

Association of Elevated Pre-Operative Cardiac Troponin I Levels with Post Operative Outcome after Coronary Artery Bypass Grafting at Peshawar Institute of Cardiology

Pre-Operative Cardiac Troponin I Levels with Post Operative after CABG

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ABSTRACT

Objective: To find out the role of pre-operative cardiac Troponin I level with post operative outcome following a Coronary Artery Bypass Grafting (CABG).

Study Design: Cross sectional study

Place and Duration of Study: This study was conducted at the Cardiac Surgery at MTI-Peshawar Institute of Cardiology (PIC). Duration: March 2022 to February 2023.

Materials and Methods: Selection of subjects was done according to the inclusion and exclusion criteria. They were divided into two cohorts. Acute MI patients with raised pre-CABG troponin I (Group A N=64) and a second group with normal pre operative troponin I (Group B N=59). Post operative outcome was assessed in terms of post operative (CABG) chest pain and hospital stay. The data was analysed using SPSS version 26.0 for MacBook Pro and organised as tables.

Results: Troponin I level showed statistical difference ($p < 0.05$) for both groups, with higher values for group A ($5.14 \text{ ng/mL} \pm 2.16 \text{ ng/mL}$) in comparison with group B ($0.09 \text{ ng/mL} \pm 0.06 \text{ ng/mL}$) subjects. Group A subjects had a prolonged hospital stay (10 days \pm 2 days) and higher post operative (CABG) chest pain for longer periods of time in comparison to group B (5 days \pm 1 day) and lower post operative pain.

Conclusion: In conclusion, this study found a direct relation between raised pre operative troponin levels and post CABG complications (hospital stay and post operative chest pain). This makes cardiac troponin I not only a diagnostic but a relatively fair and good marker or prognosis in assessing post CABG outcomes. The raised Troponin I in group A are associated with the post CABG outcomes.

Key Words: Troponin I; Biomarker; Coronary Artery Bypass Grafting; Cardiac Surgery

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INTRODUCTION

Cardiovascular disease is a huge burden of the worldwide mortality and morbidity with an ever-increasing incidence.¹⁻² Cardiac Troponin I level is a biomarker of choice for detecting cardiac injury.^{3,4} The ability of a surgeon or the tools available to him, help in accurately assessing and be able to judge prognosis in the event of adverse outcome.

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This is very important for both clinical decisions making (pre and post operatively) and discussing potential risks and benefits of a certain procedure with the patients^{5,6} Furthermore, such knowledge may help in decision making for availability of high dependency or intensive care unit beds, as predicted patients are more likely to stay longer.⁷

The use of cardiac troponin I is one fine tool in this regard which might be able to give an objective assessment into the patient's biology.⁸ Elevated Troponin levels may be detected in the blood as early as 4 hours following an ischemic event. This follows peak concentration within 24 to 48 hours and then the fall of concentration for the cardiac marker.⁹ Thus, making troponin I an excellent fit for a biomarker and to assess prognosis.

In this study we checked the outcome of post CABG surgery patients in terms of post operative chest pain and hospital stay and to find its association with pre

operative elevated cardiac troponin I levels for the patients that presented to the peshawar institute of cardiology.

MATERIALS AND METHODS

Our cross sectional (descriptive) study was carried out in the Dept. of Cardiac Surgery at MTI-Peshawar Institute of Cardiology (PIC). Duration: March 2022 to February 2023. Selection of subjects was done according to the inclusion and exclusion criteria. They were divided into two cohorts. Acute MI patients with raised pre-CABG troponin I (Group A N=64) and a second group with normal pre operative troponin I (Group B N=59). Post operative outcome was assessed in terms of post operative chest pain and hospital stay. A variable was included in our study for post CABG severe chest pain and for both groups it was checked and assessed in severe pain taken in days it lasts.

Patients from both the genders as a case for CABG (diagnosis made by consultant keeping both clinical and haematological values of the variables in account) and their pre operative troponin I checked at the hospital lab, were included in the study. Subjects undergoing CABG with co morbid such as kidney disease, secondary hypertension, thyroid, liver or parathyroid related medical conditions were excluded.

The data was analysed using SPSS version 26.0 for MacBook Pro and organised as tables.

RESULTS

Of the total 123 subjects selected in both the groups, 51 were males while the remaining 72 were females. In Group A out of the 64 subjects 34 were females and the rest 30 were males. While in Group B out of 59 subjects 38 were females and the remaining 21 were males.

The mean and Standard Deviation (SD) for age of males in both the groups was 44 ± 3.5 years while for females in both the groups it was 46 ± 4.3 years.

Table No. 1: Shows results of serum Troponin I Level for both the study group subjects

	Group A (N=64)	Group B (N=59)	p Value
Trop I Level (mg/L)	5.14 ± 2.16	0.09 ± 0.06	0.001
Hospital Stay (Days)	10 ± 2	5 ± 1	0.03
Severe Pain (Days)	8 ± 2	3 ± 1	0.01

Data shows mean \pm standard deviation (SD).

Troponin I level showed statistical difference ($p < 0.05$) for both groups, with higher values for group A ($5.14 \text{ ng/mL} \pm 2.16 \text{ ng/mL}$) in comparison with group B ($0.09 \text{ ng/mL} \pm 0.06 \text{ ng/mL}$) subjects. Group A subjects had a prolonged hospital stay ($10 \text{ days} \pm 2 \text{ days}$) and higher pain for longer periods of time in comparison to group

B ($5 \text{ days} \pm 1 \text{ day}$) and lower pain. Severe pain that lasted for each subject post operatively was expressed in days. For Group A severe pain lasted for 8 ± 2 days while for group B it lasted for 3 ± 1 days.

DISCUSSION

This study found a direct relation between raised pre operative troponin levels and post CABG complications (hospital stay and post operative chest pain). However, our study does have a few limitations given the cross sectional, study design and nature of our research.

It is important to note here that Group A subjects had a significantly raised Troponin I level in contrast to subjects in group B. Conversely, the group B subjects had a relatively lower hospital stay and post operative chest pain (better post operative outcomes). Table 1.

Post operative chest pain is a normal phenomenon and subsides on its own.^{10,11} However severe chest pain that lasts for longer periods of time is a concern. This pain is most after open thoracic surgery.^{12,13} For this purpose, in our study a variable was included in the study for severe pain and for both groups it was checked and assessed in severe pain taken in days it lasted.

It is noteworthy here that the prognostic ability of cardiac troponin post CABG surgery has been reported in other studies. A study conducted in Australia objectively predicted the short-term cardiovascular outcomes. Moreover, the study also found a link between troponin level and overall mortality in the longer term.^{14,15}

This cross-sectional study does have a lot of clinical impact and relevant significance. For the first time in our study population the relation between troponin I levels and post CABG outcomes, was established and scientifically reported. Secondly, the study had a fairly large sample size further adding strength and value to the study results and findings. And lastly a well-established inclusion and exclusion criteria also adds strength to it.

CONCLUSION

In conclusion, this study found a direct relation between raised pre operative troponin levels and post CABG complications (hospital stay and post operative pain). This makes cardiac troponin I not only a diagnostic but a relatively fair and good marker or prognosis in assessing post CABG outcomes. The raised Troponin I in group A are associated with the post CABG outcomes. It is also pertinent to carry out further large-scale studies on bigger populations to have a better understanding of the subject and get results that could be generalised.

Author's Contribution:

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