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ORIGINAL ARTICLE

Association of early Post-Operative Outcomes with Metabolic Syndrome after Coronary Artery Bypass Grafting

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ABSTRACT

Objective: The objective of this study is to find out the association of metabolic syndromewith early outcomesafter CABG.
Study Design: This was a comparative study.
Place and Duration: This study was performed from the first of July 2020 to the first of January 2021 at the Cardiac Surgery Department, PIC, Jail Road, Lahore
Methodology: The approach of non-probability sampling was applied. After obtaining consent on a consent form, 172 Patients (86 in the exposed group and 86 in the non-exposed group) were included.
Results: The average age of the participants in this study was 55.30 ± 8.77 years; there were 130 cases (75.6%) of men and 42 cases (24.4%) of women. There were 56 (65.12%) men and 30 (34.88%) women in the exposed group, compared to 74 (86.05%) men and 12 (13.95%) women in the non-exposed group. There were 5(5.8%) cases in the exposed and 1(1.2%) case in the non-exposed group of post-operative stroke found with a p-value of 0.096. Postoperative pneumonia occurred in 9(10.2%) of the exposed and 2(2.3%) of the non-exposed group (p-value 0.05). Mortality was found in 11 (12.8%) patients in the exposed and 6 (7%) in the non-exposed group (p-value = 0.20).
Conclusion: Because many MetS syndrome factors are under our control, it is important to prevent it early especially in cases of CABG, to get better outcomes. Post-operative pneumonia was significantly greater in the exposed groups, with a p-value of 0.05, while stroke and mortality were found statistically insignificant, with a p-value of >0.05, the current study's findings were quite different and unexpected. It is suggested that larger-scale studies be conducted.
Keywords: CABG, Lipid Profile, Diabetes, Obesity, Mortality

INTRODUCTION

MetS is a collection of interconnected risk factors for T2DM, atherosclerotic cardiovascular disease (ASCVD), and mortality. Hypertension, glucose intolerance, atherogenic dyslipidemia, prothrombotic condition, and proinflammatory state are examples of inappropriate laboratory test findings and unhealthy body measurements.[1]

According to new research, the primary causes of MetS in CAD include hyperglycemia, obesity, and dyslipidemia. Lately, a cross-sectional research including 200 CAD patients was conducted on Iranian people. BMI and WC were used to calculate anthropometric indices. MetS was found in 49 percent of all patients, and the incidence became greater with old age. A drop in HDL-C of about 84.7%, an increase in FBS of approximately 77.9%, and an increase in WC of approximately 75.7% are the primary causes of CAD in individuals with MetS.[2]

In a prior research, 1117 individuals between the ages of 18 and 80 participated, with a mean age of 60 ±10 years. NCEP/ATP III was the first to describe MetS. MetS was shown to be prevalent in 46 percent of the population, with 43 percent having CVD, 41 percent having CAD, and 47 percent having AAA. In general, women had a greater frequency than men. The prevalence of MetS was unaffected by age.[3]Subjects with MetS have a greater risk of developing subclinical cardiovascular, renal, and arterial disease, and this association increases the likelihood of underlying CVD developing. MetS has been related to an increased risk of atrial fibrillation (AF).[4] AF is more prevalent in women than males in the IPC population, with 34.2 % versus 7.7% for women and 19.3 % vs 10.9 percent for men.[5]MetS is named as a risk factor for AF in a prospective observational research.

It is reported that MetS had a significant effect on mortality in stable patients and not in patients with ACS. Another research found that in-hospital death was 11.6 % among individuals with Mets who had an acute MI. According to a recent study, 15.76 % with acute MI and Mets died during their hospital stay.[6] In-hospital mortality was found to be 7.5 % in the MetS group and 5.2 % in the non-metabolic syndrome group in a research that examined in-hospital mortality with and without MetS.[7]

MATERIAL AND METHODS

This comparative study performed from the first of July 2020 to the first of January 2021 at the Cardiac Surgery Department, PIC, Jail Road, Lahore. The approach of non-probability sampling was applied. After obtaining consent on a consent form, 172 Patients (86 in the exposed group and 86 in the non-exposed group) were included.

Operational definition:
Metabolic Syndrome: must have two of the following four criteria in addition to central obesity, which is defined as a waist circumference of 94 cm or more for males and more than 80 for women:

Early Outcomes
Mortality: Mortality within 30 days post-operatively.
Post-operative stroke: If a new neurological defect with morphological substrate was detected and validated by computed tomography within 7 days.
Pneumonia: The presence of a radiological infiltrate within 7 days, together with a positive sputum culture (10–5 organisms/HPS), is one of the criteria for pneumonia.

Inclusion Criteria
Exposed
Patients undergoing CABG with MetS.
Non-Exposed
1. Patients undergoing CABG MetS.
2. Patients undergoing on pump CABG.
3. Patients of both genders with age range 18-70 years.

Exclusion Criteria
1. Patients undergoing emergency CABG.
2. People who have more than four distal anastomoses

3. People having CABG who have a congenital coronary abnormality
4. Previous heart surgery history and preoperative dialysis

Data Collection Procedure: After obtaining consent, 172 patients (86 in the exposed group and 86 in the non-exposed group) were enrolled. Data was collected on well-designed performa. Early outcomes were noted for (morbidity, such as postoperative MI, Infection, and renal failure).

Statistical Analysis: In order to do the statistical analysis, SPSS Version 21.0 was used. For qualitative factors like gender and early outcomes, i.e., Postoperative Stroke, pneumonia, and mortality frequencies and percentages were provided. For quantitative factors like age, height, weight, and EF, the mean and S.D were given. The chi-square test was employed to evaluate the relationships between the qualitative factors and the two groups. P value less than 0.05 was considered significant.

RESULTS

Table 1: Comparison of age (years) in both groups

	Age (years)			
MetS	Mean S.D	Minimum	Maximum	P-value
Exposed	56.49± 8.88	37	82	0.09
Non-Exposed	54.10± 8.55	39	80	
Total	55.30± 8.77	37	82	

According to Table 1, the mean age of the patients was 55.30 ± 8.77 years, whereas the mean ages of exposed and non-exposed participants were 56.49 ± 8.88 years and 54.10 ± 8.55 years, respectively. Both groups' average ages were statistically similar (p-value > 0.09).

Table 2: Descriptive Statistics of Gender

Gender		
MetS	Male	Female
Exposed	56 (65.12%)	12(13.95%)
Non-Exposed	74(86.05%)	30(34.88%)
Total	130 (75.6%)	42 (24.4%)

In this study, there were 42 (24.4%) female patients and 130 (75.6%) male cases.

Table 3: Comparison of Intra-Operative Variables both study groups

		Mean ± S.D	Minimum	Maximum	P-value
Cross clamp time (min)	Exposed	51.45 ± 13.84	30	80	0.09
	Non-Exposed	47.71 ± 15.26	15	80	
	Total	49.58 ± 14.65	15	80	
CPB time (min)	Exposed	108.65 ± 26.70	50	170	0.22
	Non-Exposed	102.92 ± 33.38	55	210.00	
	Total	105.78 ± 30.27	56	210.00	
Number Of Grafts	Exposed	2.74 ± 0.74	1	4	0.88
	Non-Exposed	2.66 ± 0.85	1	4	
	Total	2.70 ± 0.79	1	4	

The mean XCT was 51.45 ± 13.84 and 47.71 ± 15.26 minutes, respectively, with a p-value of 0.09. The mean CPB time was 108.65 ± 26.70 minutes and 102.92 ± 33.38 minutes, respectively, with a p-value of 0.22. In both exposed and non-exposed groups, the average number of grafts utilized was 2.74 ± 0.74 and 2.66 ± 0.85 respectively.

According to the aforementioned table, there were 5 (5.8%) cases of post-operative stroke in the exposed group and 1 (1.2%) case in the non-exposed group. Additionally, post-operative pneumonia occurred in 9 (10.2%) cases in the exposed group and 2 (2.3%) cases in the non-exposed group, a difference of 0.05. In our data, mortality occurred in 11(12.8%) in exposed and 6(7%) in non-exposed group the p-value of 0.20 did not indicate statistical significance.

Table 4: Comparison of early outcomesin both groups.

Complications		Exposed	Non-Exposed	P-Value
Post-operative Stroke	Yes	5(5.8%)	81(94.2%)	0.096
	No	7(8%)	79(92%)	
Total		12(6.98%)	160(93.02%)	
Post-Operative Pneumonia	Yes	9(10.8%)	77(89.2%)	0.029
	No	2 (2.33%)	84(97.67%)	
Total		11(6.4%)	161(93.6%)	
Mortality	Yes	11(12.8%)	75(87.2%)	0.20
	No	6(7%)	80(93%)	
Total		17(9.9%)	155(90.1%)	

DISCUSSION

Central obesity, high TG, low HDL, hypertension, and hyperglycemia are all symptoms of the metabolic syndrome (MetS), which increases the risk of heart disease. About 46% to 51% of patients undergoing CABG had MetS.[8-9] In a review of the MetS in young patients having MI, the frequency of MetS, was as high as 69%.[10]

The cases in the current study had a 55.30 ± 8.77 average age, with 42 (24.4%) female cases and 130 (75.6%) male cases.The age distribution in the current study was younger than that of the other study because the mean age was in the mid-fifties as opposed to the sixties in the studies mentioned above. [11]

When having CABG, patients with MetS were more likely than those without MetS to experience complications (16.5% to 30.26% vs. 12.7% to 16.7% respectively, p = 0.0074) and mortality (p = 0.0007). Another study found that patients withoutMetS experienced lesspost-operative complications 12.2% vs 20.3% [10].

According to a research, the primary adverse cardiac arrhythmia (p value=<0.001), renal failure (p-value = 0.03), and cerebral events significant in MetS group.[12]A post-operative stroke occurred in 5 (5.7%) patients in the MetS group and 1 (1.2%) cases in the non-MetS group in the current research, with a p-value of 0.096. Another research was unable to distinguish between the two groups in terms of the proportion of patients who experienced renal impairment and a stroke following CABG. In a multivariate analysis, a Japanese research found that the MetS had odds ratios of 2.47 for postoperative stroke and 3.81 for renal impairment.[12]Renal impairment following CABG was seen in the 319 patients (5.3 vs. 11.4%; p = 0.003). The incidence of death plus serious morbidity was considerably higher in the MetS group when compared to without MetS group (p = 0.009), however this result is likely due to the renal outcome. This study was unable to demonstrate a relationship between the MetS and non-MetS as defined by the criteria in terms of mortality and significant morbidity. [13] Between the two groups with and without MetS, there was no difference in the prevalence of postoperative arrhythmias, cerebral stroke, multi-organ failure, or dialysis.[14]

Total cross clamp duration and total perfusion time were shown to be longer in this group, according to a research. The presence of MetS was remarkably linked with an increase in postoperative drainage, need for FFP, need for insulin for hyperglycemia, increase in ventilation time, pneumonia, surgical site infection, length of ICU stay, length of hospital stay, and death. Therefore, this study's conclusion is that those with MetS had a higher risk of morbidity and death after CABG. We discovered that there was no discernible difference between the two groups' mean cross clamp and CPB times, p-value > 0.05. We conducted a multivariate analysis and discovered no confounding factors, with a p-value of 0.09.

In one research, 2.4% of patients who underwent CABG surgery had died, compared to 0.9% who did not, while 35.5% of patients experienced complications, compared to 26.1% who did not have MetS. In a different research, there was no discernible difference in the death rates of 3.1% in the MetS group and 1.1% in the non-MetS group (p > 0.05). [11] A similar comparison investigation found that 46.2% of the total 1,726 patients matched the diagnostic criteria for MetS and that, on follow-up, all-cause

death was higher (p=0.04). [11] As compared to the non-MetS group, the total mortality rate in the current study was high in both groups and statistically insignificant in the MetS group, with 11 (12.8%) cases in the former and 6 (7%), with a p-value of 0.20.

CONCLUSION

Because many MetS syndrome factors are under our control, it is important to prevent it early especially in cases of CABG, to get better outcomes. Post-operative pneumonia was significantly greater in the exposed groups, with a p-value of 0.05, while stroke and mortality were found statistically insignificant, with a p-value of >0.05, the current study's findings were quite different and unexpected. It is suggested that larger-scale studies be conducted.

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