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Case Report

Left Main Aneurysm; A Rare Surgical Encounter

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Abstract

Coronary artery aneurysms are a rare entity with left main involvement being the vessel least effected. We present an 80y old female patient with a large Left Main (LM) Coronary aneurysm associated with a non-ST elevation myocardial infarction. Due to the current significant size of this aneurysm, risk of rupture and acute myocardial infarction, the patient underwent total excision of her left main aneurysm, ligation of the left main coronary artery and coronary bypass grafting. Surgery, which is one of many modalities to treat such conditions, was successful. Other methods include conservative follow-up with or without anticoagulant therapy, percutaneous stenting and coil embolization. Surgical versus medical management is still controversial and should be implemented according to each case individually.

Keywords: Aneurysm; Bypass; Coronary artery Left Main

Case Presentation

An 80y old female patient was referred to our unit for consideration of surgery on a large LM aneurysm. She had also suffered and acute Non-ST elevation myocardial infarction but was clinically stable and responded well to medical therapy. Her aneurysm had been diagnosed three years or so before this presentation and had measured 1.8 x1.6 cm. Due to the stability of her condition at the time plus her advanced age, this had been followed up conservatively by her cardiologist. However, a year ago the size of the aneurysm had increased to 2.5 x 2.0 cm and on latest presentation measured an impressive 6.0 x 3.2 cmOn clinical examination, the patient was haemodynamically stable and pain free after management of her acute myocardial infarction. She gave a history of anxiety disorder, diabetes, hypertension, was currently a heavy smoker and had a permanent pacemaker.A coronary Angiogram showed a large LM aneurysm , 90% Left Anterior Descending (LAD) stenosis, 60% osteal Circumflex coronary artery stenosis and a normal right Coronary Artery (Figure 1). Both the LAD and circumflex arteries looked suitable for grafting including an Intermediate coronary artery from the Circumflex system. A pre-operative echocardiogram showed no major valvular abnormalities and an ejection fraction of 42% Due to the dramatic increase in aneurysmal size, the risk of rupture, and associated significant coronary artery disease, a preliminary surgical plan was put in place to either open or excise the aneurysm and bypass graft the LAD, Intermediate and distal Circumflex Coronary arteries under cardiopulmonary bypass utilizing the Left Internal Mammary Artery (LIMA) and the Left long saphenous vein. The patient underwent surgery via a median sternotomy and cardiopulmonary bypass after harvesting the LIMA and Left long saphenous vein as planned. The large aneurysm was evident on opening the pericardium but was located more posteriorly behind the main pulmonary artery which had to be totally transected to enable access and removal of the aneurysm (Figure 2). The saphenous vein was anastamosed distally to the circumflex Marginal coronary artery with excellent run off. The Aneurysm was dissected and mobilised to identify the origin of the left main coronary artery off the left coronary sinus, this was then ligated and divided at that point. This enabled better mobilization and then excision of the aneurysm in it's entirety (Figure 3). The LAD, main circumflex and the intermediate coronary arteries were identified exiting the aneurysm and were divided providing three separate top ends (or basically stumps) of left sided coronary

vessels. The circumflex stump was ligated and tied off as this was already grafted distally while the ramus intermediate stump was anastamosed end to side to the saphenous vein allowing inflow to that vessel as well. The LAD was not easily identified distally as it was an intramyocardial vessel, however the stump of the LAD provided a good target for an end to end anastomosis with the pedicled LIMA. This was achieved with excellent inflow (Figure 4). The proximal end of the vein graft was anastamosed to the aorta and the main pulmonary artery was reconstituted. Post-operatively, the patient was transferred to the intensive care unit in a stable condition.Post operative recovery was slow –30 days in hospital – followed by a prolonged rehabilitation period then home discharge in a stable condition.

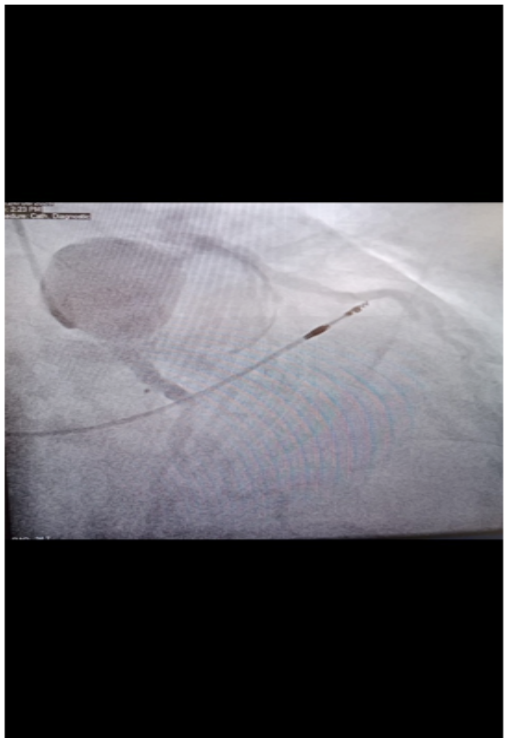


Figure 1: Angiogram showing a large Left Main Aneurysm.

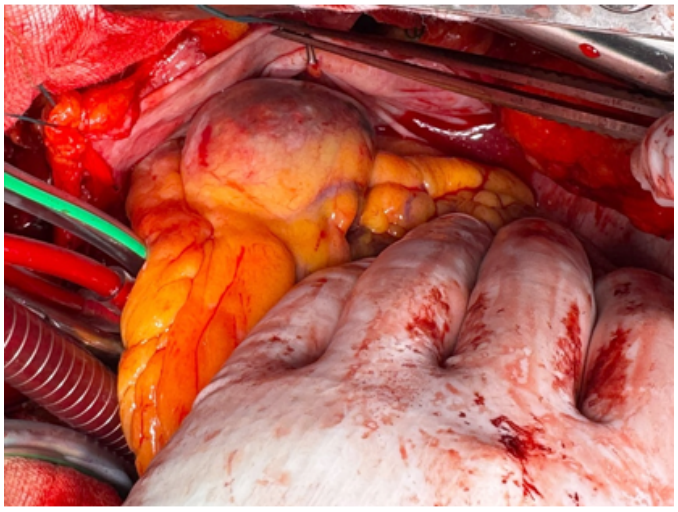


Figure 2: Left Main Aneurysm in Situ.



Figure 3: Excised Left Main Aneurysm.

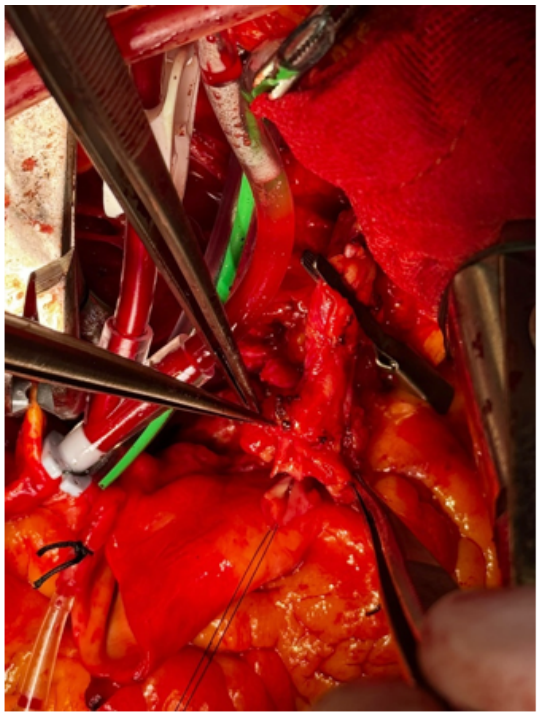


Figure 4: Left Internal Mammary Artery being anastamosed to Left Anterior Descending Coronary Artery.

Discussion

Coronary Artery Aneurysms (CAAs) are defined as dilated segments larger than 1.5 times the diameter of the adjacent vessel [1]. These are a rare entity with a male tendency occurring most often in the right coronary artery (40-70%), followed in frequency by left anterior descending (32%) and the circumflex (23%) arteries .Left main coronary aneurysms are very rare, encountered incidentally in approximately 0.1% of patients who undergo routine angiography[2]. The most common cause is atherosclerosis, accounting for at least half of cases diagnosed in adults [3]. Other causes include congenital malformation, rheumatic fever, Kawasaki disease, iatrogenic trauma during angioplasty, sub-acute bacterial endocarditis, syphilis and connective tissue disorders [4]. Angiography is the gold standard for diagnosis, other investigations include echocardiography, Computed Tomography and Magnetic Resonance Imaging. Aneurysms may be saccular or fusiform in shape and can be single or multiple. Histopathologically, thinning of the arterial media together with increased wall stress causes progressive dilatation of that segment of the coronary artery [5]. Most CAAs are asymptomatic and are an incidental finding. However, complications may arise due to flow stasis resulting in thrombosis and embolization leading to an acute myocardial infarction, although the incidence remains unknown. According to Forte et al. only 22.3% of patients presented with atypical chest pain out of the 66.7% with intraluminal thrombosis. In the presence of significant coronary disease, CAAs can cause angina due to aneurysmal artery spasms or acute coronary syndrome as seen in our patient. There is also an increased risk of cardiac tamponade and sudden death if rupture occurs. Arrhythmias may occur if the coronary aneurysm is large enough to compress adjacent structures such as the right atrium, right ventricle or sinus node area [6,7].

Management of CAAs should be individualized depending on clinical presentation, location and size of the aneurysm and patient demographics. Depending on the severity of the coexisting coronary stenosis and symptoms, patients with left main coronary artery aneurysms can be effectively managed either conservatively or surgically.Treatment modalities vary, consisting of medical management, surgical resection, and stent placement; however, the appropriate treatment for CAAs is controversial and depends on the particular clinical situation. Available treatment results have been based primarily on case reports and not on controlled studies, this has resulted in there being no specific therapeutic guidelines thus highlighting the need to fully assess each case individually. Conservative management generally consists of ongoing monitoring of the aneurysm and prevention of thromboembolic complications through the use of antiplatelet and anticoagulant therapy; however, their use is controversial, and must be based on the risk for thrombosis. Statins have also been recommended due to their pleiotropic effect [8]. More invasive techniques including percutaneous application of Polytetrafluoroethylene (PTFE)-covered stents have gained some popularity. These may effectively limit the expansion of CAAs by reducing the blood flow within the aneurysm, thereby preventing their rupture. Some authors have suggested that PTFE-covered stents should be limited to patients whose aneurysms are smaller than 10 mm in diameter [9]. Percutaneous strategies also include coil embolization, autologous saphenous vein-covered stent grafting, and one case report of drug-eluting stent implantation superimposed on a PTFE-covered stent graft [10]. Surgical management is recommended in symptomatic patients who have concomitant significant coronary artery disease or evidence of embolization leading to myocardial ischemia. Another indication for surgery is patients with progressive enlargement of the coronary aneurysm , more so in LM aneurysms as documented by serial angiographic measurement with a risk of rupture [11]. Surgical strategies that have been described include aneurysm ligation, resection, marsupialization with interposition graft, and coronary artery bypass surgery.

Conclusion

Coronary artery aneurysms in general are an uncommon and often incidental finding and are usually associated with atherosclerosis in adults. Left main coronary artery aneurysms are by far the least common of the coronary aneurysms and Angiography remains the

gold standard for diagnosis despite non-invasive techniques being available. There are no guidelines to screen for coronary aneurysms, although the literature has associated these with vasculitis. Once diagnosed, regular follow-up to monitor any significant change in size is recommended. Management is based on an individual case-by-case scenario and therefore the optimal treatment for patients with CAAs is unknown leading to controversy regarding the use of medical or surgical modalities.

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