Case Report

Redo MIDCAB in a Septuagenarian in our Setting, Fantasy or Fact? - A Case Report

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Abstract:

Worldwide growth in elderly population has led to an upsurge in the number of septuagenarian (>70 years of age) patients requiring surgical treatment for coronary artery disease. Elective coronary artery bypass grafting (CABG) in the older patients are associated with acceptable risks of adverse events and should be undertaken for appropriate indications without unnecessary hesitation. Redo coronary surgeries carries one of the highest mortality rates amongst redo cardiac surgeries, both separately or in combination with other pathologies. As a result, minimally-invasive direct coronary artery bypass (MIDCAB), was preferred to avoid the complications of re-sternotomy. We hereby present a case report of a septuagenarian patient with post CABG (2014) unstable angina with old myocardial infarction (extensive anterior) who was treated successfully, by us and to our best knowledge in the published articles this is probably the first time, a re-do MIDCAB technique has been implemented in our country.

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Introduction:

The expansion of the elderly population worldwide has led to a dramatic increase in the number of patients of older age requiring surgery for coronary artery disease[1,2]. Although advanced age has long been considered a risk factor for mortality and morbidity following coronary revascularization[1,2], the current thought is that there is no justification for refusing a patient a cardiac surgery just because of age. Elective coronary procedures are associated with acceptable risks of adverse events and should be undertaken for appropriate indications without any reluctance. Older patients undergoing coronary artery bypass grafting (CABG) often have significant comorbid illnesses like prior stroke, renal insufficiency, pulmonary disease, which may escalate postoperative morbidity[1].

Although, recent advancement in percutaneous coronary interventions (PCI) have led to a decline in repeat coronary artery bypass grafting[3], certain patient (patient with unfavorable coronary anatomy, CKD, etc) may not be proper candidate for repeat PCI, in whom surgery is only option left. Redo coronary surgeries increases the risk of mortality due to the increased risk of graft injury and subsequent myocardial injury upon sternal re-entry and carries one of the highest mortality rates amongst redo cardiac surgeries, both separately or in combination with other pathologies. Hence, the establishment of a solid indication is required, in the absence of any other alternative, along with specific work up to obtain the

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relationship between different anatomical structures, including previous graft patency and location of grafts[4,5,6] should be done.

Case report:

A 71 years old, hypertensive, non-diabetic gentleman got admitted into SHL through ER with the complaints of central compressive chest pain for one day prior to admission. Pain radiated to right arm and was associated with mild shortness of breath.

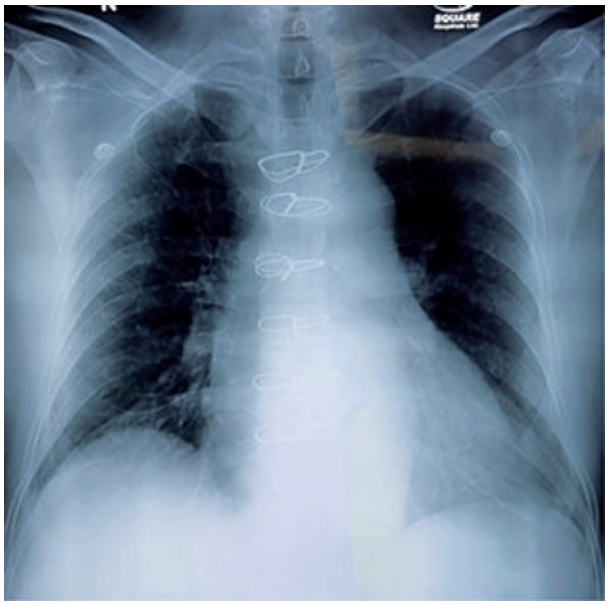

Fig.-1: *Pre-operative chest X-ray showing cardiomegaly and suture from previous surgery*

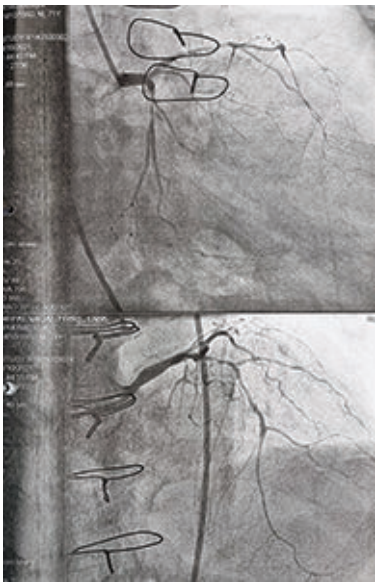

Fig.-2: *Pre-operative CAG*

He is known patient of IHD with OMI (Ext. Ant), for which he underwent CABG in 2014. Patient has no H/O CVD, CKD, COPD or Bronchial Asthma.

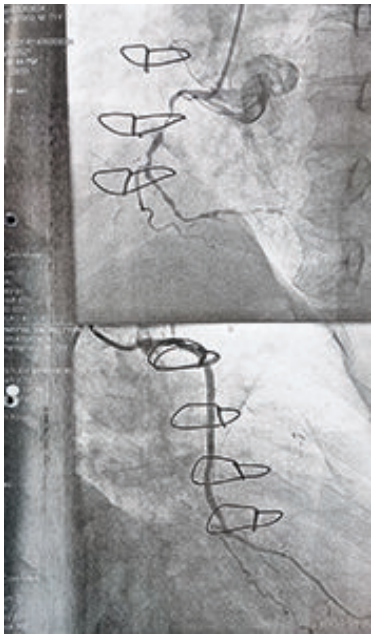

Fig.-3: Pre-operative CAG

Biochemical investigations revealed ALT 127 IU/L, ALP 199 IU/L, CRP 23.1 mg/L, S. Creatinine 1.2 mg/dl, ESR 60 mm at the end of 1st hour, NT-proBNP 619.6 pg/ml.

Pre-operative Color Doppler echocardiogram showed, thin, echogenic, akinetic mid anterior wall, mid anteroseptum & apex with severely hypokinetic mid basal inferior wall. Severe LV dysfunction (LVEF-30%). Dilated LV. Mild MR. Trivial TR (PASP-30 mm of Hg). Normal RV function. No pericardial effusion or intra-cardiac thrombus seen.

Coronary Angiogram showed LMCA: Mild distal LM stenosis. LAD: 50% Ostial stenosis followed by 95% stenosis in late proximal LAD. LCx: Non dominant artery having 70% stenosis in proximal LCx. OM_1 is 100% occluded from proximal segment. RCA: Dominant artery, 100% occluded from distal RCA. RSVG to OM & PDA widely patent. RSVG to LAD: 100% occluded from origin. LIMA: Normal. Native triple vessel coronary artery disease.

Pre-operative carotid Doppler showed, atherosclerotic changes with intima-medial thickening and hard plaques formed in both CCAs and soft plaques formed in the left CCA. Features of total occlusion of the right ICA and partial occlusion in the distal right CCA with thrombus. Features of ≥70% but less than near occlusion in the left ICA.

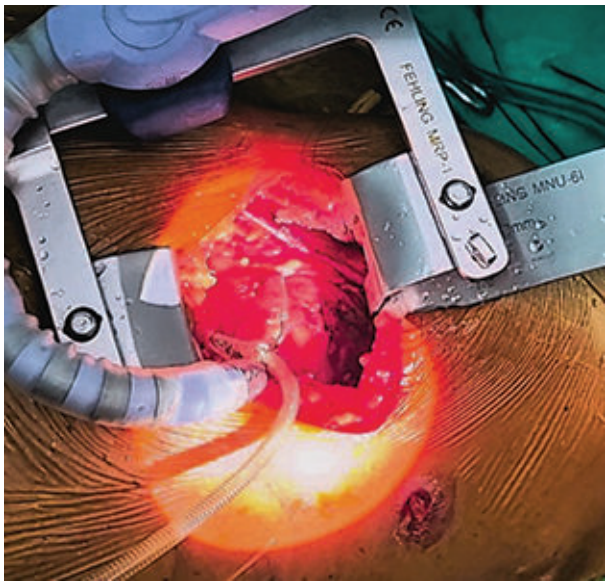

Fig.-4: Per-operative picture of IMA harvesting

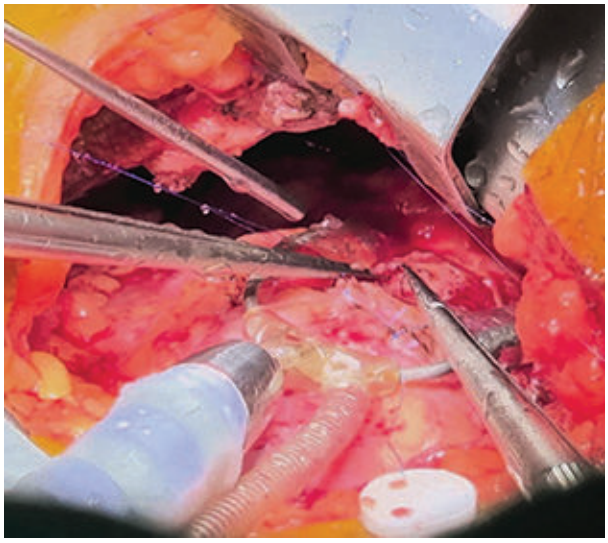

Fig.-5: Per-operative picture of LIMA-LAD anastomosis

His pre-operative EUROScore II was 41.84%.

After optimization of patient's status, under all aseptic precautions, under GA and proper positioning (30° right lateral) patient was operated by thoracotomy at 5th inter-costal space with single lung ventilation (right). Mild to moderate adhesion was found around heart and left lung, with the surrounding structures. Careful dissection was done to identify LIMA and harmonic scalpel assisted LIMA harvesting was done. After heparinization previous RSV to LAD (distal) identified. LIMA to LAD anastomosis done,

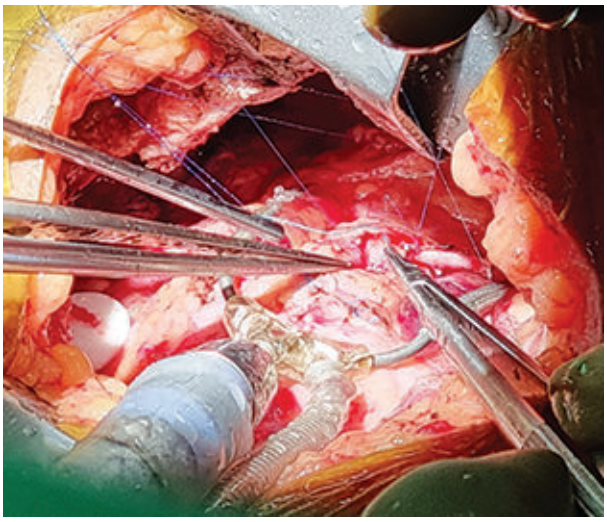

Fig.-6: *Per-operative picture of LIMA-LAD anastomosis*

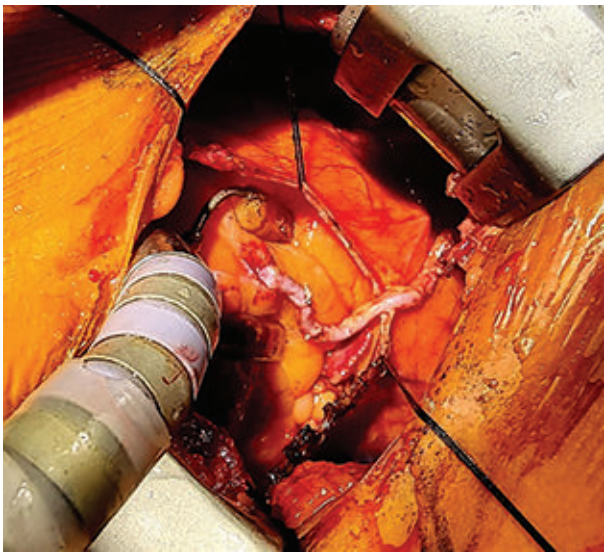

Fig.-7: *In-situ LIMA-LAD graft just before chest closure*

distal to previous distal anastomosis with suction stabilizer. After protaminization hemostasis achieved and wound closed in layers keeping chest drain tube in situ.

Total operative time was 110 minutes.

Patient was shifted to ICU without any inotropic support. He was extubated after six hours of ICU admission. His subsequent post-operative days were eventless.

Post-operative Color Doppler echocardiogram showed, akinetic mid anterior wall, mid anteroseptum & apex with hypokinetic mid basal inferior wall. Moderate LV systolic dysfunction (LVEF-35%). Dilated LA & LV. Mild MR. Trivial TR (PASP-40 mm of Hg). Good RV function. No pericardial effusion or intra-cardiac thrombus seen.

Fig.-8: *Post-operative picture showing left sub-mammary scar of MIDCAB and a large median sternotomy scar of previous surgery*

Fig.-9: *Post-operative picture showing left sub-mammary scar of MIDCAB and a large median sternotomy scar of previous surgery*

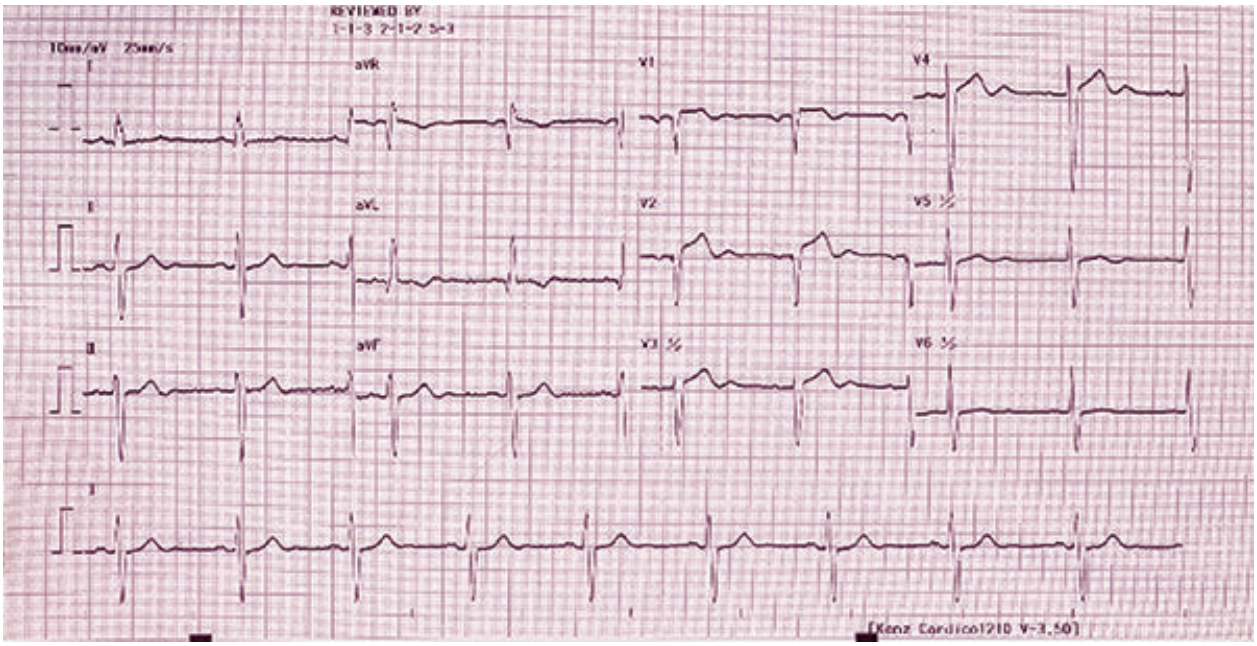

Fig.-10: *Post-operative ECG*

Patient was discharged on 7th POD without any complications. At follow after one-month patient was doing extremely well at routine daily activities.

Discussion:

In a redo coronary surgery, the previous grafts normally remain surrounding the heart, and connects the

ascending aorta to the coronary targets. This is important as, these would normally cross the midline at different levels and will inadvertently lie closely to the sternum, exposing grafts to the risk of injury during redo sternotomy. The biggest risk with a redo CABG is typically associated with the repeat sternotomy. Because of the scaring and adhesions after an initial sternotomy, surgeon usually loses the definitive planes and anatomical clarity they may have experienced during the primary surgery. Complications of repeat sternotomy and dissection can include damage to the heart itself, the coronary vasculature (including patent bypass grafts), the great vessels, the lungs, and any surrounding nerves[7]. Moreover, repeat CABG is often associated with higher operative times, likely because of more extensive dissections, adhesion, increased bleeding, inability to identify the target vessels. Consequently, increased operative time leads to increased inflammatory response, increased risk of infection, increased risk of transfusion reactions and increased coagulopathy[8,9]. As a result to avoid many of the negatives of re-do sternotomy we preferred MIDCAB procedure for our patient.

Patent grafts isolation is essential for a successful redo CABG[10], as it can contravene the protective effects of cardioplegia by maintaining a continuous flow of normal warm blood with low pottasiun. Moreover, in redo coronary surgery where previous venous graft is present, intraoperative myocardial infarction may occur due to thrombus dislodgment during manipulation of venous grafts[11].

To overcome the complications of CPB in redo coronary surgery various techniques are described including off-pump approach. Ascione[12] et al, demonstrated that performing coronary surgery on the beating heart without CPB reduces morbidity in elective patients when compared with conventional technique[12].

Minimally-invasive direct coronary artery bypass (MIDCAB) technique is now-a-days a popular procedure, that commonly include a left internal mammary artery to the left anterior descending coronary artery graft, which supplies the interventricular septum and a significant area of the anterior surface of the heart via a small left, lateral thoracotomy approach[13]. The LIMA graft is considered the most important as patency rates are excellent compared to other types of grafts. In our case all three grafts done previously were venous grafts, so previously untouched LIMA was harvested meticulously with harmonic scalpel and LIMA to LAD graft was done.

When performed off-pump MICS-CABG is associated with a reduction in perioperative stroke rates due to less or no ascending aortic manipulation[14]. In our case no aortic technique was obligatory as the patient had bilateral carotid stenosis. In addition MIDCAB also provide the patient with other already known benefits of MICS[15].

Proper planning with such complex cases like early exposure of femoral vessels to allow emergency cannulation if required and availability of appropriate instrument provides the team with the confidence to deal with any complications that may arise.

Conclusion:

More patients will need redo revascularization day by day and the complexity of coronary artery disease is on the rise as the population ages. In the aging population, the risk profile of the patients increases, that creates a challenging situation for the surgical team. Neverthless, MICS-CABG procedures are technically challenging, have a steep learning curve, and requires longer operation time. Currently we are running dedicated MICS program in our hospital and MIDCAB is one of the strong tool in our armamentarium to serve the grieving myocardium. Yet again, in cardiac surgery teamwork is essential to achieve the desired outcome for every surgical procedure especially in this type of challenging procedure.

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