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Bilateral Internal Mammary Artery Grafting in Diabetic Females - Incidence of Sternal Wound Infections: A Case Study

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Abstract: ***Bilateral Internal mammary artery grafting in diabetic females-Incidence of sternal wound infections-a case study Introduction Coronary artery bypass graft (CABG) surgery is the gold standard for revascularisation in patients with multivessel coronary artery disease. The left internal mammary artery (LIMA) and saphenous vein are the most commonly used conduits in CABG. However, recent studies suggest that use of bilateral IMA is associated with significantly better long-term outcomes. In spite of the benefits, most surgeons are reluctant to use both IMAs, because it is technically more demanding, time-consuming and is associated with marginally higher sternal wound infection rates. In our study the safety of using bilateral IMAs with regard to early postoperative outcomes with special reference to deep sternal wound infections has been addressed. Our study provides enough evidence to convince more surgeons about the advantages of bilateral IMA grafting especially in diabetic female patients. Results Postoperative recovery was uneventful in all 18 patients with no evidence of sternal wound related complications in early 30 days. All patients remained free of angina and early readmission. Conclusion: Although bilateral mammary artery (LIMA-RIMA Y) grafting is more technically demanding, its use in female patients has slightly more advantages because of the quality and wide lumen of mammary artery as internal mammary artery is habituated to supply and deal with high blood flow naturally as it also supplies mammary gland. As Coronary artery disease incidence is more in Fatty, obese, less mobile, bulky female patients, increased tissue and muscle mass in chest, mammary gland and upper abdomen makes high blood flow demanding situations through internal mammary artery. This makes internal mammary artery bound to become large and wide lumen, making it the perfect conduit of choice for coronary revascularization in these patients.***

Keywords: Bilateral Internal mammary artery grafting, diabetic females, Incidence of sternal wound infections

1. Introduction

Coronary artery bypass graft (CABG) surgery is the gold standard for revascularisation in patients with multivessel coronary artery disease. The left internal mammary artery (LIMA) and saphenous vein are the most commonly used conduits in CABG. However, recent studies suggest that use of bilateral IMA is associated with significantly better long-term outcomes. In spite of the benefits, most surgeons are reluctant to use both IMAs, because it is technically more demanding, time-consuming and is associated with marginally higher sternal wound infection rates. In our study the safety of using bilateral IMAs with regard to early postoperative outcomes with special reference to deep sternal wound infections has been addressed. Our study provides enough evidence to convince more surgeons about the advantages of bilateral IMA grafting especially in diabetic female patients.

Surgical coronary revascularization is the gold standard for the treatment of coronary artery disease. [1, 2] The use of the left internal thoracic artery (LITA) to bypass the left anterior descending coronary artery (LAD) is considered superior as many studies have proved its advantages over vein grafts. [3] An additional benefit has been documented by few studies when both mammary arteries are used; however, studies suggesting the superiority of bilateral internal thoracic artery (BITA) grafting over single internal thoracic artery (SITA) grafting still remains a topic of debate due to increased risk of deep sternal wound infections (DSWI) in BIMA procedures. [4]

In our study, BIMA grafting was found to be safe and effective for older patients (60–75 years). Similar to younger patients (< 60 years), BIMA grafting in elderly patients (60–75 years) could also achieve a satisfactory short-term (3 months) result. Thus, advanced age (60–75 years old) should not be a contraindication for BIMA grafting. It is evident from many studies that BIMA grafting does not increase perioperative mortality. BIMA grafting can be performed with an operative mortality in the range of 1–2% if patients are carefully chosen.[5-9]

Sternal dehiscence is the most common expected complication of BIMA grafts, particularly in diabetic patients. Most studies have documented only a marginal increase in the risk ofsternal wound infctions, even in diabetic patients. Ioannidis and colleagues reported that harvesting BIMA grafts increased the risk of DSWI from 0.4% to 1.3%, [15] whereas Matsa and colleagues found it increased the risk from 1.7% to 2.6%. [10]

2. Methods

Techniques-Off pump Coronary artery bypass surgery

18 female patients with class 3 to 4 angina were studied.

Time of study-September 2021 to March 2022.

Inclusion criteria

Diabetic female patients > 60 years

Patients having Coronary artery disease-Significant triple vessel disease, double vessel disease, Left main disease were included in the study.

Surgical technique

Median Sternotomy, Harvesting of Pedicled left internal mammary artery (LIMA) and skeletonised full length right internal mammary artery (RIMA) followed by LIMA-RIMA 'Y' anastomosis. LIMA was used to graft Diagonal artery and Left anterior descending artery (LAD) sequentially. Y extension from RIMA was used to graft Ramus, Obtuse marginals (OM), Posterolateral branch (PLV), Posterior descending artery (PDA) and even the distal right coronary artery in few cases sequentially according to the lesions in target vessels. Sternal wiring was done with No 6 steel.

3. Results

Postoperative recovery was uneventful in all 18 patients with no evidence of sternal wound related complications in early 30 days. All patients remained free of angina and early readmission.

4. Conclusion

Internal mammary artery is the conduit of choice for Coronary artery revascularization. Although bilateral mammary artery (LIMA-RIMA Y) grafting is more technically demanding, its use in female patients has slightly more advantages because of the quality and wide lumen of mammary artery as internal mammary artery is habituated to supply and deal with high blood flow naturally as it also supplies mammary gland. As Coronary artery disease incidence is more in Fatty, obese, less mobile, bulky female patients, increased tissue and muscle mass in chest, mammary gland and upper abdomen makes high blood flow demanding situations through internal mammary artery. This makes internal mammary artery bound to become large and wide lumen, making it the perfect conduit of choice for coronary revascularization in these patients. In these female patients, it has been seen that high amount of loose areolar tissue and fat makes Internal mammary artery harvesting also easier.

Other benefits of BIMA revascularisaton

1) Avoids extra surgical incision and scars in thigh, legs (for vein harvesting) and forearms (Radial artery harvesting).
2) Cosmetically better as there is no additional surgical incision apart from median sternotomy.
3) Less pain and minimal use of analgesics.
4) No issues related to limb movements during physiotherapy, leading to easy, comfortable and early mobilisation,
5) Early mobilisation out of bed reduces abdominal issues like constipation, distension etc, less need of antacid and laxative.
6) Skeletonised RIMA harvesting doesn't compromise sternal wound healing as there is less devascularization of sternum.
7) Less postoperative/ hospital length of stay.
8) Decreased incidence of ITU Psychosis as patients are shifted to general ward since they are mobilised early.
9) Increased longevity and quality of life due to high patency rate of internal mammary arteries.
10) Less chances of need for Redo surgery/repeat revascularization.
11) No aorta related complications like stroke as these surgeries are done without handling aorta (Anaortic surgeries)

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