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ORIGINAL ARTICLE

Association of Diabetes Mellitus (DM) with Early Morbidity in Patients of Heart Disease (IHD) Undergoing Coronary Artery Bypass Surgery (CABG)

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ABSTRACT

Objective: To find association of Diabetes Mellitus (DM) with early morbidity in patients of heart disease(IHD) undergoing coronary artery bypass surgery (CABG)

Methodology: In this Prospective Cohort Study conducted at Deptt. of Cardiac Surgery / Punjab Institute of Cardiology(PIC), which is tertiary Cardiac Center in Punjab/Lahore, we enrolled 200 cases(100 exposed and 100 non-exposed) who were undergoing isolated CABG procedure, all cases taking or in need of anti-diabetic agents either pre-operative diagnosis or at admission were classified as DM. The preoperative variables were noted before undergoing surgical operation while operative, and postoperative variables (Renal Dysfunction, bleeding and usage of intra-aortic balloon pump) was collected prospectively recorded.

Results: The frequency of post operative complications was recorded as 28%(n=28) in exposed and 10%(n=10) in non-exposed group, R.R was 2.80, p value was 0.002, bleeding in exposed group was 12%(n=12) and 9%(n=9) in non-exposed group, R.R was 1.33, p value was 0.49 whereas usage of intra aortic balloon pump was 16%(n=16) in exposed and 12%(n=12) in non-exposed group, R.R was 1.34, p value was 0.41.

Conclusion: We concluded that there is a significant association of DM with early morbidity in patients of IHD undergoing CABG.

Keywords: Ischemic heart disease, Diabetes Mellitus, Coronary Artery Bypass Surgery (CABG), early morbidity

INTRODUCTION

Diabetics are increasingly in need of emergency or elective surgical procedure; however, the role of diabetes in compromising surgical procedure is unclear. It is widely accepted that diabetic cases are significantly higher risk of cardiovascular diseases (CVD)when compared to those with non-diabetics.[1]

According to study around 20-30% of the cases undergoing Coronary Artery Bypass Graft (CABG) are diabetics.[2] As DM is a potential risk factor of heart failure and CVD.[3] The shift towards more diabetic patients being operated represents a challenge in coronary artery bypass surgery. Due to its associated complications, diabetes remains one of the main risk factors for postoperative morbidity, early-and late mortality in cardiac surgery cases.

Various studies have been carried out to explore the effect of DM on coronary artery bypass surgeries but all have come with two different results and the controversy still exist. Study conducted by Zheng J(2017) was found that OPCABG may be effective in diabetics, however, postoperative infection. A previous univariate analysis revealed that ICU stay duration was 55.2+53.0 compared with 49.29+51.30 hrs in diabetic and non-diabetics, post-operative infection in 9.20% versus 4.67% which is significantly higher in diabetics.[4]

A local study is evident that a significant difference in postoperative creatinine and levels in both diabetics and non-diabetics. Immediate renal dysfunction 36%, bleeding 14%, intra- aortic balloon pump use 17% in diabetics whereas 13%, 8% and 7% respectively.[5] However,

Koochemeshki V et al (2013) demonstrated DM did not increase 30-day mortality risk in addition to MI, arrhythmia, infections, neurological complications, pulmonary embolism. Re-operation due to bleeding was significantly higher in non-diabetics.[6]whereas females cases have higher risk of complications.[7] Another local study clarifies that the risk of surgical site infection may be controlled by aggressive glycemic control.[8]

The literature review shows a high level of controversy regarding the effect of Diabetes mellitus on in-hospital and long term outcomes of coronary artery bypass grafting so there seems a need for further studies to explore the issue in a best manner and to reveal the long term effects of diabetes on coronary artery bypass grafting. The proposed study is aimed to contribute in revealing some facts about the effect of diabetes on early complication of coronary artery bypass grafting while the study will determine the effect of known diabetes on two comparative groups.

METHODOLOGY

In this Prospective Cohort Study conducted at Cardiac Surgery Department / Punjab Institute of Cardiology, which is tertiary Cardiac Center in Punjab/Lahore a total of 200 consecutive patients (100 exposed and 100 non-exposed) who were undergoing isolated CABG procedure, we excluded those undergoing for Redo CABG, emergency CABG or Off Pump Surgery, having IHD with simultaneous

valvular heart disease and those undergoing cardiac surgical procedures other than CABG. The patients with a documented history of diabetes regardless of types who needs anti-diabetic agents either on admission or preoperative diagnosis was classified as having DM. The preoperative variables were noted before undergoing surgical operation while operative, and postoperative variables (Renal Dysfunction, bleeding and usage of intra-aortic balloon pump) was collected prospectively recorded. The collected data was analyzed by 20th version of SPSS. Categorical variables like gender, risk factors such as family history of IHD, smoking (5 packs/year), hypertension (BP>140/90), hyperlipidemia (TC>200mg/dl) and post-operative complication like immediate renal dysfunction, bleeding and usage of intra-aortic balloon pump was expressed as frequency and percentages. Numeric variables like age, height, weight, BSL, BMI, EF, was presented as mean ± Standard Deviation (S.D) and compared by applying independent samplet-test. The data was stratified for age, gender, BMI, HTN, dyslipidemia. Risk ratio was applied to observe association between categorical variables in both groups.

RESULTS

A total of 200 cases (100 in each group) fulfilling the selection criteria were enrolled to find association of Diabetes Mellitus (DM) with early morbidity in patients of heart disease(IHD) undergoing coronary artery bypass surgery (CABG).

Age distribution shows that 66%(n=66) in exposed and 65%(n=65) in non-exposed group were between 30-50 years of age whereas 34%(n=34) in exposed and 35%(n=35) in non-exposed group were between 51-65 years of age, mean+sd was calculated as 47.65+7.07 years in exposed and 47.80+7.40 years in non-exposed group. Gender distribution shows that 38%(n=38) in exposed and 37%(n=37) in non-exposed group were male whereas 62%(n=62) in exposed and 63%(n=63) in non-exposed group were females. Mean blood sugar level in exposed group was 230.78+39.85 and 154.58+24.71 in non-exposed group. Frequency of smoking in exposed group was 28%(n=28) and 30%(n=30) in non-exposed group. Frequency of hypertension in exposed group was 39%(n=39) and 33%(n=33) in non-exposed group. Frequency of hyperlipidemia in exposed group was 50%(n=50) and 43%(n=43) in non-exposed group.

Table 1: Frequency Of Post Operative Complications (N=200)

Complications	Exposed (n=100)		Non-exposed (n=100)		R.R	P value
	No. of patients	%	No. of patients	%		
Immediate Renal Dysfunction	28	28	10	10	2.80	0.002
Bleeding	12	12	9	9	1.33	0.49
Usage of Intra-Aortic Balloon Pump	16	16	12	12	1.34	0.41

Frequency of family history of IHD in exposed group was 42%(n=42) and 46%(n=46) in non-exposed group.

Frequency of post operative complications was recorded as 28%(n=28) in exposed and 10%(n=10) in non-exposed group, R.R was 2.80, p value was 0.002, bleeding in exposed group was 12%(n=12) and 9%(n=9) in non-exposed group, R.R was 1.33, p value was 0.49 whereas usage of intra aortic balloon pump was 16%(n=16) in exposed and 12%(n=12) in non-exposed group, R.R was 1.34, p value was 0.41. (Table)

DISCUSSION

In our study, the frequency of post operative complications was recorded as 28%(n=28) in exposed and 10%(n=10) in non-exposed group, R.R was 2.80, p value was 0.002, bleeding in exposed group was 12%(n=12) and 9%(n=9) in non-exposed group, R.R was 1.33, p value was 0.49 whereas usage of intra aortic balloon pump was 16%(n=16) in exposed and 12%(n=12) in non-exposed group, R.R was 1.34, p value was 0.41.

We compared our results with a study conducted by Hassan H (2015) in Gulab Devi Post Graduate Medical Institute, where a significant difference in postoperative creatinine and levels in both diabetics and non-diabetics was recorded. Immediate renal dysfunction 36%, bleeding 14%, intra- aortic balloon pump use 17% in diabetics whereas 13%, 8% and 7% in non-diabetics.[5] Our findings are near to this study. However, bleeding and intra-aortic balloon pump use was not significantly higher in exposed group but higher cases in this group.

Another study conducted by Moshtaghi N (2010) showed that women have significantly higher infection rate in addition to prolonged ventilation, stroke, cardiac arrest, coma, renal dysfunction, AF and inhospital mortality.[7]

Although diabetes does not appear to affect in-hospital mortality after CABG, short- and long-term survival after CABG are significantly reduced in diabetic patients. In different large observational studies, compared with nondiabetic patients, patients with diabetes had higher mortality rates at 30 days (5 versus 2.5 percent) and at 5 and 10 years (22 versus 12 percent and 50 versus 29 percent, respectively).[9-17] As with mortality, nonfatal coronary outcomes after CABG also may be somewhat more common in diabetic patients. In a report of over 12,000 patients, diabetes was associated with a significantly lower rate of freedom from PCI at 10 years (83 versus 86 percent) but no difference in either MI or additional CABG at 5 or 10 years.[15] Another report evaluated 1615 patients who underwent CABG at a single center and had one or more repeat angiograms, and they were followed for ≥25 years.[18] Diabetes was associated with a relative risk of 1.39 for progression of atherosclerosis or recurrent symptoms. However, our study was limited to Immediate Renal Dysfunction, bleeding and Usage of Intra-Aortic Balloon Pump.

In summary, known cases of diabetes mellitus undergoing CABG are higher risk of complications i.e. Immediate Renal Dysfunction, bleeding and Usage of Intra-Aortic Balloon Pump when compared with those having no diabetes. However, further trials are also required to validate our results.

CONCLUSION

We concluded that there is a significant association of DM with early morbidity in patients of IHD undergoing CABG.

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