

Surgical Treatment of Multiple Vein Graft Aneurysms in 72 Year Old Man

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Abstract

The rarity of saphenous vein graft aneurysms following coronary artery bypass graft surgery presents an interesting case, as seen in a 72 year-old gentleman who underwent his third bypass surgery for an aneurysmal graft. Information regarding the case was gathered using the Lehigh Valley Health Network medical databases. The 8 cm aneurysmal portion of the graft was resected successfully and replaced with a CryoVein. Following surgery the patient had relief of symptoms and recovered well. It was determined that the patient had two true aneurysms present, making surgery a necessity in this specific case.

Introduction

Saphenous vein graft (SVG) aneurysms following coronary artery bypass grafting (CABG) are rare but fatal complications that frequently require surgical repair.¹ We address a rare surgical case regarding an individual requiring a third sternotomy involving two SVG aneurysms with thrombus, 22 years following CABG. Information was gathered retrospectively using the LVHN database.

Case Report

In November of 2013, a 72 year-old man, a former smoker with a previous history of hypertension, hyperlipidemia, coronary artery disease, myocardial infarction, and coronary artery bypass graft surgery, was readmitted for a third sternotomy to resect a giant vein graft aneurysm forming on the right coronary artery (RCA) graft that had grown to a diameter of 8 cm. An additional aneurysm of 5 cm was also present on the circumflex vein graft.

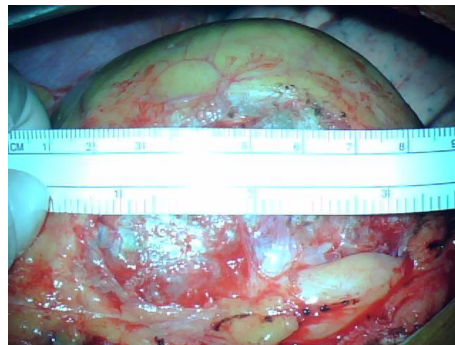


Photo of aneurysm of saphenous vein graft measuring 8 cm during surgery.

The patient had undergone coronary artery bypass graft (CABG) surgery in 1991, with his first redo CABG occurring in 2007. At that time, the vein graft aneurysm measured 4 cm but was not resected during the second bypass graft procedure to the left anterior descending (LAD) and circumflex arteries. Five years later, in 2013, the patient returned after a syncope episode and presented at the hospital with an enlarged aneurysm of the RCA vein graft, measuring 8 cm and a 5 cm aneurysm of the circumflex vein graft. A transesophageal echocardiogram (TEE) was performed, showing the presence of the aneurysms and as a result, inflow obstruction from the inferior and superior vena cava due to small atrial chamber size. The patient was scheduled for surgery in November and discharged from the hospital.



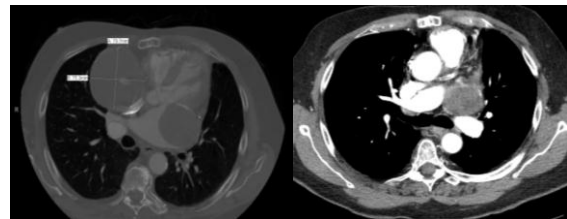
Patient chest x-ray pre (left) and post (right) surgery showing aneurysmal bulge and its removal.

At the time of surgery, the patient received general anesthesia, and a skin incision was made right below the clavicle to expose the axillary artery, through which the patient was heparinized. An 8 mm Hemashield conduit was anastomosed onto the right axillary artery and connected to the arterial line. A left groin incision was made to expose the femoral vein on the left side. This vein was cannulated with a 24 French venous cannula from Edwards Medical Supplies Inc. The patient was opened through a median sternotomy with an oscillating saw following the removal of previous surgical wires. A retractor was inserted into the mediastinum after the substernal structure was dissected. Upon opening, the vein graft aneurysm from the RCA was clearly visible and easily palpated. The aneurysm was first dissected off of adhesions, pleural tissue, and the right atrium. The ascending aorta was partly visible at this time, but it was a fairly short view. A segment of 3 to 4 cm of vein graft that was not aneurysmal was identified prior to the extremely aneurysmal portion. A right angle dissector was used to get around the normal caliber of the vein graft. The dissection continued along with the aneurysm out along the diaphragmatic surface of the heart, where the native RCA became visible on top of the vein graft aneurysm.

The aneurysm had grown over the years causing tenting and migration of the native RCA to occur. There was clear anastomosis and it was followed, causing

movement further distally into the heart itself. The distal PDA that appeared to be of reasonable caliber was dissected out. At this time the CryoVein was prepared, and the vein was incised to shape it. Using a beating heart on-pump technique, the distal PDA was opened with a 1.5 mm shunt for bleeding control, and the vein was anastomosed to the arteriotomy. The vein graft was sized to the original vein graft of the RCA and was clamped proximally. A punch hole was made in the vein graft for proximal anastomosis.

With the vein graft still clamped, the proximal neck of the vein graft aneurysm was cut into and disconnected from the normal segment of the old vein graft. After sewing over the cut end of the old graft, it could then be laid into the vein graft aneurysm after removing all thrombus and grommet material. The entire venous graft aneurysm was compressed and most of the aneurysmal wall was resected.



CT Scans of the patient pre (left) and post (right) surgery, showing presence and removal of the vein graft aneurysm.

There was a second aneurysm of the vein graft by the diaphragmatic surface of approximately 4 to 5 cm in diameter. This was resected in its entirety and disconnected from the native coronary artery. The native coronary artery was completely occluded and so the artery was clipped and divided. The patient was then weaned off of cardiopulmonary bypass without difficulties, protamine was given, cannulas removed and hemostasis was achieved. Following surgery the patient did have pneumomediastinum that resolved and a resolved left pleural effusion as a result of surgery over the five-

day period before discharge. Upon discharge the patient had an improved blood pressure and was recovering well.

Discussion

After CABG, aneurysms of SVGs are a rare complication that can occur from a few days to over 21 years after surgery.² Aneurysms can present as either true aneurysms or pseudoaneurysms. A relative distinction has been determined, that true aneurysms typically present as late complications of bypass surgery,³ while pseudoaneurysms may occur early after initial surgery at the anastomotic site.⁴ It has been determined that our patient developed two true aneurysms following both bypass graft procedures. True aneurysms have been found to occur more commonly in the body of the graft, present more than 5 years following bypass and are a result of vein graft necrosis, hypertension, trauma at harvest or implantation, or progressive atherosclerosis and thrombosis.⁵

Our patient presented with a single syncope episode, which is a common symptom presenting with SVG.² CT and CT with contrast were used to show the extent of the aneurysm and its relation to and impact on surrounding structures. In a study from the Annals of Thoracic Surgery using 15 patients' data, 25% had SVG aneurysms to the right coronary artery graft and 19% had the same to the circumflex coronary artery graft, which were the second and third highest locations of aneurysmal sites.⁶ In the same study, patients with previous histories of myocardial infarctions and hyperlipidemia were more at risk to develop SVG aneurysms,⁶ which were previous health factors for our patient. True aneurysms have been found to commonly form in the body of the vein graft as a result of chronic degeneration by vascular injury from hyperlipidemia and progression of atherosclerosis.^{7,8}

With complications presenting as a result of compression from the aneurysmal graft, surgical intervention for this patient was required. Surgical correction was necessary due to previous heart history, multiple aneurysms, possibility for rupture, and presence of thrombus within the aneurysm. Aneurysms of SVGs are frequently unknown until symptoms arise or the discovery is made coincidentally with other medical testing. Patients with increased risk factors for SVG aneurysms should follow-up with physicians around the 10-year mark post surgery to check for aneurysm formation.

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