47% [1,6]. An incidence varying from 3.5 to 5% has been reported in

autopsy studies [7]. The etiologies include hypertrophic cardiomyopathy, myocarditis, arrhythmogenic right ventricular dysplasia, Chagas's disease, syphilis, tuberculosis, glycogen storage disease, and sarcoidosis. In addition, congenital LVA and dilated cardiomyopathy also have been reported [1,2]. Complications include rupture, thrombosis, arrhythmia; and cardiac dysfunction [1,2]. Rupture of the free wall of the left ventricle (LV) is a catastrophic complication occurring in 4% of patients after MI and in 23% of those who die of MI [5]. Rarely the rupture is contained by an adherent pericardium creating a pseudo-aneurysm. Differentiation between left ventricular pseudoaneurysm (LVPA) and LVA remains difficult. Clues with CT include size of the collar, site, visible myocardium, pericardial calcification and lack of contractility. Patients with LV pseudoaneurysm usually present within 2 mo of a myocardial infarction while LVA takes longer [2,8]. False aneurysms are usually substantially larger than true aneurysms [6,9]. Annular submitral type LVA a rare congenital out-pouching of left ventricular wall, invariably occurring adjacent to the posterior leaflet of mitral valve seen in black young Africans reported from Nigeria and South Africa with suggested etiology of weakness of fibrous annulus [5,9].

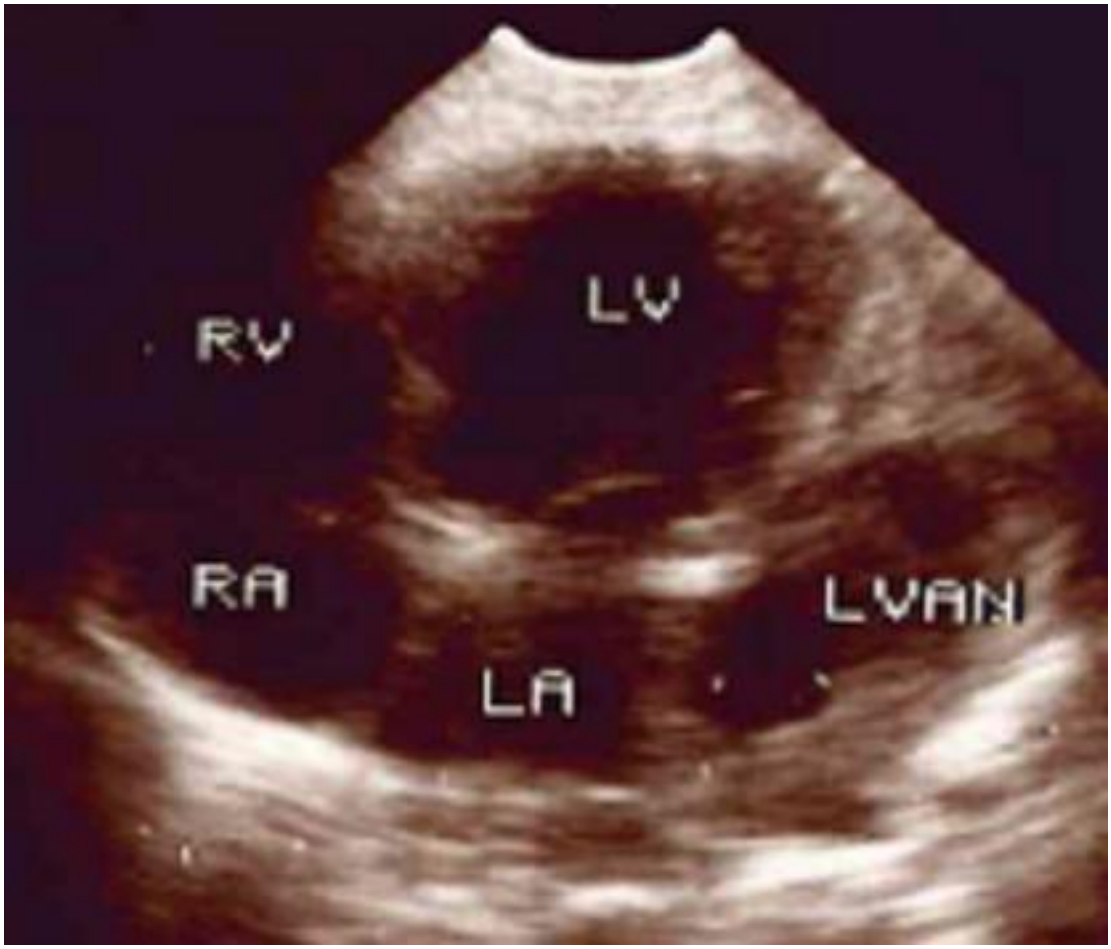

Fig. 1. Ultrasound image of the heart of the patient with 2DE B mode at apical four chamber window showing left ventricular aneurysm in the sub mitral posterolateral wall of the left ventricular wall. RA, RV, LA, LV, LVAN: right atrium, right ventricle, left atrium, left ventricle an left ventricular aneurysm respectively

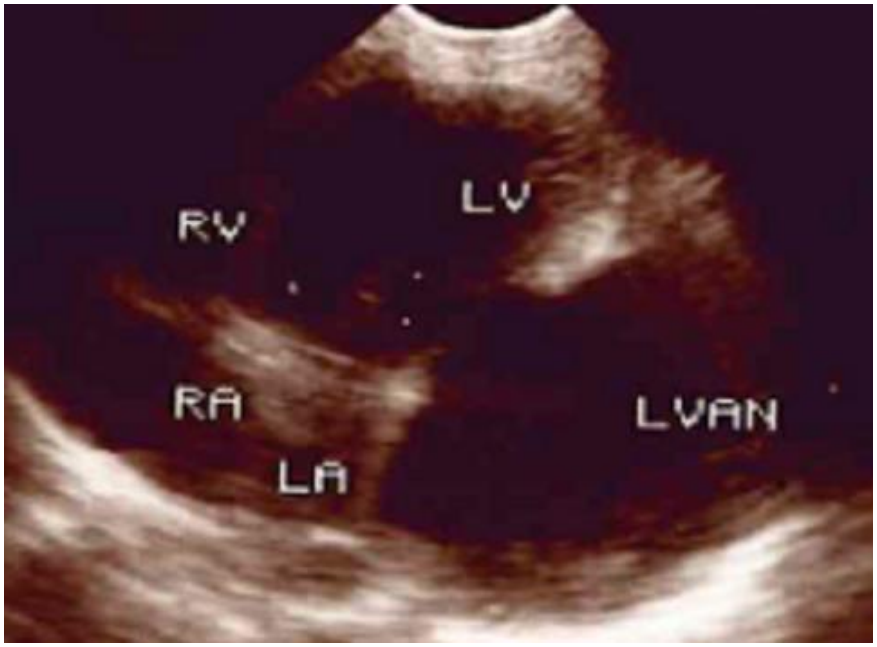

Fig. 2. Ultrasound of the heart of the patient with 2DE B mode image at apical four chamber window showing left ventricular aneurysm in the sub mitral posterolateral wall of the left ventricular wall. The aneurysm is seen communicating with a wide defect to the left ventricular cavity. RA, RV, LA, LV, LVAN: right atrium, right ventricle, left atrium, left ventricle an left ventricular aneurysm respectively

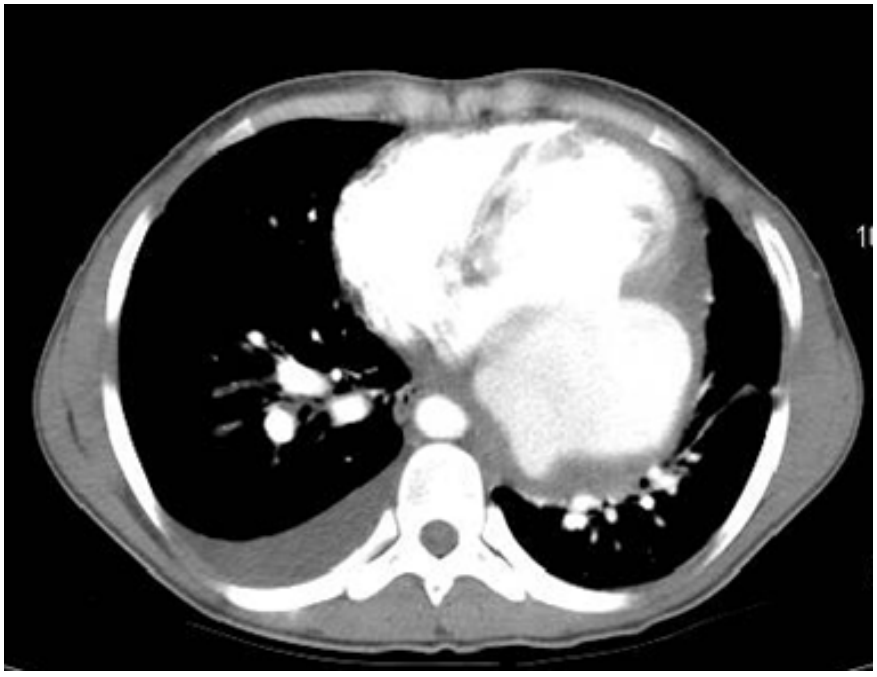

Fig. 3. Post contrast CT axial image of the chest of the patient at the level of the cardiac ventricles in a mediastinal window demonstrating a left ventricular aneurysm. There is right pleural effusion

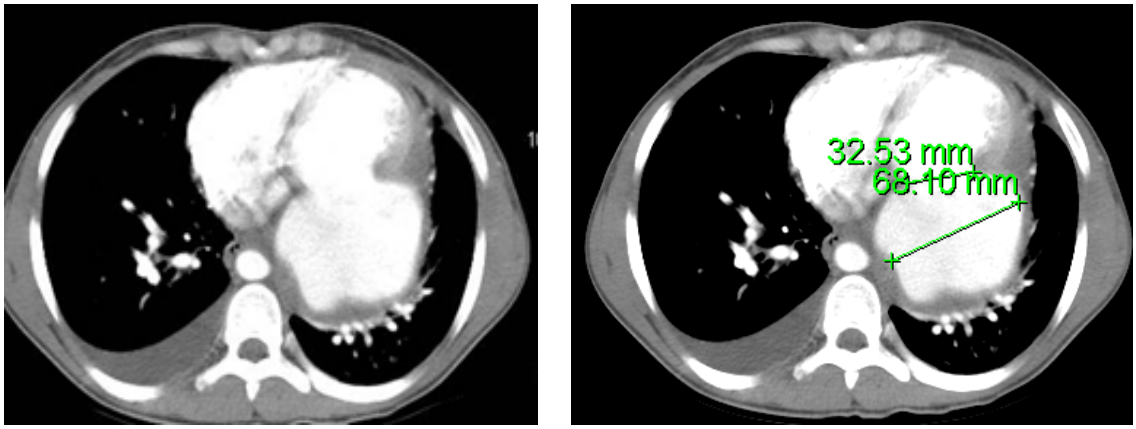

Fig. 4. Post contrast CT axial image of the chest of the patient at the level of the cardiac ventricles in a mediastinal window demonstrating a left ventricular aneurysm communicating with a wide collar to the left ventricular cavity with measurement of the neck and maximum width of the aneurysm

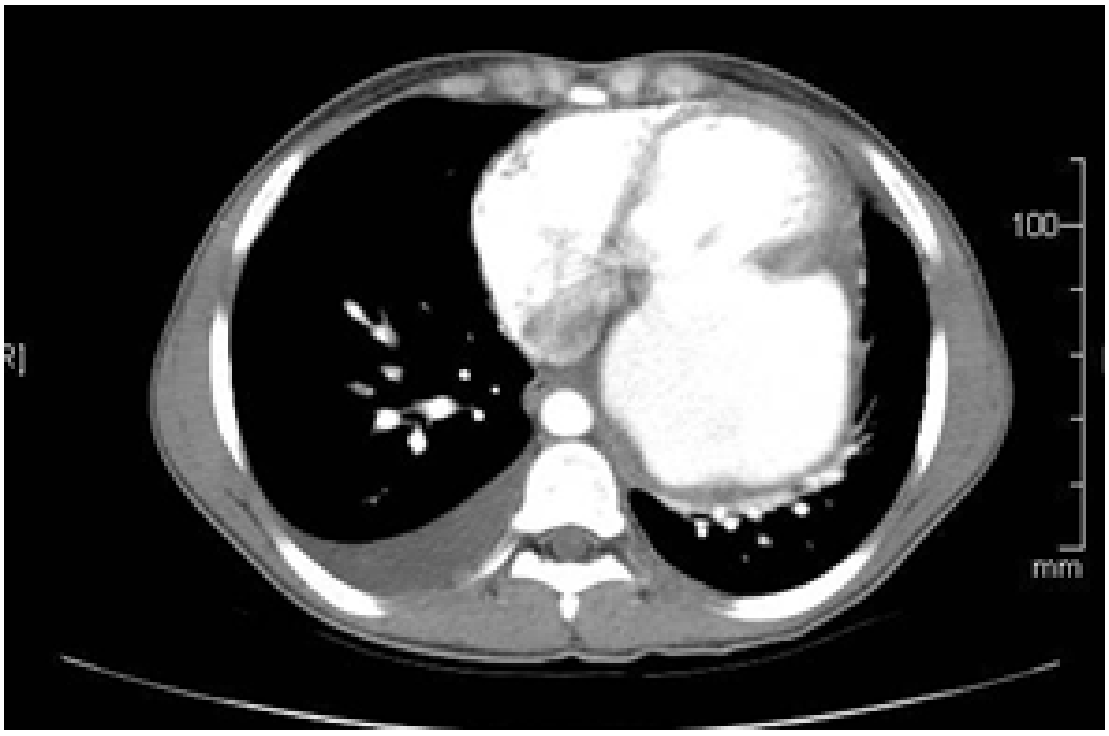

Fig. 5. Post contrast CT axial image of the chest of the patient at the level of the cardiac ventricles in a mediastinal window demonstrating a left ventricular aneurysm with thin but intact aneurismal wall

There are no pathognomonic clinical signs in LVA and LVPA, but suspicion should be raised by the occurrence of congestive heart failure, angina pectoris, ventricular arrhythmia, embolism, or endocarditis in a patient with prior myocardial infarction, especially when accompanied by ventricular gallop, or apical systolic murmur. The electrocardiogram is generally considered insensitive and nonspecific but may be helpful when it reveals old MI or persistent ST segment elevation. Chest radiography is helpful only when an enlarged LV

is associated with a bulge or calcification seen being sensitive in 50% of the cases and little is gained by the addition of fluoroscopy [8]. The history, physical examination, ECG, and x-ray are helpful in only 75% of patients [8].

Two-dimensional echocardiography provides 73% to 93% sensitivity and 84% to 100% specificity in the diagnosis of LVA, and it allows assessment of LVA size and residual LV function [8]. The criteria for diagnosis of LVA is the presence of LV bulge with dyskinesia. Though left ventriculography is considered the gold standard modality and provides information on hemodynamics and coronary artery anatomy with a diagnostic accuracy of about 85%, it is seldom used because of the concern for thrombus dislodgement [1,3,8]. Cardiac MRI has a sensitivity of 100% and a specificity of 83%. Cardiac computed tomography is another non invasive imaging modality used for acquiring the three-dimensional anatomical and functional information on the myocardium and pericardium. However, the limited temporal resolution, the usage of iodinated contrast and exposure of the patient to ionizing radiation, makes it less favorable [8]. Previously, the usefulness of CT scan for detecting LV aneurysm has been limited because of artifact created by cardiac motion. However advances in the CT scan technology allowed to make a correct diagnosis of LV pseudo aneurysm and is taken as alternative complimentary imaging modality [3]. CT is as accurate as 2-dimensional (2-D) echocardiography and provides improved localization and more accurate estimation of the extent of wall thinning after infarction, as compared with projectional techniques, such as left ventriculography, and with most scintigraphic techniques [9].

On this patient the diagnosis of LVA is considered by cardiac ultrasound and confirmed by CT scan, on both images there was huge out pouching 68.1 mm in diameter at the posterolateral left ventricular wall adjacent the mitral valve cusp with wide neck which measures 32.5mm on CT measurement and decreased contractility at the out pouching wall on ultrasound. LVA is favored than LVPA by the position of the aneurysm, by the wide neck of the aneurysm and the lack of myocardial defect in the aneurysm. The age of the patient, the position of the aneurysm and absence of laboratory and EKG evidence of MI favors the rare congenital and other non ischemic causes of LVA. The site is typical of submitral LVA which is a rare, almost exclusively in African black patients and of varied cause, such as congenital, inflammation, infection, or traumatic illness [2]. The infectious illnesses mentioned most often as possible causes of these types of aneurysms are syphilis and tuberculosis [2]. The lack of history of trauma rules out traumatic cause while biopsy is needed to exclude post infectious causes. Coronary arterial angiography and left ventricular angiography could exclude extremely rare cause of post MI LVA in this young patient. Unfortunately it was not done due to lack of the setup.

Surgical removal of the aneurysm as option of treatment is recommended on this patient as the patient had radiologic evidence for CHF. No setup in the country is capable of undergoing aneurysmectomy and this patient had been only on medical treatment in the first year after the imaging diagnosis. The symptoms at presentation including the chest pain have improved after the patient is treated with diuretics suggesting congestion associated with the LVA as a cause. As to the reference of the author this case is the first case of LVA reported in Ethiopia and the rest of East Africa.

4. CONCLUSION

In conclusion this is a huge LVA of annular submitral type diagnosed with ultrasound and CT scan of the chest in a young male Ethiopian patient. Complete work up and surgical management of this case is not available in Ethiopia and the author recommends improvement in cardiac workup and surgery in the country.

ETHICAL ISSUE

Verbal consent was taken from the patient and ethical clearance and permission to publish the case was obtained from the hospital administration.

COMPETING INTERESTS

Author has declared that no competing interests exist.

REFERENCES

1. Pai-Feng Kao, Wen Yueh Hung, Wen-Chin Ko, Hung-Yu Yang and Paul Chan. Left Ventricular Aneurysm with Normal

Coronary Angiogram: A Case Report and Literature Review Acta Cardiol Sin. 2005;21:153
2. Hertzeanu H, Deutsch1 V, Yahini JH, Lieberman2 Y, Henry N. Left ventricular aneurysm of unusual aetiology:585 report of two cases. Thorax. 1976;31:220.
3. Hitoshi Hirose, Iwao Matsunaga, and Michael D Strong, III Left Ventricular Pseudoaneurysm Found by CT Scan. Cardiovasc Med J. 2008;2:26–27.
4. Amit Kumar Chaurasia, Sivadasanpillai Harikrishnan, Valaparambil Kumar Ajith, and Jagan Mohan Tharakan. Mitral Stenosis, LV Aneurysm, Myocardial Bridge, and Myocardial Infarction: The Mystery Demystifie; International Cardivascular Research Journal. 2013;7(3):104-105.
5. D H Fitchett, M Kanji, Mitral subannular left ventricular aneurysm. A case presenting with ventricular tachycardia. Br Heart J. 1983;50:594-596. DOI:10.1136/hrt.50.6.594
6. Negareh Mousavi, Raena Buksak, Jonathan R Walker, Farrukh Hussain etal. Left ventricular pseudoaneurysm: The role of multimodality cardiac imaging; Can J Cardiol. 2009;25(11):e38.
7. Ba'albakmi HA, Clements SD. Left Ventricular Aneurysm: A Review. clin. Cardiol. 1989;12:5-13.
8. Lavanya Alapati, W Randolph Chitwood, John Cahill, Sanjay Mehra, and Assad Movahed, Left ventricular pseudoaneurysm: A case report and review of the literature. World J Clin Cases. 2014;2(4):90–93.
9. Kharwar RB, Sethi R, Sanguri R, Singh V, Narain VS. Multimodality imaging of submitral left ventricular aneurysm: Echocardiography; 2014;31(2):E44-7. DOI: 10.1111/echo.12410. Epub 2013 Oct 18.

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