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ASSESSMENT OF RISK FACTORS FOR MORTALITY IN CARDIAC SURGICAL ADULT PATIENTS

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ABSTRACT

Aim: To assess risk factors for mortality in cardiac surgical adult patients.

Methods: One thousand hundred adult patients who underwent cardiac surgery under cardiopulmonary bypass, aged 20 to 60 years of either gender were selected and parameters such as clinical profile, systolic and diastolic blood pressure, preoperative condition, type of operations performed and risk factors, etc. were recorded.

Results: There were 620 males and 480 females. Age groups 20-30 years had 50, 30-40 years had 250, 40-50 years had 520, and 50-60 years had 280 patients. BMI showed healthy 660, overweight 370, obese 50, and severe obese 20 subjects. Preoperative conditions found were diabetes in 230, hypertension in 140, extracardiac arteriopathy in 60, intermittent claudication in 80, chronic renal insufficiency in 50, and chronic pulmonary disease in 20 patients. Operations performed were elective coronary artery bypass surgery in 600, aortic valve surgery in 250, mitral repair or replacement in 210, and ASD closure in 40. The difference was significant ($P< 0.05$). Out of 1100 patients, 30 (2.7%) died. Common risk factors were advancing age, female gender, extracardiac arteriopathy, chronic pulmonary disease, neurological dysfunction, serum creatinine >2.0, LVEF <30% and systolic pulmonary pressure > 60.

Conclusion: Several risk factors contribute to cardiac surgical mortality such as systolic pulmonary pressure > 60, increasing age, female gender, extracardiac arteriopathy, chronic pulmonary disease, neurological dysfunction, serum creatinine >2.0, LVEF <30%. Using this data, a risk stratification method for estimating hospital mortality and evaluating the quality of care can be created.

Keywords: cardiac surgeries, female, serum creatinine

INTRODUCTION

Cardiac surgical procedures involve interventions on the heart or great vessels to treat various cardiovascular conditions. These operations are performed by cardiac surgeons, and they can range from relatively common procedures to complex surgeries.[1] An ever-increasing number of patients can now undergo cardiac surgery because of advances in surgical techniques and supporting technologies. Although crude fatality rates are frequently employed as a gauge of the quality of care, their applicability is constrained in the absence of patient risk profile information. The present risk profile of patients undergoing cardiac surgery is not well understood.[2]

Coronary Artery Bypass Grafting (CABG) is a surgical procedure used to treat coronary artery disease (CAD), where the blood vessels supplying the heart muscle (coronary arteries) are narrowed or blocked. Some believe that crude mortality also reflects the quality of treatment, it may be sufficient for measuring the quality of care.[3] This is false in the context of cardiac surgery

due to the risk paradox, which has been demonstrated to be most evident in high-risk patients when it comes to the relative benefit of surgery over medical care.[4] Additionally, some believe that patients who survive heart surgeries may still have substantial morbidity and a poor long-term result, and that operative mortality is not the sole significant outcome indicator.[5,6] We performed this study to assess risk factors for mortality in cardiac surgical adult patients.

MATERIALS & METHOD

After considering the usefulness of the study and obtaining approval from the ethical review committee, we selected one thousand one hundred adult patients who underwent cardiac surgery under cardiopulmonary bypass, aged 20 to 60 years of either gender. Patients' consent was obtained before starting the study.

Data such as name, age, etc. was recorded. Parameters such as clinical profile, systolic and diastolic blood pressure, preoperative condition, type of operations performed and risk factors etc. were recorded. The results were compiled and subjected to statistical analysis using the Mann- Whitney U test. P value less than 0.05 was regarded as significant.

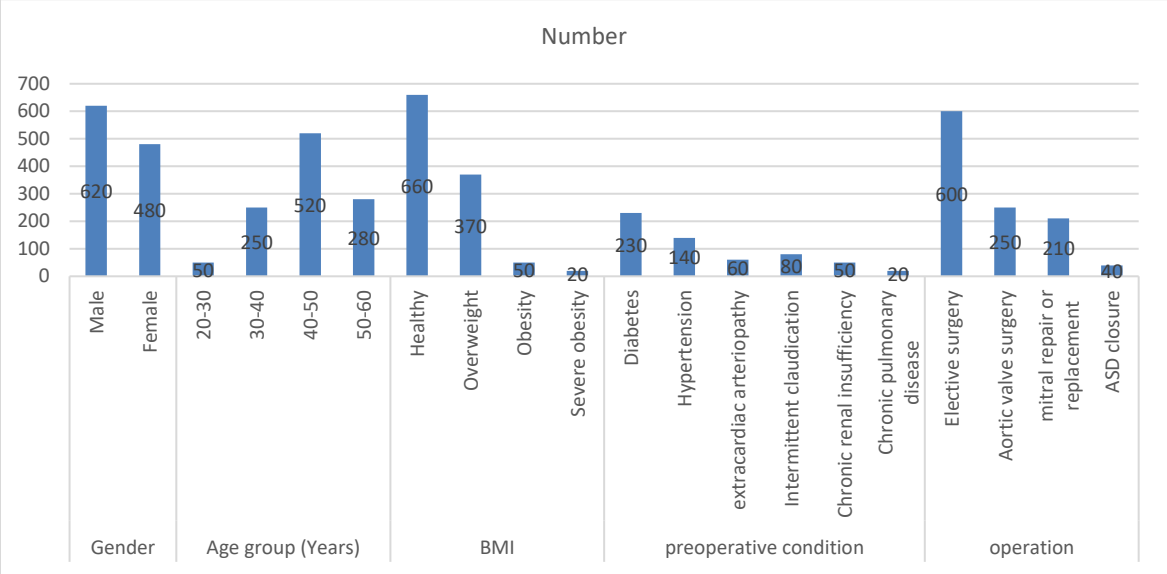
RESULTS

Table I Patients characteristics

Parameters	Variables	Number	P value
Gender	Male	620	0.02
	Female	480	
Age group (Years)	20-30	50	0.05
	30-40	250	
	40-50	520	
	50-60	280	
BMI	Healthy	660	0.03
	Overweight	370	
	Obesity	50	
	Severe obesity	20	
preoperative condition	Diabetes	230	0.04
	Hypertension	140	
	extracardiac arteriopathy	60	
	Intermittent claudication	80	
	Chronic renal insufficiency	50	
	Chronic pulmonary disease	20	
operation	Elective surgery	600	0.19
	Aortic valve surgery	250	
	mitral repair or replacement	210	
	ASD closure	40	

There were 620 males and 480 females. Age groups 20-30 years had 50, 30-40 years had 250, 40-50 years had 520 and 50-60 years had 280 patients. BMI showed healthy 660, overweight 370, obese 50 and severe obese 20 subjects. Preoperative conditions found were diabetes in 230, hypertension in 140, extracardiac arteriopathy in 60, intermittent claudication in 80, chronic renal insufficiency in 50 and chronic pulmonary disease in 20 patients. Operations performed were

elective coronary artery bypass surgery in 600, aortic valve surgery in 250, mitral repair or replacement in 210 and ASD closure in 40. The difference was significant (P< 0.05) (Table I, graph I).



Graph I Patients characteristics

Table II Mortality rate

Total patients	Mortality	Percentage
1100	30	2.7%

Out of 1100 patients, 30 (2.7%) died (Table II).

Table III Determinants of operative mortality for adult patient

Variables	OR	P value
Age	1.3	0.01
Female gender	1.4	0.01
Extracardiac arteriopathy	1.7	0.01
Chronic pulmonary disease	1.6	0.01
Neurological dysfunction	2.1	0.01
Serum creatinine >200	1.7	0.01
LVEF 30-50%	1.4	0.02
LVEF <30%	2.3	0.02
Systolic pulmonary pressure > 60	2.1	0.01

Common risk factors were advancing age, female gender, extracardiac arteriopathy, chronic pulmonary disease, neurological dysfunction, serum creatinine >2.0, LVEF <30% and systolic pulmonary pressure > 60 (Table III).

DISCUSSION

For individuals with coronary artery disease, coronary artery bypass graft surgery is a crucial and successful strategy for revascularization.[7,8] Since the early 1980s, the annual number of CABG

procedures performed has risen steadily, and patients who were previously deemed to be "too old" or "too sick" can now benefit from surgery.[9] There is a notable correlation between postoperative cardiac events (CE) and mortality and morbidity. For myocardial infarction, in-hospital death rates have varied from 15% to 25%, and for cardiac arrest, they have reached as high as 65%.[10,11] We performed this study to assess risk factors for mortality in cardiac surgical adult patients.

Our results showed that there were 620 males and 480 females. Age groups 20-30 years had 50, 30-40 years had 250, 40-50 years had 520 and 50-60 years had 280 patients. BMI showed healthy 660, overweight 370, obese 50 and severe obese 20 subjects. Preoperative conditions found were diabetes in 230, hypertension in 140, extracardiac arteriopathy in 60, intermittent claudication in 80, chronic renal insufficiency in 50, and chronic pulmonary disease in 20 patients. Operations performed were elective coronary artery bypass surgery in 600, aortic valve surgery in 250, mitral repair or replacement in 210, and ASD closure in 40. In a study by Roques et al[12] there were 28% females and a mean age of 62:5. The average body mass ratio was 26:3. The prevalence of common risk factors was as follows: reduced left ventricular function (31.4%), chronic renal failure (3.5%), chronic pulmonary illness (3.9%), diabetes (16.7%), extracardiac arteriopathy (2.9%), and prior cardiac surgery (7.3%). Of all surgeries, 63.6% involved isolated coronary surgery, while 29.8% of patients underwent valve operations. Hospital mortality as a whole was 4.8%. The death rate from heart surgery was 3.4%. When there were no significant risk factors, the death rates following coronary surgery were 0.4%, mitral valve surgery was 1%, aortic valve surgery was 1.1%, and atrial septal defect correction was 0%. Risk variables for increasing mortality included age, gender, serum creatinine, extracardiac arteriopathy, chronic airway disease, severe neurological dysfunction, prior cardiac surgery, recent myocardial infarction, left ventricular ejection fraction, chronic congestive cardiac failure, pulmonary hypertension, active endocarditis, unstable angina, procedure urgency, ventricular septal rupture, noncoronary surgery, thoracic aortic surgery.

It was seen that out of 1100 patients, 30 (2.7%) died. Rannuci et al[13] 4557 adult patients who had undergone elective heart surgery were included. Five additional risk scores from the validation series were compared to the ACEF score. By using an analysis of the receiver's operational properties, discriminatory power, or accuracy, was determined. The Cleveland Clinic score (0.812) had the highest accuracy, with the ACEF score (0.808) next to it. The two scores fared equally well in coronary procedures (0.815 versus 0.813), and in isolated coronary operations, the best accuracy was achieved by ACEF (0.826), with the Cleveland Clinic score at 0.806.

We observed that common risk factors were advancing age, female gender, extracardiac arteriopathy, chronic pulmonary disease, neurological dysfunction, serum creatinine >2.0, LVEF <30% and systolic pulmonary pressure > 60. Warner et al[14] assessed patients who underwent CABG between 1993 and 1995 (group III) and compared them with patients who underwent the procedure between 1981 and 1987 (group I) and 1988 and 1992 (group II) to ascertain if the trend toward higher-risk persisted and to assess the impact of risk on in-hospital outcomes. Between the three time periods, there were notable changes, and the risk increased with time. In group II, higher

risk was linked to higher mortality; however, in group III, mortality decreased even with ongoing increases in patient risk. Group III saw minimal change, whereas Group II experienced a rise in problems. In group III, the actual death rate was lower than expected.

CONCLUSION

Several risk factors contribute to cardiac surgical mortality such as systolic pulmonary pressure > 60, increasing age, female gender, extracardiac arteriopathy, chronic pulmonary disease, neurological dysfunction, serum creatinine >2.0, LVEF <30%. Using this data, a risk stratification method for estimating hospital mortality and evaluating the quality of care can be created.

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