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ORIGINAL ARTICLE

Outcomes of Patients who Received Bailout Thrombectomy for Primary Percutaneous Coronary Intervention

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ABSTRACT

Objective: The purpose of this study was to compare outcomes among patients undergoing primary percutaneous coronary intervention with and without bailout thrombectomy.

Study Design: Observational/ cross sectional study.

Place and Duration: This observational/cross sectional study was conducted at Interventional Cardiology, National Institute of Cardiovascular Diseases, Karachi, Pakistan in the period from March,2022 to August, 2022.

Methods: Total 140 patients of both gender had ST elevation myocardial infarction were presented for primary percutaneous coronary intervention. Patients were included after getting informed written consent for detailed demographics such as gender, age, comorbidities and history of CAD. We divided patients into two groups. Group I received only PPCI in 70 cases and 70 cases of group II received only PPCI with bailout thrombectomy. After PPCI comma results of both groups were compared. To analyzation of data, we use SPSS 18.0.

Results: Among all presented cases, 80 (57.1%) were male patients and 60 (42.9%) were females. The patients mean age in group I was 53.17±11.62 years and in group II mean age was 55.9±10.94 years. Diabetes mellitus was the most common comorbidity found among both groups 35(50%) in group I and 27(38.6%) in group II followed by hypertension 21(30%) in group I and 24(34.3%) in group II. Family history of coronary artery disease (CAD) in group I was 19(27.1%) and in group II was 23(32.9%).There was no significance difference found in both groups in terms of mortality. There was significant higher number of renal impairment, stroke, heart failure, excess bleeding and renal infarction in group II as compared to group I with p value<0.05. Hospital stay was also higher in group II as compared to group I with p value<0.04.

Conclusion: It is determined that patients who underwent bailout thrombectomy for percutaneous coronary intervention (PCI) had a significant risk of comorbidities. Between the two groups, there was no discernible variation in mortality. Those who underwent bailout thrombectomy, however, had higher rates of post-procedure stroke and renal impairment.

Keywords, Bailout thrombectomy, Outcomes, ST-segment elevated myocardial infarction, PPCI.

INTRODUCTION

In patients with ST-segment elevation myocardial infarction, primary percutaneous coronary intervention (PCI), when possible, is the most efficient way to achieve reperfusion (STEMI). [1] The potential for thrombus distal embolization and failure to restore flow at the microvascular level, however, are significant drawbacks of primary PCI. It has been demonstrated that indicators of microvascular tissue reperfusion, such as the degree of ST-segment resolution or the grade of angiographic myocardial blush, can predict the mortality rate following initial PCI. [2,3]

Before the placement of a stent, the thrombus can be removed manually to reduce distal embolization and increase microvascular perfusion. Improvements in tissue reperfusion indicators have been observed in small, randomised studies of thrombectomy. [4]In the Thrombus Aspiration during Percutaneous Coronary Intervention in Acute Myocardial Infarction Study (TAPAS), the primary endpoint of myocardial blush grade was improved, and thrombectomy was associated with decreased mortality. [5,6] After this, regular manual thrombectomy was advocated in practise recommendations. [7] Because of this, thrombectomy has rapidly expanded in popularity and been incorporated into clinical practise.

One of the variables most significantly linked to outcome in ST-segment elevation myocardial infarction (STEMI) is time to reperfusion. [8,9] After first percutaneous coronary intervention, ischemia duration may be related to the degree of myocardial healing (PCI). There is a theory that thrombus aspiration is advantageous for patients who appear early since observational analyses have revealed that it is less helpful for individuals with prolonged ischemia durations. [10] Others claim that patients with prolonged ischemia periods have structured thrombi, necessitating and benefiting more from thrombus aspiration. This topic was ready to be answered by the TOTAL (Thrombectomy with PCI versus PCI Alone in Patients with STEMI) experiment, which randomly assigned 10 732 STEMI patients to receive either upfront thrombus aspiration with PCI or PCI alone. Overall, the TOTAL trial found that manual thrombectomy followed by PCI, as opposed to PCI alone, was not associated with a lower risk of the primary outcomes of cardiovascular (CV) death, myocardial infarction (MI), cardiogenic shock, or heart failure. Instead, it was linked to a higher risk of stroke. [11]

However, two more substantial randomized clinical trials, the TASTE (Thrombus Aspiration in STEMI in Scandinavia) as well as TOTAL (Trial of Routine Aspiration Thrombectomy with PCI vs PCI Alone in Patients with STEMI) studies, did not find any advantages of aspiration thrombectomy in lowering the risk of all-cause or cardiovascular mortality, reoccurring myocardial infarction, or stent thrombosis. [12] Even elevated stroke rates at 30 days and a year were discovered in the TOTAL research in relation to aspiration thrombectomy. [13]

Aspiration thrombectomy is used more selectively in real-world settings than in randomised control trials because it is dependent on the doctor's assessment of the target lesions' unique architecture, coronary flow, and thrombus load. Hence, thrombectomy used selectively vs used in randomised control studies may result in differing clinical results. The prognosis of PPCI has also been shown to be related to hospital and physician volumes. [14,15]

The goal of the current study was to compare the results of bailout thrombectomy for PPCI with patients who only got PCI in order to assess the effectiveness of the procedure in patients with acute STEMI.

MATERIALS AND MEHODS

This observational/cross sectional study was conducted at Interventional Cardiology, National Institute of Cardiovascular Diseases, Karachi, Pakistan in the period from March,2022 to August, 2022 and comprised of 140 cases of STEMI. Patients over

the age of 25 who underwent Primary Percutaneous Coronary Intervention (PPCI) for acute ST-segment elevated myocardial infarction (STEMI) were included. After obtaining informed written consent, a patient's complete demographic information—including age, gender, place of residence, co-morbidities like diabetes mellitus, hypertension, a history of smoking and high cholesterol, history of liver and renal disease, and co-occurring diseases like diabetes—was examined. Excluded patients were those who required Coronary Artery Bypass Grafting (CABG), had a delayed presentation with STEMI (later than 24 hours), and those who did not give their consent.

We divided patients into two groups. Group I received only PPCI in 70 cases and 70 cases of group II received only PPCI with bailout thrombectomy. Results including mortality, re-infarction, heart failure, cardiogenic shock, renal dysfunction, excessive bleeding, post-procedure stroke, and hospital stay were compared between the two groups. Using SPSS 18.0, data was examined. Chi-square analysis and the student t test were used to compare the results between the two groups. To study the values in tabular form, frequency and percentages were acquired. For statistical significance, a P-value of 0.05 was used.

RESULTS

Among all presented cases, 80 (57.1%) were male patients and 60 (42.9%) were females. (figure 1)

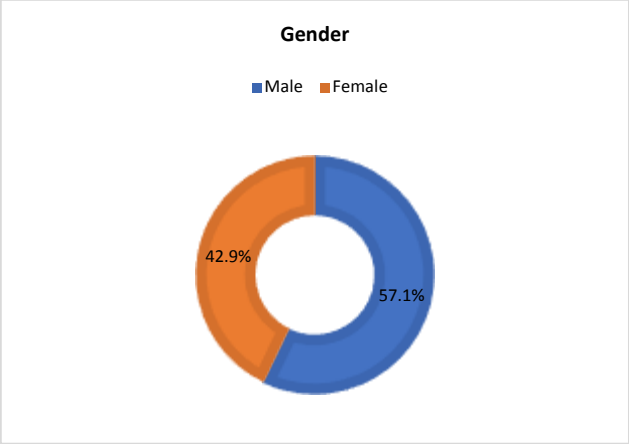

Figure-1: Association of gender among all cases

The patients mean age in group I was 53.17±11.62 years with mean BMI 25.3±4.28 kg/m^2 and in group II mean age was 55.9±10.94 years with mean BMI 24.18±6.39 kg/m^2. Diabetes mellitus was the most common comorbidity found among both groups 35(50%) in group I and 27(38.6%) in group II followed by hypertension 21(30%) in group I and 24(34.3%) in group II. Family history of coronary artery disease (CAD) in group I was 19(27.1%) and in group II was 23 (32.9%). There were 25 (37.1%) cases in group I and 27 (38.6%) cases in group II had smoking history. (table 1)

Table-1: Both groups baseline characteristics

Variables	Group I (n=70)	Group II (n=70)
Mean age (years)	53.17±11.62	55.9±10.94
Mean BMI (kg/m^2)	25.3±4.28	24.18±6.39
Comorbidities		
DM	35(50%)	27(38.6%)
HTN	21(30%)	24(34.3%)
Hypercholesterolemia	14 (20%)	19 (27.1%)
Family History of CAD		
Yes	19(27.1%)	23 (32.9%)
No	51 (72.9%)	47 (67.1%)
History of Smoking		
Yes	25 (37.1%)	27 (38.6%)
No	45 (62.9%)	43 (61.4%)

In group I 42 (60%) cases had anterior MI and in group II 36 (51.4%) cases had anterior MI while rest of the patients of both groups had inferior MI.(figure 2)

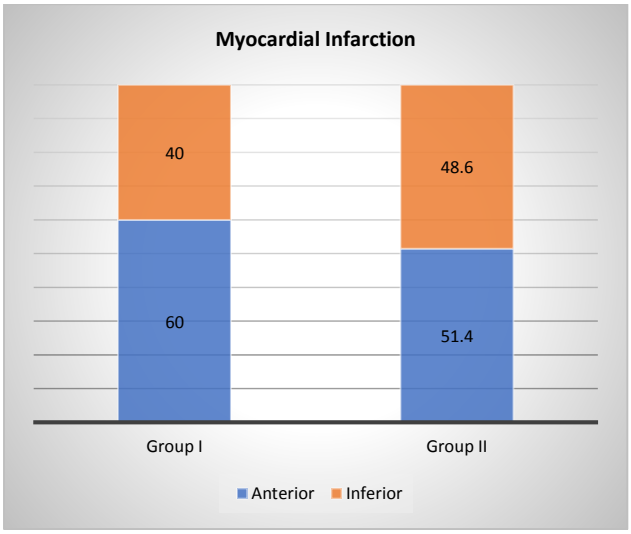

Figure-2: Types of MI among both groups

There was no significance difference found in both groups in terms of mortality. There was significant higher number of renal impairment, stroke, heart failure, excess bleeding and renal infarction in group II as compared to group I with p value<0.05.(table 2)

Table-2: Comparison of outcomes among both groups

Variables	Group I	Group II
mortality	3 (4.3%)	4 (5.7%)
heart failure	3 (4.3%)	6 (8.6%)
excess bleeding	1 (1.4%)	3 (4.3%)
renal impairment	2 (2.9%)	7 (10%)
renal infarction	2 (2.9%)	5 (7.1%)
stroke	2 (2.9%)	4 (5.7%)

Hospital stay was also higher in group II as compared to group I with p value<0.04.(table 3)

Table-3: Post-treatment hospitalization among both groups

Variables	Group I	Group II	P Value
Hospitalization (days)	4.5±2.24	6.10±15.46	<0.04

DISCUSSION

We examined 140 patients who were receiving PPCI as part of this trial. Patients were split into two groups, Group I and Group II. Patients in Group II had PCI with bailout thrombectomy while those in Group I only received PCI. The patients mean age in group I was 53.17±11.62 years and in group II mean age was 55.9±10.94 years. Diabetes mellitus was the most common comorbidity found among both groups 35(50%) in group I and 27(38.6%) in group II followed by hypertension 21(30%) in group I and 24(34.3%) in group II. These results were inline with the previous studies. [16,17] There was no significance difference found in both groups in terms of mortality. There was significant higher number of renal impairment, stroke, heart failure, excess bleeding and renal infarction in group II as compared to group I with p value<0.05. Hospital stay was also higher in group II as compared to group I with p value<0.04. In terms of long-term mortality and reinfarction, Deng et al. found no statistically significant variations. [18]

Embolization of thrombus from the myocardial vasculature to the systemic vasculature is one explanation for the rise in ischemic stroke in the thrombectomy group. Also, in order to properly bridge lesions with the thrombectomy catheter, operators may have

employed more forceful guide catheter manipulation, which may have resulted in the dislodging of atheroma from the aorta. Also, the regular thrombectomy arm's procedure times were lengthier. These processes could account for strokes that occurred soon after PCI and those that were ischemic. The thorough scientific investigation revealed that the risk of stroke is highest within 48 hours and then appears to level off between 2 and 90 days. During thrombectomy between 90 and 180 days, there is a tendency for an elevated risk of stroke once more. While the early increase is understandable, the extremely late increase (90–180 days) lacks a reasonable explanation and might be the result of chance.[8-14]

In general, it is asserted that manual operations have a lower mortality rate than mechanical procedures, and that the therapy of patients with severe thrombus burdens should include both mechanical techniques and measures of myocardial perfusion. [19] There was no significant difference in one-month mortality between conventional PCI and PCI with thrombectomy, according to a recent meta-analysis by Tamhane et al., but manual devices enhanced myocardial perfusion parameters. [20] In all of the patients who required bailout thrombectomy, Glycoprotein IIB/IIIA and balloon pre-dilatation were employed because these patients frequently had entire blockage of the coronary arteries and had a higher thrombus burden. These patients required fewer stenting procedures because they had higher no-reflow following thrombus aspiration and balloon pre-dilatation. Prior research showed that PCI alone with thrombectomy allowed only as a last resort did not improve the risk of the primary outcomes of cardiovascular death, recurrent myocardial infarction, cardiogenic shock, or NYHA class IV heart failure after 180 days. This conclusion was true for patients with a significant thrombus burden, a population who could be anticipated to benefit the most from thrombus aspiration.[16] Hospital stay was also higher in group II as compared to group I with p value<0.04 in current study.

CONCLUSION

It is determined that patients who underwent bailout thrombectomy for percutaneous coronary intervention (PCI) had a significant risk of comorbidities. Between the two groups, there was no discernible variation in mortality. Those who underwent bailout thrombectomy, however, had higher rates of post-procedure stroke and renal impairment.

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