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Skeletonized Left Internal Mammary Artery Harvesting is better than Pedicled Left Internal Mammary Artery Harvesting in the Context of Sternal Wound Complication Following Off-Pump Coronary Artery Bypass Grafting

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Abstract

Background: Off-pump coronary artery bypass grafting's most difficult complication is sternal wound. Left internal mammary artery harvesting affects sternal wound complications. It is unclear which left internal mammary artery harvesting method prevents sternal wound complications. Skeletonized and pedicled left internal mammary artery harvesting were compared for sternal wound complications during off-pump coronary artery bypass grafting. As a result, proper methodology might be supported as an attractive method to decrease the incidence of sternal wound complication. **Material & Methods:** This comparative cross-sectional study was conducted at the department of cardiac surgery, Bangabandhu Sheikh Mujib Medical University. Total 120 patients were enrolled after fulfilling the selection criteria and divided into two groups. Among them,60 patients of group A received skeletonized left internal mammary artery whereas 60 patients of group B received pedicled left internal mammary artery. After performing off-pump coronary artery bypass grafting postoperative ICU care was given to each patient as per ICU protocol. Statistical analysis was conducted using Statistical Package for Social Science (SPSS) version 26.0 for windows software. Comparisons between groups were made with Student's t-test, Chi-Square test and Fisher's exact test. Observations were recorded as statistically significant if ap-value ≤0.05. **Results:** In this study 10 (8.33%) patients developed sternal wound complication. Among them2 (1.67%) patients in group A and 8 (6.66%) patients in group B developed sternal wound complication. Occurrence of sternal wound complication was more in group B than group A which was not statistically significant(p=0.35). The mean age of patients in Group A and Group B were 54.34±10.55 years and 53.50±11.70 years respectively. Age was not statistically significant between two groups (p=0.89). The gender difference among two groups were not also statistically significant(p=0.69). Mean BMI was 24.33±1.65 in group A and 24.55±1.45 in group B and findings were not statistically significant between groups (p=0.76). The differences between comorbidities (HTN, DM, dyslipidaemia, anaemia) of both groups were statistically insignificant (p>0.05). However, number of smokers was statistically significant between groups (p=0.03). Sternal wound complication was

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more in smoker patients in group B and this finding was statistically significant(p=0.04). Mean ± SD number of bypass grafts used by group A was 2.76±0.79 and group B was 2.83 ±0.65(P=0.69). Pre-operative parameters such as duration of operation and post-operative parameter like duration of mechanical ventilation, duration of chest drains, duration of central venous line and amount of postoperative mediastinal bleeding were found statistically not significant between groups (p>0.05). Comparison of postoperative laboratory parameters was statistically not significant between groups. Distribution of wound complications, duration of ICU and hospital stay between two groups were also not statistically significant (p>0.05). **Conclusions:** Occurrence of sternal wound complication was found less in skeletonized left internal mammary artery harvesting than pedicled left internal mammary artery harvesting after off-pump coronary bypass grafting in this study. But this finding was not statistically significant.

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Keywords:- Left Internal Mammary Artery, Harvesting, Off-Pump Coronary Artery Bypass Grafting.

INTRODUCTION

Coronary artery disease is one of the most common cardiovascular diseases in term of incidence and prevalence. Bangladesh has the highest prevalence of common cardiovascular diseases (CVD) risk factors among other South Asian countries.[1] In Bangladesh, 99.6% male and 97.9% female are exposed to at least one of the established risk factors of CVD and become victim at a younger age.[2] Coronary artery disease (CAD) is narrowing of the coronary arteries resulting from atherosclerosis which is a multifactorial, chronic inflammatory process. Thickening and loss of elasticity of the arterial wall is also responsible for limiting blood flow to the myocardium.[3] Previously on-pump coronary artery bypass grafting was mainstay of surgical revascularization of CAD. But in the mid-1990s off-pump method of coronary artery bypass grafting was introduced as a revolution in treatment of CAD.[4] Cardiopulmonary bypass (CPB) is not used in off-pump coronary artery bypass grafting (off-pump CABG or OPCAB). So, complications of CPB can be avoided easily. Various conduits are used in CABG. Some of them are: Internal mammary artery, Saphenous vein, Radial artery, Right Gastroepiploic artery and occasionally Ulnar artery, Splenic artery and Inferior epigastric artery. Among them left internal mammary artery (LIMA) has become the first choice for myocardial revascularization. However, surgeons must harvest the LIMA in the best possible way to achieve both short-term and long-term advantages.[5] There are two established techniques for LIMA harvesting. There are skeletonized LIMA harvesting and pedicled LIMA harvesting. In skeletonized LIMA harvesting technique LIMA is separated from the surrounding tissue like intrathoracic fascia, veins, adipose tissue. There are some advantages of skeletonized LIMA harvesting. Skeletonization of LIMA shows extra length which permits composite arterial grafting. It allows easier anastomosis without tension.[6] Skeletonization results in increased graft diameter for the anastomosis and improved

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graft flow.[7] It also allows visual inspection of the vessel to identify any injury, which if unnoticed may jeopardize the long-term outcome. Another potential benefit of skeletonization is decreased frequency and severity of postoperative chronic chest wall pain.[8]

In pedicled LIMA harvesting technique, LIMA is harvested together with surrounding fascia, veins and adipose tissue. This technique is less time consuming. It has less chance of inducing mechanical and physical damage to the vessel wall. But this technique does not have advantage of increased available graft length, greater blood flow in the early postoperative period like skeletonized LIMA harvesting. Moreover, it may cause more devascularization of the sternum and thereby increases the risk of sternal wound complication. Sternal wound complication is one of the most challenging complications of cardiac surgery. Despite of careful precautions SWC in cardiovascular surgery is associated with adverse outcomes ranging from less than 1% to more than 10% and increases according to severity of underlying surgery. SWC vary from sterile wound dehiscence to suppurative mediastinitis. The terms sternal wound complication, like sternitis, mediastinitis have been used in various studies synonymously to denote sternal wound complication. For the sake of consistency in comparing data from various reports, sternal wound complication was documented as follows:

1) Sternal wound dehiscence: Median sternotomy wound breakdown in the absence of clinical or microbiologic evidence of infection.

(2) Sternal wound infection: Clinical or microbiologic evidence of infected pre-sternal tissue and sternal osteomyelitis, with or without mediastinal sepsis and with or without unstable sternum.

Subtypes include: (A) Superficial wound infection: wound complication confined to the subcutaneous tissue; (B) Deep wound infection: Wound complication associated with sternal osteomyelitis with or without infected retrosternal space.[9] According to Centre for disease control and prevention (CDC) in United States, deep sternal wound complication can be defined by either (i)organisms cultured from mediastinal tissue or fluid obtained during a surgical operation or needle aspiration, or (ii) evidence of mediastinitis seen during a surgical operation or histopathological examination, or (iii) at least one of the following with no other recognized cause: fever (>38.8°C), chest pain or sternal instability and at least one of the following: a) purulent discharge from mediastinal area, b) organisms cultured from blood or discharge from mediastinal area, or c)mediastinal widening on x-ray. There are some important factors which are responsible for sternal wound complication. Obesity, diabetes mellitus, COPD, heart failure, renal failure, smoking, poor dental hygiene and older age are considered as preoperative factors. Poor management of hyperglycaemia, use of both internal mammary arteries redo surgeries, excessive use of bone wax and prolong procedural time are per operative risk factors. Post- operative prolong ventilation, prolong duration chest drain and CV line, excessive amount of mediastinal bleeding, prolong ICU and post-operative hospital stay are common post operative risk factors. Considering above

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variables, the technique of LIMA harvesting is being considered as a new variable along with the factors influencing sternal wound complication. It is still debated that which of the harvesting techniques of LIMA is better in regard of sternal wound complication (SWC).

Blood supply of sternum is mainly derived from the IMA. Moreover, there are fewer collateral vessels in the inferior portion of the sternum, which makes this are a more vulnerable to complication following IMA harvest.[10] Some experimental and clinical evidence suggest that a skeletonized graft preserve postoperative sternal blood flow. Thus, it reduces postoperative sternal ischemia and sternal wound complication. Because de-vascularized sternum provides a necrotic substrate favourable for bacterial growth that increases SWC.[11] Several studies have demonstrated a lower proportion of SWC after off pump CABG if skeletonization of both internal mammary arteries (BIMA) was used. But in case of LIMA the potential clinical superiority of skeletonized over pedicled harvesting on sternal wound complication has been addressed in only a few studies with conflicting results.[12] But SWC can be potentially life-threatening complication. So, a decisive answer is required. Whether skeletonized LIMA harvesting can be considered as the standard approach of CABG with a significant benefit of low SWC is still need to be determined.

The aim of the study was to investigate the comparison of sternal wound complication between skeletonized and pedicled left internal mammary artery harvesting after off-pump coronary artery bypass grafting.

OBJECTIVE

To compare occurrence of sternal wound complication in skeletonized and pedicled LIMA harvesting after off-pump CABG.

MATERIAL AND METHODS

This was a comparative cross-sectional study which was conducted from October 2020 to September 2021. The study was conducted in the Department of Cardiac surgery, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh. Patients undergoing off-pump CABG for coronary artery disease and receiving LIMA as conduit were included in this study. Patients who underwent OPCAB for coronary artery disease were included in my study. A total number of 60 patients were evaluated. The patients were divided by two groups. Group A: 60 patients who received skeletonized LIMA. Group B: 60 patients who received pedicled LIMA. Patients undergoing off pump coronary artery bypass grafting and receiving LIMA as graft. Patients who gave informed written consent to participate in the study.

Purposive sampling method was applied for this study.

Data Collection and Analysis

A semi-structured questionnaire was developed in English. The questionnaire was developed using the selected variables according to the specific objectives. The questionnaire contained questions related to socio-demographic characteristics, preoperative, per-operative and postoperative parameters. A checklist was also developed to record desired variables from admission record,

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history sheet and relevant medical reports. The preformed semi-structured questionnaire was pre-tested on 5 patients in the department of Cardiac Surgery, BSMMU before submission and approval of thesis protocol. It was finalized after necessary modification based on pre-testing with the help of supervisor. Data were checked immediately after completing interview and review of necessary investigation reports. Again, before data processing, collected information was checked for completeness and internal consistency considering the norms of missing data. Statistical analyses were performed using windows-based computer software devised with Statistical Packages for Social Sciences (SPSS-26) (SPSS Inc, Chicago, IL, USA). Descriptive and inferential statistical methods were applied to analys0e data. In descriptive statistics, continuous data was summarized by mean ± SD and categorical data was summarized into frequency distribution and percentage. To make comparison between groups and draw conclusions on data, several inferential statistics were used including chi-square or fisher exact test for qualitative data, paired or unpaired t-test for quantitative data. A value of 0.5 signifies it is no better than what would be expected by chance. The optimal cut-off value was the value that had the highest and nearest negative and positive predictive value. For all analytic tests, the statistical significance threshold was set at 5% and a p value of ≤0.05 was considered statistically significant. The summarized data were interpreted accordingly and then presented in the form of tables and figures.

Ethical Considerations

Ethical clearance for the study was taken from the concerned departmental, academic and technical committee and also from the institutional review board. A protocol was developed and approved by institutional review board. All patients enrolled in this study were explained about the nature and the purpose of the study and about the questionnaire to be used for the study. An informed written consent was taken from all the participants. The provision for protection of dignity, rights, safety, well-being and privacy of the patient and confidentiality of the data was also made.

RESULTS

The mean age of patients in Group A and Group B were 54.34±10.55 years and 53.50±11.70 years respectively. Age was not statistically significant between two groups. Mean BMI was 24.33±1.65 in group A and 24.55±1.45 in group B and findings were not statistically significant between groups.

[Table 2] shows the distribution of patients by gender between two groups. No statistically significant difference present between two groups in distribution of patients by gender.

[Table 3] shows the distribution of data by evaluating major risk factors. The comparison of history of hypertension, DM, dyslipidaemia and anaemia in group A and B patients were statistically not significant (p>0.05). However, smokers were found more in group A and was found to be statistically significant between two groups (p=0.03).

[Table 4] shows the comparison between the two groups in terms of duration of operation, the number of distal anastomoses was not statistically significant.

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[Table 5] shows the comparison of postoperative parameters between two groups. Mean duration of mechanical ventilation was 8.15±1.66 in group A and 8.78±1.85 hours in group B. p value was 0.11 which was not significant. Mean duration of chest drains was 53.07±16.97 in group A and 49.07±15.65 hours in group B. p value was 0.31 which was not significant. Mean duration of CV line was 4.87±1.65 days in group A and 3.33±1.72 in group B. Amount of postoperative mediastinal bleeding was 674.76±2.5.07 ml in group A and 642±199.88 ml in group B.

[Table 6] explores the postoperative laboratory investigations between two groups done on 1st POD, 3rd POD and 7th POD. Mean Hb on 1st POD observation was 11.12±0.83 and 12.93±0.88, on 3rd POD, 12.47±0.60 and 11.73±0.76 and 7th POD 11.67±0.76 and 11.65±0.70 in group A and in group B respectively. Mean WBC on 1st POD observation was 12333±2202 and 12267±1540, on 3rd POD 11542±1756 and 12280±2280 and on 7th POD 11434±1776 and 12237±2506 in group A and group B respectively. Mean Neutrophil count on 1st POD observation was 79.44±5.86 and 80.65±5.44, on 3rd POD 72.50±7.55 and 71.78±8.35 and on 7th POD 69.74±6.88 and 71.14±9.55 in group A and in group B respectively. Mean ESR found on 1st POD was 41.22±21.23 and 38.73±16.80, on 3rd POD 17.94±11.99 and 25.00±14.79 and on 7th POD 18.90±11.54 and 23.10±13.77 in group A and in group B respectively. Mean RBS found on 1st POD was7.76±1.77 and 7.94±1.62, on 3rd POD 7.76±1.77 and 8.07±1.04 and on 7th POD 7.07±0.86 and 7.15±0.96 in group A and in group B respectively. Mean CRP found on 1st POD was 5.05±3.96 and 5.88±4.44, on 3rd POD 5.70±4.88 and 6.88±5.49 and on 7th POD 4.56±3.70 and 6.67±4.67 in group A and in group B respectively.

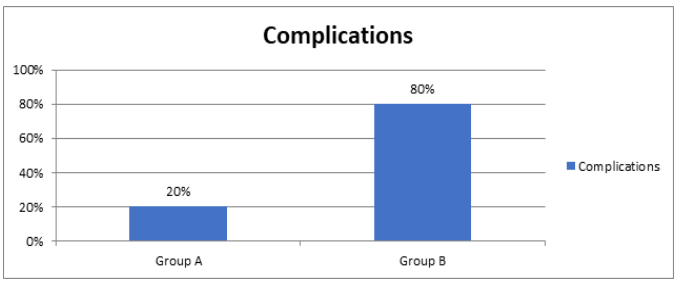

Figure 1: Comparison of postoperative sternal wound complication between two groups.

Table 1: Comparison of mean of age and BMI between two groups

Demographic Variables	Group A (N=60)	Group B (N=60)	Total (N=120)	P Value
Age (years)				
35-44	14 (63.64)	8 (36.36)	22	0.78
45-54	24 (48.0)	26 (52.0)	50	
55-64	10 (45.45)	12 (54.55)	22	
65-75	12 (46.15)	14 (535.85)	26	
Mean±SD	54.34±10.55	53.50±11.70	52.44±10.12	0.89
BMI (kg/m2)	24.33±1.65	24.55±1.45		0.76

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Table 2: Distribution of patients by gender

Gender	Group A	Group B	Total	P Value
Male	54 (50.94)	52 (49.06)	106	0.69
Female	6 (42.86)	8 (57.14)	14	
Total	60 (50.0)	60 (50.0)	120	
Male: Female	9:1	6.25:1		

Table 3: Comparison of the patients according to preoperative risk factors between groups

Risk Factors	Group A (N=60)	Group B (N=60)	Total	P value
Smoking	40 (62.5)	24 (37.5)	64	0.03
Hypertension	38 (46.34)	44 (53.66)	82	0.41
Diabetes	28 (40.0)	42 (60.0)	70	0.07
Dyslipidaemia	32 (47.05)	36 (52.95)	68	0.60
Anaemia	8 (50.0)	8 (50.0)	16	1.00

Table 4: Distribution of patients by per-operative findings

Attributes	Group A Mean±SD	Group B Mean±SD	P value
Duration of operation (minutes)	243.33±52.35	252.67±45.25	0.46
Number of distal anastomosis	2.76±0.79	2.83±0.65	0.69

Table 5: Comparison of mean of postoperative findings between two groups

Attributes	Group A Mean±SD	Group B Mean±SD	P value
Duration of postoperative mechanical ventilation (hours)	8.15±1.66	8.78±1.85	0.11
Duration of chest drains (hours)	53.07±16.97	49.07±15.65	0.31
Duration CV line (days)	4.87±1.65	3.33±1.72	0.17
Amount of postoperative mediastinal bleeding (ml)	674.76±2.5.07	642±199.88	0.54

Table 6: Comparison of mean of post-operative laboratory findings between two groups

Attributes		Group A Mean±SD	Group B Mean±SD	P value
Haemoglobin (gm/dl)	On 1st POD	11.12±0.83	12.93±0.88	0.239
	On 3rd POD	12.47±0.60	11.73±0.76	0.608
	On 7th POD	11.67±0.76	11.65±0.70	0.786
WBC (thousand/cm m)	On 1st POD	12333±2202	12267±1540	0.334
	On 3rd POD	11542±1756	12280±2280	0.167
	On 7th POD	11434±1776	12237±2506	0.118
Neutrophil	On 1st POD	79.44±5.86	80.65±5.44	0.143
	On 3rd POD	72.50±7.55	71.78±8.35	0.267
	On 7th POD	69.74±6.88	71.14±9.55	0.114
ESR (mm/hour)	On 1st POD	41.22±21.23	38.73±16.80	0.560

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	On 3rd POD	17.94±11.99	25.00±14.79	0.154
	On 7th POD	18.90±11.54	23.10±13.77	0.135
RBS (mmol/L)	On 1st POD	7.76±1.77	7.94±1.62	0.954
	On 3rd POD	8.07±1.06	8.07±1.04	0.867
	On 7th POD	7.07±0.86	7.15±0.96	0.645
CRP (mg/dl)	On 1st POD	5.05±3.96	5.88±4.44	0.435
	On 3rd POD	5.70±4.88	6.88±5.49	0.424
	On 7th POD	4.56±3.70	6.67±4.67	0.145

Among a total of 120 patients, 10 patients developed sternal wound complications. Among 10 patients having SWC, 2 (20%) patients were from Group A and 8 (80%) patients were from Group B.

Table 7: Comparison of mean of postoperative ICU and hospital stay between two groups

Postoperative stay	Group A Mean±SD	Group B Mean±SD	P value
Duration of ICU stay (days)	4.44±0.83	4.26±0.70	0.30
Duration of hospital stay(days)	10.07±3.88	10.87±3.66	0.73

Among diabetic patients, 6 patients developed SWC. In group A, 28 patients were diabetic and out of them, 2 patients got complications and in group B, out of 42 patients, 4 got complications. The finding was not significant. Among non-diabetic patients, 4 developed SWC. In group A, out of 32 non-diabetic patients, no patient got complications and in group B, out of 18 non-diabetic patients, 4 got complications. Among non-diabetic patients, the infection rate is not statistically significant (p=0.12).

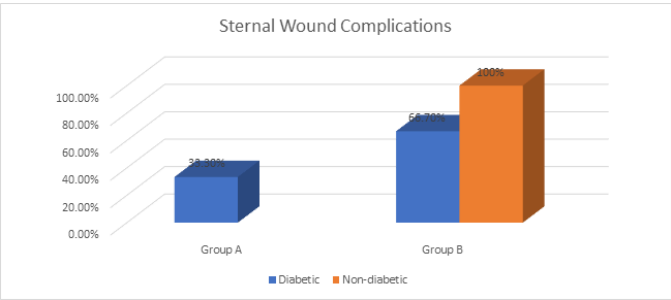

Figure 2: Occurrence of sternal wound complication between diabetic and non-diabetic patients

Among 64 patients having of smoking 6 patients developed SWC. In group A, among 40 patients with history of smoking no patient developed wound complication and in group B out of 24 patients with smoking history, 6 patients developed complication. The difference was statistically significant (p=0.04).

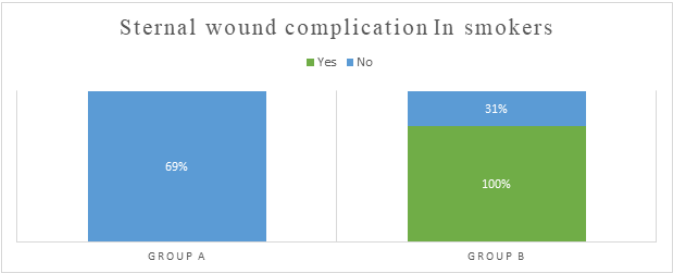

Figure 3: Occurrence of sternal wound complications in smokers

In group A, among 38 patients with a history of HTN, 2 patients suffered from wound complications and in group B out of 44 patients with HTN history, 4 got complications. The difference was statistically not significant (p=1.00). In group A, among 8 patients with a

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history of anaemia, 2 patients suffered from wound complications and in group B out of 8 patients with a history of anaemia, 4 got complications. The difference was statistically not significant (p=1.00). In group A, among 32 patients with a history of dyslipidaemia, 2 patients suffered from wound complications and in group B out of 36 patients with a history of dyslipidaemia, 6 got complications. The difference was statistically not significant.

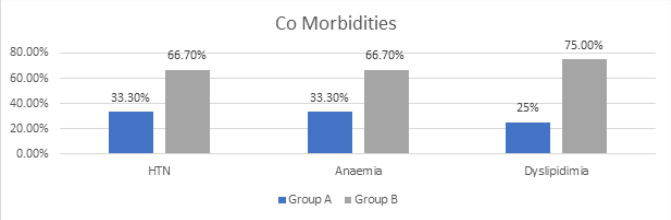

Figure 4: Occurrence of sternal wound complication in patients having co-morbidities

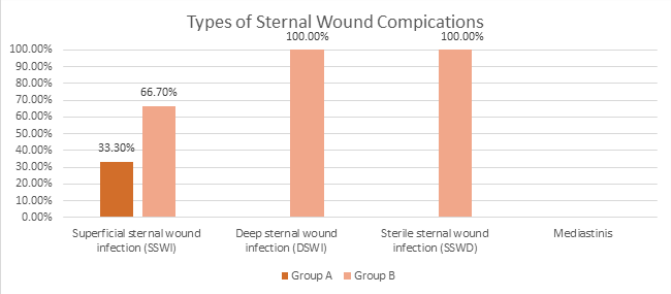

Figure 5: Comparison according to types of sternal wound complications between two groups

Superficial sternal wound infection occurred in 6 patients, among them 2 (33.3%) was from group A and 4 (66.7%) patients were from group B. Deep sternal wound infection occurred in no patient in group A and 2 patients in group B. Sternal wound dehiscence occurred in no patient in group A and 2 patients in group B. No patient suffered from mediastinitis in either group. The findings were not statistically significant (p>0.05).

Among 8 infected cases with positive culture, pseudomonas was identified as most common pathogen. It was found in 6 patients, 2 (33.3%) in group A and 4 (66.7%) in group B. Staphylococcus was found in 2 patient of group B.

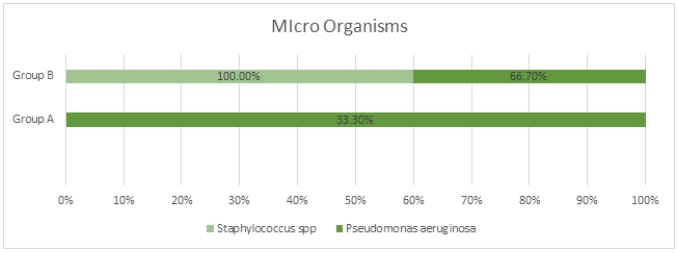

Figure 6: Types of micro-organisms isolated from infected wound if patients from both groups

The mean duration of ICU stay in group A was 4.44±0.83 days and in group B 4.26±0.70. Mean duration of postoperative stay was 10.07±3.88 and 10.87±3.66 in group A and group B respectively. P value was not statistically significant in both groups.

DISCUSSION

Sternal wound complication increases morbidity, mortality and cost. This study was performed to compare the outcome of post-operative wound complications after OPCAB between two groups receiving LIMA with different harvesting techniques. The demographic variable of the participating patients was recorded and analysed. The mean age of patients in Group A and Group B were 54.34±10.55 years and 53.50±11.70 years respectively, which was not statistically significant (p=0.78).

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This finding is similar to the study carried of Kamia and colleagues where mean age 62.3±2.40 in group A and 60.9±3.10 years in group B, p=0.65.[13] This age difference of these two studies can be explained by the study carried out by Fatema and colleagues where they stated that prevalence of coronary disease is more in younger age in Bangladesh.[2] Regarding gender, 90% were male and 10% were female in Group A. In Group B, 86.7% were male and 33.3% were female. Male patients were predominant in both groups. The difference of gender between two groups was not statistically significant (p=0.69) which corresponds to the findings of Jef Van Den Eynde and colleagues which was also not significant.[14] Mean BMI was 24.33±1.65 in group A and 24.55±1.45 in group B and findings were not statistically significant between groups (p=0.76). Similar study carried out by Jef Van den Eynde and colleagues showed mean BMI in group A was 26.9 ±4.28kg/m2 and in group B was 28.3±4.5 kg/m2, which was also statistically not significant(p=0.89).[14]

Presence of hypertension, diabetes mellitus, dyslipidaemia and anaemia as risk factors between the two groups were also analysed statistically but were found to be statistically insignificant (p=0.41, p=0.07, p=0.600 and p=1.00 respectively), which shows similarity with a study carried out by Onarati and colleagues, in which p=0.08 for hypertension and p=0.0.06 for diabetes mellitus and p=0.15 for dyslipidaemia and p=0.16 for anaemia.[5] This study observed higher number of smokers in group A (40 patients,62.5%), compared to group B (24 patients,37.5%) which was statistically significant(p=0.03).

Operative time to perform OPCAB on patients of group A and B were also compared statistically. The mean time taken to complete OPCAB in group A was 243.33±52.35minutes and that of group B was 252.67±45.25 minutes, which was statistically insignificant (p=0.46). In similar study conducted by kamiya and colleagues where mean duration was 233.4±88.9 hours and 225.5±73.7 hours in group A and group B respectively and was also statistically not significant (p=0.09). Comparison of mean number of distal grafts performed on patients (2.76±0.79 and 2.83±0.65) of group A and B respectively was also not significant (p=0.69). These findings correspond to the(p=0.69). study by Peterson and colleagues where p=0.17.[15]

The postoperative factors such as duration of mechanical ventilation, duration of chest drain tube, duration of CV line and amount of mediastinal bleeding in the patients were similar in both groups and found non-significant. Post-operative laboratory findings done on 1st, 3rd and 7th POD was similar in both groups and were statistically not significant. Similar findings were found by Onarati and colleagues where these parameters were statistically not significant.[5]

In this study among total 120 patients, 10 patients developed sternal wound complication (8.33%), 1.67% in group A and 6.66% in group B. In group A out of 60 patients, 2 (3.33%) had sternal complication and in Group B, 8(13.33%) patients had wound complication. Wound complication in Group A and Group B was not statistically significant (p=0.35). Our findings were similar to the findings of Peterson and colleagues in which the overall incidence of sternal wound complication was similar between these two groups of patients (4.8% and

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4.2%, respectively=0.8) and was not statistically significant.[15] But the occurrence of SWC is more in our study than the findings of Peterson and colleagues. Because the development of SWC following LIMA grafting is multifactorial and independent of the harvesting technique. Skeletonization alone will not eliminate sternal wound complication. The patient selection, method of clipping the branch vessels, use of harmonic scalpel all these may have been influenced the difference between above findings. In group A, out of 10 patients with SWC, superficial sternal wound infection occurred in 2 patients (3.33%), DSWI & SSWD occurred in no patient. In group B, out of 10 patients having complication, 4(6.67%) had SSWI, 2(3.33%) had DSWI and 2 (3.33%) had SSWD. No patient suffered from mediastinitis in either group. This was not statistically significant (p=1.00, 0.49 & 0.49 respectively). Among 10 patients having complication Pseudomonas was identified as most common pathogen. It was found in total 6 (60%) patients. Staphylococcus was cultured in 2 (20%) patients. No growth was observed in 2 (20%) patients having SWC. But in most other study, staphylococcus species was identified as the commonest organism isolated from sternal wound infection. Oakley and colleagues reported that staphylococcus was the commonest organism isolated in 70% of cases that were studied. This finding does not correlate to our study.

In this study we did not find any association between diabetes and SWC although this association has been well described in the literatures. Our findings are consistent with those of Furnary and colleagues who demonstrated the positive impact of strict glucose level control on SWC for this group of population.[16] Association with SWC with other comorbidities like hypertension, dyslipidaemia and anaemia in two groups were also analysed statistically but was found to be statistically not significant (p=1.00, p=0.60 and p=1.00 respectively). But other studies suggested that diabetes and other comorbidities are significantly associated with subsequent development of postoperative wound complication.[11] Okonta and colleagues reported that the commonest risk factor was diabetes mellitus. However, these findings do not correlate with the present study. May be larger number of populations is needed to draw this conclusion regarding diabetes as risk factor for wound complication. SWC was more in smokers in group B which was found significant (p=0.04). However, this finding was not consistent with many studies. As the definition of smoking is variable, smoking has not been evaluated in most studies. Maty be the relationship was underestimated those literatures. The mean duration of ICU stay in group A was 4.44±0.83 days and in group B 4.26±0.70. Mean duration of postoperative stay was 10.07±3.88 and 10.87±3.66 in group A and group B respectively.

When should the LIMA be skeletonized? The decision to skeletonize the LIMA should be made according to the surgeon's preference. But to decrease the chance of SWC, surgeon should prefer skeletonization of LIMA to pedicled LIMA. So, the practical implementation of this study is very important. LIMA should be harvested in skeletonized manner with meticulous attention to preserving sternal blood flow.

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CONCLUSIONS

The occurrence of sternal wound complication was found less in skeletonized left internal mammary artery harvesting than in pedicled left internal mammary artery harvesting after off-pump coronary bypass grafting in this study. However, this finding was not statistically significant.

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