

Coronary Artery Bypass Grafting in Patients with Intracoronary Stent Related Complications

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Abstract

Intracoronary stenting is an established modality of treatment to relieve narrowing of coronary arteries. Increasing use of stenting is bringing to light new complications. Here we present our experience with a newly emerging indication for surgical intervention for cardiac surgeons. This new indication is complications arising from intracoronary stents. Very little is available in the existing literature to guide the surgeon. We explain our rationale in doing things with two of our cases.

Key Words: Coronary stent, Surgical removal

Introduction

There has been a change lately in the way we help patients with coronary artery disease. Cardiologists are becoming more aggressive with percutaneous coronary artery interventions. Now multiple, complex, diffuse and smaller coronary vessels are being stented. As a result the surgeons are being referred patients with extensive, diffuse vessels for coronary artery bypass grafting (CABG). Increasing stent insertion is also resulting in more procedure related complications like undeployed or improperly deployed stents. Furthermore complications resulting from the natural progression of coronary artery disease such as stenosis before, within and after the stent are increasing. These are putting forward new set of challenges in front of the surgeon wishing to help the patients with CABG.

We present our experience with two different cases. One represents complications due to natural progression of atherosclerosis and the other an example of procedural problems.

Case Summary

Case 1:

A fifty four year old hypertensive, diabetic and dyslipidaemic gentle man was admitted to the coronary care unit (CCU) of our hospital on 26.08.06. He complained of sudden severe compressive chest pain without any radiation and associated with severe sweating for the last one hour. This patient also gave a history of anterior myocardial infarction (MI) in 2003. During that episode he was thrombolysed in another hospital followed by per cutaneous intervention (PCI) to the left anterior descending (LAD) artery in our hospital. Two stents were implanted in tandem at the time. However the patient had lost all documentations from that admission.

The patient was stabilized as per established medical management protocols including thrombolysis. Thereafter a repeat coronary angiogram (CAG) was done on 30.08.06. There was also an ostial stenosis of the large diagonal (Fig 1 &2) This showed in stent restenosis along the entire length of the implanted stents. The patient continued to have intermittent chest pain at rest with ECG changes despite maximum medical management. The patient was discussed between the cardiologists and the surgeons and it was decided to graft the distal LAD and the large diagonal with a view to relieve the symptoms. Echo study showed apex dyskinetic, basal and mid portion of anterior septum severely hypokinetic, diastolic dysfunction grade II, Ejection Fraction (EF) 40%.

The patient was taken to the operating room (OR) on 07.09.06. Under general anaesthesia the heart was approached via a median sternotomy. The patient was attached to the heart lung machine using routine aortic and two stage single venous cannulation. On bypass the patient was cooled down to 28 degree Celsius, aorta cross clamped and the heart was arrested with antegrade cold blood cardioplegia. On palpating the LAD we found to our horror that the stents extended to cover most of the length of the vessel. The short distal segment that was free of stents lumen not accepting a 1.0 mm metal probe. We realized there has been a misjudgment and miscalculation on our part interpreting the angiographic findings. As we were committed now it was decided to go for endarterectomy combined with explantation of one or both the stents. This is something we had not done before. We made two small arteriotomies, one over the stent covered portion and another one over the LAD segment free of disease. By using the traction method we were able to remove the atheroma along

with the distal one of the two stents (Fig 3). We were quite uncomfortable at the time of pulling on the stent. Because it elongated with traction and at times it looked the overlying epicardium will give away. However with patience and controlled traction we were able to achieve our objective. We anastomosed the previously harvested left internal mammary artery (LIMA) to the proximal arteriotomy and closed the distal one with a vein patch (Fig 4). Thereafter we made an arteriotomy in the heavily diseased diagonal artery and grafted it with reversed long saphenous vein. The surgery proceeded smoothly. Patient was rewarmed, disconnected from the heart lung machine and a routine closure was done. Bypass time was 83 minutes and the cross clamp time was 56 minutes.

The patient was shifted to the intensive care unit, extubated the same day, shifted to the general ward on the second post operative day and discharged home on the seventh post operative day. The patient continued to be asymptomatic till about three months after surgery. He was readmitted with fast atrial fibrillation. He responded well to correction of hypokalaemia and oral amiodarone. The patient was discharged again after a short hospital stay. It has been four years since the surgery. The patient is asymptomatic on a minimum of medication and leading a normal life.

Case 2:

A fifty eight year old hypertensive, ex-smoker gentleman attended the cardiology out patient department of our hospital after having a coronary angiogram (CAG). This was done in another hospital following a cardiac ischemic event. The CAG report stated a case of double vessel coronary artery disease involving the principle obtuse marginal (OM) branch having 80% proximal lesion and 100% occlusion of the posterior left ventricular (PLV) branch. Rest of the coronary artery tree was normal. The recommendation was for percutaneous intervention (PCI) to the principle OM artery.

The patient was taken to the Catheterization laboratory on 09.07.09. Target vessel was approached via the femoral artery using a 6F sheath. Guide wire was passed over the target lesion over balloon support. The lesion was predilated in succession. A TAXCOR (DES) 2.75+32mm stent was deployed at the site of the lesion. The balloon at the time of deployment did not inflate properly. So on withdrawal of the balloon the stent recoiled into a position proximal to the lesion. All subsequent measures to retrieve the stent or to salvage the situation failed.

The patient was put on intra-venous heparin infusion. It was decided that a surgical extraction of the misplaced stent with a graft to the offending vessel would be done. The patient's family arranged the necessary resources and go ahead for the surgery was given.

The patient was taken to the operating room on 11.07.09. The heart was approached via median sternotomy. The heart was connected to the heart-lung machine via routine aortic and two stage venous cannulation. Cardio-pulmonary bypass (CPB) was established and the patient was cooled down to 32 degree Celsius. The aorta was cross clamped and the heart was arrested with antegrade cold blood root cardioplegia with topical cooling. Lesion was identified by digital palpation. The culprit obtuse marginal artery was opened proximal to the site of the lesion. The vessel itself at the site was heavily diseased. The undeployed stent was found to have migrated proximally into the left main stem with only the tip visible. It was grabbed with a pair of fine Debaquey forceps and gently coaxed out (Fig 5). The site was repaired with continuous 6/0 prolene suture. A harvested long saphenous vein was reversed and a graft constructed beyond the lesion on the OM. The PLV artery was too small to be grafted. Bypass time was 52 minutes and cross clamp time was 27 minutes. The rest of the operative and post operative course was uneventful. The patient was discharged home on the 6th post operative day with appropriate advice and medications.

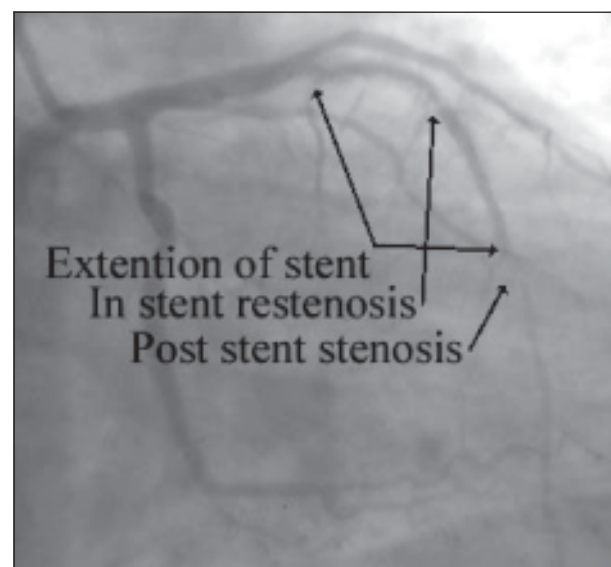
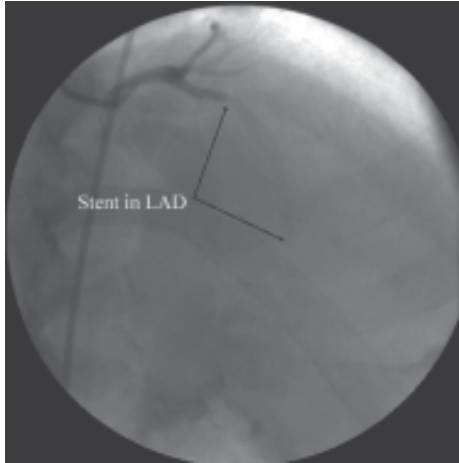
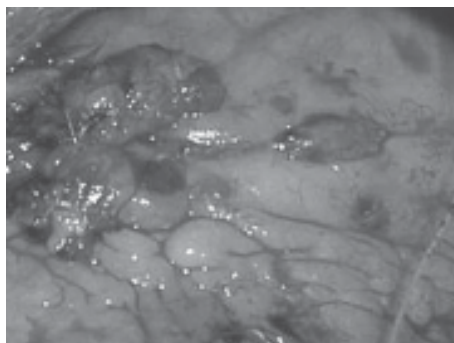
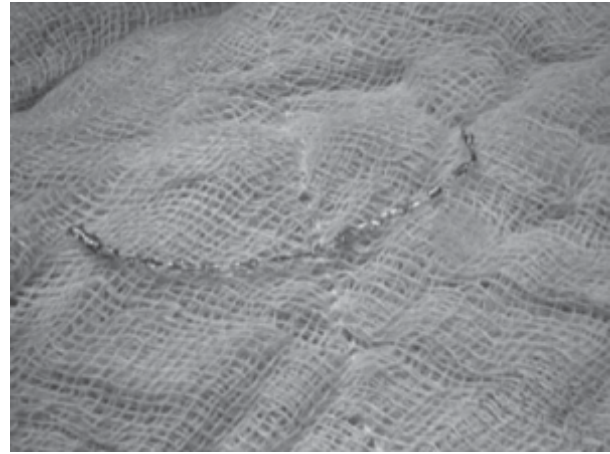


Fig-1:

**Fig-2:****Fig-3:****Fig-4:****Fig-5:****Discussion**

Cardiac surgeons will have to face stent related complications more frequently in the future. Accordingly new skills have to be acquired and new guidelines have to be laid down to deal with such clinical scenarios. There is very little available in the published literature.¹⁻⁴ We hope our small experience will help the doctors in making decisions in helping their patients.

References:

1. Walley VM, Marquis JF, Keon WJ. Successful surgical endarterectomy of a stented coronary artery. *Ann Thorac Surg* 1999; 68: 2346-49.
2. Fukui T, Takanashi S, Mihara W, Ishikawa K, Hosoda Y. Coronary endarterectomy and stent removal after iatrogenic perforation. *Ann Thorac Surg* 2004; 77: 708-11.
3. Ergun Demirsoy, Altay Tandogan, Oguz Yilmaz, Faruk Tukenmez, Suavi Tufekcioglu, and Bingur Sonmez. Grafting the Restenosed Coronary Artery after Removal of Multiple Failed Stents by Endarterectomy. *Tex Heart Inst J* 2006; 33(2): 262-63
4. Eldad Erez, Itzhak Herz, Eitan Snir, Ehud Raanani, Hanoch Menkes, Bernardo A. Vidne. Surgical removal of stent entrapped in proximal left coronary artery system. *Ann Thorac Surg* 1996; 62: 884-85.