Case Report

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Coronary Artery Bypass Grafting Using Total Arterial Conduit (LIMA-RIMA) On A Young Female : A Case Report

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Abstract

Background : Coronary Artery Bypass Grafting (CABG) although commonly done in our population, there is an alarming increase of young candidates for CABG now-a-days. Evidence suggests, young patients are more benefitted with total arterial grafts. But, total arterial grafts in the form of bilateral mammary artery harvesting may provoke sternal complications especially in the women.

Case Presentation: We have successfully treated a young diabetic, female patient in our center with bilateral mammary grafting without any complications and after months of follow-up patient is leading a symptom free life. As per our knowledge this is the first reported case of Bilateral Internal mammary Artery (BIMA) grafting in a female patient in our institute.

Conclusion: Through augmented preparation Bima grafting can be safely done in females in indicated cases keeping careful consideration of potential sternal healing issues.

Key words: BIMA-Y in female sex; CABG in women; LIMA-RIMA Y in female; Total arterial revascularization in female.

Introduction

Coronary artery disease remains one of the leading causes of death in women and the Coronary Artery Bypass Grafting (CABG) even after major advancement in treatment modalities, still remained the higher cause of death in women than in men.[1] Data obtained over decades has supported the use of Left Internal Mammary Artery (LIMA) to graft the Left Anterior Descending artery (LAD) to prolong patient survival. The common and usual practice of surgical revascularization in our population is, LIMA is grafted to the LAD, whereas other coronary arteries are grafted with Saphenous Vein Grafts (SVG).

Guidelines and evidence suggest that the right IMA (RIMA) can be used in addition to LIMA Bilateral Internal Mammary Artery (BIMA grafting) as well. The RIMA is biologically equivalent to LIMA in terms of longevity.[3-6]

Moreover, the ART trial has demonstrated that, multiple arterial grafts and total arterial grafting has significant benefits in clinical outcomes (In terms of myocardial infarction, stroke, mortality, repeat revascularization etc) in comparison to single arterial grafts.[2]

Case Presentation

Mrs. X, a 30-year-old diabetic, normotensive, mother of a 9-year-old, pleasant lady got admitted at Square Hospitals, Dhaka, with the complaints of burning diffuse chest pain radiating to neck for the last 2 weeks. As pain was gradually becoming severe, she got admitted to a renowned hospital in Dhaka and was diagnosed as acute myocardial infarction (Antero-septal) and was treated with 6 doses of LMWH. After stabilization, in the same setting, she underwent coronary angiogram which revealed triple vessel coronary artery disease and was recommended for Coronary Artery Bypass Grafting (CABG). She was also suffering from Polycystic Ovarian Syndrome (PCOS) cystic acne, androgenic alopecia and anxiety disorder. So, she got admitted under our care for better management and we performed CABG using both mammary arteries (LIMA-RIMA). Patient's recovery was excellent and she was discharged symptom free on 6th post-op day.

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Relevant Investigations and Other History

On admission blood picture- Hb%: 14.5 g/dl, Total count: 9.61 K/µL, Platelet count: 158 K/µL. Preoperative transthoracic echocardiogram showed- i) Apex, mid LV & mid distal IVS akinetic ii) Moderate to severe LV systolic dysfunction (EF:30-35%) iii) Mild MR & TR iv) PASP- 35 mmHg v) Normal cardiac chamber dimensions, vi) No pericardial effusion/ intracardiac thrombus seen.

CAG revealed:Normal left main coronary artery. Osteo-proximal and mid LAD has got 90-95% lesion. LCx is non-dominant and mid portion has got 99% lesion involving the origin of principal OM. RCA is dominant vessel, mid and distal RCA has 80-85% stenosis.

Patient has a history of taking oral contraceptives and insulin for the treatment of PCOS and diabetes respectively. She has no known history of obstructive pulmonary disease, hypertension or drug and food hypersensitivity.

Operative Procedure

Under all aseptic precautions after proper painting and draping, a median sternotomy was done. Thymus was dissected along with pericardiotomy. LIMA, RIMA were harvested and heparinization was done. LIMA-RIMA "Y" anastomosis was constructed. LIMA to Left Anterior Descending (LAD) RIMA to Obtuse Marginal (OM2) and Posterior Descending (PDA) (Sequential) distal anastomoses were done with 8-0 prolene suture. Protamine was given. After maintaining proper hemostasis, the wound was closed in layers keeping two mediastinal and one left pleural drain tubes in situ. Dressing was applied. Patient was shifted to intensive care unit with minimum inotropic support and was extubated on the day of surgery. Her post-operative chest drainage was minimum and she was mobilized the very next day. Her tube drains were removed on 2nd post-op day and she was shifted to ward on the on the same day. Her post-operative recovery was excellent and she was discharged on the 6th post-op day. Follow-up after one month showed healthy wounds, normal sinus rhythm of heart and transthoracic echocardiogram showed-i) Apex and distal IVS hypokinetic ii) Moderate LV systolic dysfunction (EF-40%) iii) Good RV function iv) Normal cardiac chamber in dimension v) No pericardial effusion/ intracardiac thrombus seen.

Discussion

BIMA grafting has shown survival advantage over CABG with only LIMA grafting, in several observational studies and meta-analyses.[3-6] The extensive use of arterial conduits (>2) in comparison to CABG with 2 arterial grafts, may provide additional late mortality benefit. One meta-analysis comprising 38 studies (174,205 patients) has shown 7.25 years reduced mortality rate with the use of BIMA.[6] Observational studies and two meta-analyses supported the use of ≥3 arterial grafts including total arterial revascularization.[7,8]

Increased BIMA volume was associated with protocol adherence and suggests importance of surgical expertise.[9] Low institutional BIMA volume was associated with higher operative mortality rate with BIMA grafting. The increased risk of sternal infection with BIMA grafting should be considered during pre-operative planning for CABG.[10]

On the contrary, despite the higher risk of sternal wound infection in case of BIMA grafting in the diabetic patients, there is lack of evidence that it affects the mortality, rather patients who receives BIMA have a long-term survival benefit.[11] In our case we observed no sternal complications and patients recovered smoothly regarding the surgical wound.

Conclusion

Over the period of time, the younger population are increasingly affected by diabetes, coronary artery disease, hypertension, etc and eventually becoming candidates for surgical revascularization. Bilateral mammary artery grafting in high volume centers should be the principal treatment modality irrespective of sex if not contraindicated otherwise. Proper pre-operative planning, patient preparation (Intra-nasal mupirocin, tight per-operative glycemic control, etc) rigorous surgical techniques (Topical application of vancomycin at sternal margins, skeletonization of mammary during harvesting, etc) might help in better patient recovery.

Recommendations

More cases like this can help us to compare, optimize and upgrade the existing management protocol.

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Contribution of authors

SDG-Conception, design, citing references, drafting, critical revision & final approval.

SNE-Citing references, drafting & final approval.

SB-Citing references, drafting & final approval.

MH-Conception, design, critical revision & final approval.

PKC-Conception, design, critical revision & final approval.

Disclosure

The authors declare no competing interest.

Informed Consent

Patient was informed and consent was taken about this publication and the necessity of such publication.

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