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Research Article

**C-REACTIVE PROTEIN LEVELS PREOPERATIVELY AND
POSTOPERATIVELY EFFECT ON CARDIOVASCULAR
SURGERY COMPLICATIONS**¹Ishfaq Hassan, ²Arif Hussain, ³Ammar Waqas¹Medical Officer, BHU Kutani Wala Karor Lal Esan Layyah.²Medical Officer, RHC Chak No.110 TDA, Layyah.³Medical Officer, DHQ Layyah**Abstract:**

Objective: to determine the relationship between pre-operative CRP and post-elective cardiac surgery complications, including atrial fibrillation, systemic inflammatory response syndrome, wound infection, acute renal failure, shock, and death.

Materials and Methods: This prospective observational study was conducted at the Department of Cardiology Mayo Hospital, Lahore for the period of 1 year from December 2016 to December 2017. Patients who underwent cardiovascular surgery at CRP levels were measured in all patients in the morning following surgery. Patients were categorized as Group A (CRP <2 mg / dL) and Group B (CRP > 2 mg / dL) and hospitalization was followed by postoperative complications.

Results: 140 patients (100 (70%) male and 40 (30% female) were studied; There were 97 (65.1%) patients with CRP <2 mg / dl (Group A) and 52 (34.9%) with CRP > 2 mg / dl (Group B). The average age in group A was 43.6 ± 13.2 years and in group B was 48.9 ± 13.4 years. The overall mortality rate in our study was 3.35% (n = 5). Systemic inflammatory response syndrome (SIRS) was 81 (54.4%); B group was 34 (65.4%) and 47 (48.5%) group (p = 0.048). Acute renal failure developed in 26 (50%) patients in group B and 28 (28.9%) in patients (p = 0.011). wound infections were observed in 13 (25%) patients and 11 (11.3%) in the high CRP from the low CRP group (p = 0.031). There was no significant statistically difference in atrial fibrillation and shock in both groups. Death rate was same in both groups. Conclusion: Preoperative high CRP levels may be postoperative complications such as SIRS, acute renal failure after elective cardiac surgery and wound infection.

Keywords: C Reactive Proteins, Cardiovascular Surgery, Postoperative Complications.

Corresponding Author:**Ishfaq Hassan,**

Associate Professor ,

Rajiv Gandhi Institute Of Medical Sciences,

Kadapa.

Email.ID :- yamsiveera81@gmail.com

Phone:- 8019877715

QR code



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INTRODUCTION:

C-reactive protein (CRP) is an acute phase reagent derived from the liver. It increases in response to inflammation and contributes to the host defense system against various antigens. The value has been explored as a risk indicator in atherosclerotic patients and in the resulting clinical conditions. Factors Identification integrated with high risk of postoperative complications helps to stratify the risk and to preoperatively optimize the clinical situation of patients. Multiple scoring methods have been developed for patients undergoing cardiac surgery. Although not routinely used, serum CRP levels before coronary angioplasty were reported to be superior as predictors.

Complications and clinical restenosis compared with clinical presentation and other risk factors. Inflammatory reactions play a fundamental role in postoperative development of mortality and morbidity. As a result, the patient's preoperative inflammatory status will affect significantly the stage of systemic inflammation and the postoperative outcome. Among C-reactive protein (CRP), inflammatory biomarkers is the most commonly used. However, the predictive role and clinical practice of cardiac surgery should be discussed. This study was performed to assess the postoperative complication rate after elective cardiac surgery (especially coronary artery disease, valve heart disease and congenital heart disease) in patients with normal and high CRP levels. Postoperative complications (end points) were systemic inflammatory response syndrome (SIRS), arrhythmia, acute renal failure, wound infection, shock and death.

MATERIALS AND METHODS:

This prospective observational study was carried out at the Cardiology Department Mayo Hospital, Lahore, Pakistan. After receiving the patient's consent, she was selected using a non-probabilistic sampling technique for a period of 1 year from November 2015 to November 2016. Demographic characteristics such as age and gender were noted. Effective regulators of diabetes mellitus, hypertension, smoking, dyslipidemia and coronary artery disease family history have also been noted. hematocrit, platelet count, white blood cell count, APTT, urea, creatinine. Patients were excluded, for example, from previous cardiac surgery, endocarditis, clinical conditions, or CRP measurements using latex agglutination techniques, except for active infection laboratory markers or this need emergency surgery, prosthetic valve thrombosis aortic dissection, etc. The samples were collected the morning before surgery. It

was divided into two groups Group A with CRP levels <2 mg / dl and CRP levels and group B > 2 mg / dl. Postoperative complications of all patients, especially the syndrome, were followed by Systemic Inflammatory Reaction (SIRS), arrhythmia, acute renal failure, wound infection, shock and death. SIRS was diagnosed when two or more were present high pulse rate (HR high than 90 / min), tracheal (RR greater than 20 / min) with hypocapnea (PCO₂ less than 32 mm Hg) and WBC count changes (WBC greater than 12 thousand / mm³ or less than 4,000 / mm³). This type of electrolyte abnormality was diagnosed by postoperative AF telemetry or electrocardiogram if the patient continued for more than one hour in the absence of other causes such as adrenergic drug or thyrotoxicosis during hospitalization, or if electrical or pharmacological cardioversion was required. Critical diagnosis was made with an relative increase in renal function > 0.29 mg / dL at an intermediate level (within 48 hours) Criteria Network Acute renal failure was used to describe renal insufficiency (FR) 6 serum creatinine or 50% increase baseline by (1.5 fold) or urine output less than 0.5 ml / kg / h for 6 hours. systolic blood pressure (SBP) <80 mm Hg or mean arterial pressure <50 mmHg and CVP less than 5 mm Hg called vasoplegic shock.

STATISTICAL ANALYSIS

The data were scrutinized with SPSS 18.0 Version for Windows. Continuous variables were given as mean ± standard deviation. Variables categorical were presented as frequency, percentage and graph. For qualitative variables, the relationship between preoperative CRP levels in cardiovascular surgery patients with postoperative complications was determined by chi-square test, and independent sample T test for quantitative variables was applied. P value less than 0.05 was taken significant. All tests were performed on two lines.

RESULTS:

A total of 140 patients (100 (69.8%) male and 40 (30.20%) female) were studied. There were 97 patients (65.1%) with less than 2 mg / dL CRP in (Group A) and 52 (34.9%) patients with greater than 2 mg / dL CRP in (Group B). The age in mean of the population taken for study was 45.4. In group B patients were aged than the A group and the mean age was 48.88 ± 13.4 and 43.6 ± 13.2, respectively (p = 0.045). There was no difference significantly in sex, weight and height in both groups. Diabetes mellitus, hypertension, smoking, dyslipidemia frequency and family history of ischemic heart disease were similar in both groups (Table 1).

Table 1: Baseline Characteristics of the Study Population.

Variable		CRP levels (mg/dL)		P-value
		Group A <2 n=97	Group B ≥2 n=52	
Gender	Male	66 (68%)	38 (73.1%)	0.523
	Female	31 (32%)	14 (26.9%)	
Age (years)		43.6±13.2	41.36±13.4	0.043
Height (Cm)		157.5±17.8	160.5±14.5	0.101
Weight (Kg)		65.6±15.7	66.2±12.4	0.315
Diabetes mellitus		30 (32.0%)	19 (36.5%)	0.573
Hypertension		56 (57.7%)	28 (53.8%)	0.648
Smoking		32 (33%)	24 (46.2%)	0.114
Dyslipidemia		24 (24.7%)	15 (28.2%)	0.587
Family history		40 (41.2%)	24 (46.2%)	0.563
Previous acute MI		23 (23.7%)	22 (42.3%)	0.018
Fever at least 2 weeks		16 (16.5%)	18 (34.6%)	0.012
Known joint disease		24 (24.7%)	14 (26.9%)	0.771
Operation type	CABG	67 (69.1%)	36 (69.2%)	0.486
	Valvular	24 (24.7%)	15 (28.8%)	
	Congenital	6 (6.2%)	1 (1.9%)	
Use of Aspirin		35 (36.1%)	25 (48.1%)	0.133
Use of Beta-blockers		33 (34%)	15 (28.9%)	0.518

Beta blockers, aspirin and joint diseases were similar in both groups. The previous myocardial infarction and fever in the last two weeks were associated significantly with high levels of CRP ($p = 0.018$ and 0.012 , relatively). In general, the rate of mortality in our study was 3.35% ($n = 5$); SIRS was observed in 3 patients (Group B) and 2 patients (Group A) in 81 patients (54.4%), 34 patients (65.4%) in Group B and

47 patients (48.5%) in Group A ($p = 0.048$). . Fifty-four patients (36.2%) developed acute renal failure; Twenty-six (50%) of the CRP group and 28 (28.9%) of the normal CRP group ($p = 0.011$). Wound infection was seen in 24 patients (16%); 13 of them increased preoperative CRP levels ($p = 0.031$). Atrial fibrillation and shock prevalence were similar in both groups (Table 2).

Table 2: Primary final events according to preoperative levels of CRP.

Variables	CRP levels (mg/dL)		P-value
	Group A <2 n=97	Group B ≥2 n=52	
SIRS	47(48.5%)	34(65.4%)	0.048
Acute Renal Failure	28(28.9%)	26(50%)	0.011
Atrial Fibrillation	12(12.4%)	11(21.2%)	0.157
Shock	26(26.8%)	21(40.3%)	0.089
Wound Infection	11(11.3%)	13(25.0%)	0.031
Death	2(2.1%)	3(5.8%)	0.343

DISCUSSION:

Observational data from our single center reveal that high preoperative CRP levels can predict postoperative complications such as SIRS, acute renal failure, shock and wound infection after elective cardiac surgery. The identification of factors associated with increased risk of postoperative complications allows riskier stratification and helps in the preoperative optimization of the patient's clinical condition. Multiple scoring methods have been developed for patients undergoing cardiac surgery. These systems have a complex and dynamic nature of surgical and anesthesia management, with a wide range of extracardiac comorbidities making it difficult to use these scoring systems. It is necessary to have some simple and practical determinants that can accurately predict postoperative outcomes and can be applied comfortably in daily practice. Several scoring systems have been shown to be a good predictor of outcomes after cardiac surgery because there is a certain degree of uncertainty in estimating the risk of postoperative death. In recent years, CRP has emerged as an important indicator of cardiovascular events in healthy persons and those with known coronary artery disease. Predicts short and long term results after percutaneous coronary intervention and after peripheral vascular surgery. Gaudino et al They had a prevalence of > 0.5 mg / dl in the preoperative CRP levels with a greater risk of postoperative adverse events than those with 113 sera in the sera. Kangasniemi and colleagues retrospectively studied 843 patients after coronary surgery and observed no effect of the preoperative level of CRP of 1 mg / dL or more in the early postoperative period, but observed adverse effects on long-term overall survival. . (Mean follow-up of 12 years). Cappabianca et al. In a heterogeneous population with preoperative CRP > 5 mg / l in cardiac surgeons, including CABG, 3-year hospital and all-cause mortality was shown. Biancari et al. Reported an independent risk factor for postoperative mortality in preoperative CABG 764 patients with a preoperative 1 mg / dL or greater. This study was undertaken to evaluate the association of high CRP levels with cardiac surgery complications such as SIRS, acute renal failure, atrial fibrillation, shock, wound infection and death.

AHA / ACC classifies SIRS as a common postoperative complication of cardiac surgeon. Routine clinical parameters and laboratory findings, which are not detected by the underlying inflammation, can affect this important complication. Among the inflammatory biomarkers, PCR is the most commonly used. Our study showed a significant correlation with high CRP for the postoperative

development of SIRS. Atrial fibrillation is widespread postoperatively in patients undergoing cardiac surgery. High baseline CRP levels may determine high-risk patients. In this study, postoperative atrial fibrillation is not associated with elevated CRP levels, and this opposite finding may be due to the limited size of the samples. As shown in previous studies, acute renal failure is strongly associated with high preoperative CRP levels. Kim et al. showed a relationship between preoperative CRP levels and renal dysfunction in the postoperative period. Tjörvi et al. Mortality after cardiac surgery showed increased CRP > 3 mg / dL. Our work could not reproduce this relationship; It may be due to small size of the sample and low mortality in the short term. Silvina et al. We showed the importance of PCR in predicting postoperative shock, the shock more prevalent in our study Although there was no statistically significant difference between the two groups in patients with crushed CRP levels. Wound infection can also be predicted by underlying preoperative inflammatory conditions, as our high CRP levels suggest, our study supports this hypothesis.

CONCLUSION:

High levels of preoperative CRP may predict postoperative complications such as acute renal failure, systemic inflammatory response, wound infection and shock in patients undergoing cardiac surgery electively.

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