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Original Research Article

COMPARING THE OUTCOMES OF CABG SURGERY ACCORDING TO THE STRATIFIED SYNTAX SCORE

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Abstract: *Hydrocele management techniques such as Jaboulay's procedure and hydrocelectomy with sac excision using a vessel sealing device are commonly employed. However, their comparative outcomes in terms of post-operative complications and recovery remain underexplored.* ***Objective:*** *To compare the outcomes of Jaboulay's technique versus hydrocelectomy with sac excision using a vessel sealing device in adult patients with hydroceles.* ***Methods:*** *This randomized controlled trial was conducted at a tertiary care hospital. A total of 86 patients with idiopathic hydroceles were randomly allocated into two groups. Group A (n=43) underwent hydrocelectomy with sac excision using a vessel sealing device, while Group B (n=43) underwent Jaboulay's procedure. Post-operative outcomes, including hematoma, edema, surgery duration, and hospital stay, were recorded over a 4-week follow-up period.* ***Results:*** *Among the 86 patients, 89.5% had unilateral and 10.5% had bilateral hydroceles. The mean age was 49.92 ± 6.78 years, with 66.3% over 45 years of age. Urban residents comprised 69.8% of the cohort, and 66.3% were from middle-income backgrounds. Group A had fewer cases of hematoma (2.3%) compared to Group B (7.0%), though the difference was not statistically significant (P=0.306). Edema was significantly lower in Group A (9.3%) compared to Group B (34.9%) (P=0.004). Surgery duration was comparable between the groups (P=0.674). Hospital stay was significantly shorter for Group A (1.51 ± 0.63 days) compared to Group B (1.88 ± 0.62 days) (P=0.007).* ***Conclusion:*** *Hydrocelectomy with sac excision using a vessel sealing device demonstrated superior outcomes compared to Jaboulay's technique, with significantly fewer complications, particularly edema, and a shorter hospital stay. This method offers a safe and effective alternative for managing adult hydrocele patients.*

Keywords: Coronary Artery Bypass Grafting, Cabg, Coronary Artery Disease.

Introduction

Coronary artery disease is a common cardiac disorder primarily treated with coronary artery bypass grafting. Another alternative treatment for CAD is percutaneous coronary intervention which was previously used to treat single vessel disease and then its efficacy expanded to multi-vessel CAD and left main CAD. Hence, several studies have been conducted to compare the outcomes of CABG and PCI (1, 2, 3). The SYNTAX trial is worth mentioning in this research which evaluated the gold standard for the treatment of complex CAD (4). The authors found no difference in the outcomes of both treatments in 85 hospitals across two continents. The SYNTAX score developed during this trial has been used in various studies to expand the literature (5, 6). SYNTAX score II aids in selecting between CABG and PCI as the better treatment for CAD through anatomical variables and clinical factors. However, the results of the score are not very reliable with regard to predicting mortality after CABG in the Asian population where OPCAB is more common than CABG. In addition, these scores do not have universal acceptance as they mainly depend upon SYNTAX score I which does not majorly influence score II in CABG patients. However, it is significant to assess the predictability and impact of SYNTAX scores on CABG outcomes. This study was conducted to compare the outcomes of stratified SYNTAX scores post-CABG and evaluate the reliability of these scores in the Pakistani population.

Methodology

A retrospective study was conducted in the Cardiac Surgery Department of Punjab Institute of Cardiology Lahore from September 2022 to September 2024. A total of 220 CABG patients with triple vessel coronary artery disease and/or left main trunk disease.

Acute MI patients, patients who underwent CABG or PCI previously, and patients requiring accompanying procedures were excluded. All patients provided their consent to become a part of the study. The ethical committee of the hospital approved the study.

Patients' demographic, radiological, laboratory, and surgical data were recorded. SYNTAX scores were calculated for each patient by reviewing the angiograms. Incidence of myocardial infarction, MACCEs, stroke, mortality, and repeated vascularization was evaluated at a two-year follow-up. To assess the relationship between SYNTAX scores and outcomes, stratification of score I was done such as a score less than 23 was regarded as low score, a score between 23 and 33 was regarded as intermediate, and a score of 33 or more was regarded as high score. Stratification of score II was done such as a score lower than

30 was a low score, a score between 30 and 40 was intermediate and a score of 40 or more was a high score.
A successful procedure outcome with complete revascularization and greater than 75% stenosis was achieved in all patients. CABG and OPCAB were performed depending on patient needs. Arterial grafts at left internal thoracic artery, right internal thoracic artery, and radial artery were placed and patency was confirmed by angiography or CT scan. Revascularization was assessed by an ultrasonic Doppler flowmeter during surgery.
All data was analyzed by SPSS version 23. Mean and SD were used to evaluate continuous data and frequencies were used to present categorical data. ANOVA and post-hoc tests were used to assess differences between stratified SYNTAX scores. Incidence of mortality, stroke, MACCEs, myocardial infarction, and revascularization was predicted by the Kaplan-Meier method. ROC curve was employed to predict mortality at follow-up by score II which was taken significantly at an AUC of less than 0.8. A p-value of less than 0.05 was taken significantly.

Results

Table 1 illustrates the baseline features and operative variables of patients according to SYNTAX score I classification. There was no significant difference between age (p=0.81) and incidence of male gender (p=0.22) in each group. STS score was comparable between all groups (p=0.54). Prevalence of comorbidities including PVD, diabetes, COPD, dyslipidemia, and creatinine was not statistically significant between all groups but the incidence of hypertension was significantly less in low score group (p<0.001). Surgery duration and bypass grafts were significantly higher in the high-score group (p<0.001).

The all-cause mortality rate was 40.2% in the low-score group, 39.4% in the intermediate group, and 32.1% in the high-score group, the difference between groups was insignificantly (p=0.59). The difference between cumulative rates of MACCE (p=0.71) and MI (p=0.48) was not statistically significant. However, the rates of repeat revascularization were significantly higher in low-score patients (9.1%) as compared to 1% in high-score patients (p=0.4). LVEF was directly associated with score II (p=0.001).
Table 2 illustrates the baseline features and operative variables of patients according to SYNTAX score II classification. Score II was not associated with score I (p=0.28) but was significantly associated with PVD, mean age, and creatinine clearance (p<0.001). STS score, MACCEs, and all-cause mortality were directly associated with score II (p<0.001). The lowest number of arterial grafts were placed in the high-score group (p<0.001). Rates of MI (p=0.72) and repeat vascularization (p=0.53) were not statistically significant between all groups. The ROC curve predicted the 2-year mortality according to score II as 12% with an area under the curve of 0.774. The predicted mortality was accurate but insignificant.

Table 1: Patients' Baseline and Operative Data comparing Score I

Parameter	Low Score (n=44)	Intermediate Score (n=90)	High Score (n=86)	P Value
Mean age	70 ± 11.2	67.7 ± 9.3	67 ± 10.1	0.81
Male gender	36 (82%)	69 (76.7%)	78 (90.7%)	0.22
Mean BMI	23.7 ± 3.8	24.8 ± 3.6	24.3 ± 2.8	0.30
SYNTAX score	16.8 ± 4.0	28.2 ± 3.1	40.6 ± 4.9	<0.001
STS score	3.1 ± 6.0	3.3 ± 4.4	4.0 ± 5.3	0.54
Hypertension	27 (61.4%)	76 (84.5%)	69 (80.3%)	<0.001
Diabetes	19 (43.2%)	44 (48.9%)	38 (44.2%)	0.65
Dyslipidemia	21 (47.8%)	53 (58.9%)	54 (62.8%)	0.11
LMT disease	31 (70.5%)	61 (76.8%)	54 (62.8%)	0.43
LVEF	60.6 ± 14.2	58.1 ± 14.6	52.2 ± 29.7	0.001
Prior MI	13 (29.6%)	22 (24.5%)	22 (25.6%)	1
Prior stroke	7 (16%)	11 (12.3%)	14 (16.3%)	0.67
Creatinine clearance	60.7 ± 26.8	65.4 ± 29.1	62.6 ± 29.4	0.52
Hemodialysis	2 (4.7%)	6 (6.7%)	8 (9.4%)	0.36
COPD	1 (2.4%)	3 (3.4%)	1 (1.2%)	0.17
PVD	4 (9.1%)	15 (16.7%)	16 (18.7%)	0.39
OPCAB	38 (86.4%)	71 (78.9%)	66 (76.8%)	0.23
CABG	1 (2.4%)	2 (2.3%)	5 (5.9%)	0.65
Bypass grafts	4 ± 0.93	4 ± 0.82	5 ± 1.1	<0.001
Arterial grafts	3 ± 0.72	3.2 ± 0.8	3.3 ± 0.9	0.1
Surgery duration	300 ± 89.6	352 ± 105	361 ± 92.1	<0.001

Table 2: Patients' Baseline and Operative Data comparing Score II

Parameter	Low Score (n=72)	Intermediate Score (n=88)	High Score (n=60)	P Value
LMT	39 (54.2%)	59 (67.1%)	48 (80%)	<0.001
SYNTAX score I	29.3 ± 9.1	31.4 ± 8.8	29.2 ± 9.2	0.28
Mean age	60.3 ± 6.2	70.2 ± 6.0	75.9 ± 7.5	<0.001
Male gender	54 (75%)	71 (80.7%)	51 (85%)	0.26
LVEF	54 ± 16.8	57.3 ± 14.3	52.7 ± 15.1	0.08

Creatinine clearance	83.2 ± 27.5	59.4 ± 14.6	43.7 ± 20.8	<0.001
COPD	1 (1.4%)	1 (1.2%)	1 (1.7%)	0.001
PVD	1 (1.4%)	7 (8%)	27 (45%)	<0.001
STS score	2.0 ± 2.9	2.5 ± 2.1	5.2 ± 5.5	<0.001
Predicted mortality	5.2 ± 0.5	10.5 ± 1.9	27.4 ± 11.8	<0.001
OPCAB	60 (83.4%)	69 (78.5%)	47 (78.4%)	0.25
CABG	2 (2.9%)	4 (4.6%)	1 (1.7%)	0.52
Bypass grafts	2.9 ± 1.1	3.0 ± 1.0	2.9 ± 1.0	0.33
Arterial grafts	1.9 ± 1.0	1.9 ± 1.0	1.5 ± 0.9	<0.001
Surgery duration	340 ± 99.1	355 ± 88.2	330 ± 108	0.09

Discussion

We conducted this study to compare the comorbidities and mortality outcomes after CABG surgery according to stratified SYNTAX score. The results reported that SYNTAX score I was indirectly associated with LVEF and high-score patients need more bypass grafts. Rates of all causes of death, stroke, MACCEs, and MI were comparable between score I groups. SYNTAX score II was significantly associated with all-cause death and MACCEs. SYNTAX score II accurately predicted the long-term mortality and clinical outcomes.

Preoperative ejection fraction was associated with the score I in our study which was similar to Masuda et al which reported that patients with high scores had lower LVEF.7 SYNTAX score I also indicate CAD anatomical complications; a high score shows severe ischemia which results in low LVEF and a higher number of bypass grafts for revascularization of stenosed arteries.

The difference in mortality, MACCEs, MI, and stroke was insignificant between score I groups. As the score does not predict clinical outcomes including kidney functionality, it cannot accurately estimate these outcomes in CABG patients. Uygur et al also reported that a high score in complex CAD patients could not estimate long-term death.8 Previous studies have used SYNTAX score I along with other prognostic scores to predict clinical outcomes in CAD patients (9, 10).

Score I and II were not correlated to each other in CABG patients as SYNTAX score II predicts the PCI and CABG outcomes in coronary artery disease patients whereas SYNTAX score I influences score II calculation in patients with PCI. Hence, the irrelevance of both scores is justified in our study as agreed by other studies (11).

SYNTAX score II was directly related to long-term mortality and MACCEs as it is a predictor of clinical outcomes. High-score patients had a fivefold higher risk of death and a twofold higher risk of MACCEs in the long term in comparison to patients with low scores. The significant difference in MACCEs may be due to the fact that most patients with high scores are often admitted for congestive heart failure. Score II also had a high accuracy for predicting long-term mortality which has been verified by other studies in CABG and PCI patients (12, 13, 14).

Conclusion

SYNTAX score II has a high predictive value for the prediction of long-term clinical outcomes in patients with CAD undergoing CABG.

Declarations

Data Availability statement

All data generated or analyzed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department Concerned. (IRBEC-TCHM-293742/24)

Consent for publication

Approved

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Conflict of interest

The authors declared absence of conflict of interest.

Author Contribution

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Coordination of collaborative efforts.
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Conception of Study, Development of Research Methodology Design, Study Design,, Review of manuscript, final approval of manuscript.
Conception of Study, Final approval of manuscript.
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