

Chest Pain and Troponin Levels; Alarming Factors among Patients with Myocardial Infarction

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Abstract:- It is of ace importance to assess a person with myocardial infarction in emergency to impose definitive treatment. The measurement of troponin levels is necessary to identify the presence or absence of myocardial infarction. The aim of this article is to elucidate the importance the importance of troponin level measurement among patients with chest pain as a marker of myocardial infarction. Troponin levels are at a negligible level in a normal person but elevate to a large extent within 3 to 4 hours of initiation of chest pain and remain high upto many days. Measurement of serum troponin levels is a good diagnostic mesure to plan definitive treatment of patients with myocardial infarction and differentiate the chest pain originated from myocardial infarction and chest pain from other factors.

Keywords:- Troponin, Chest Pain, Myocardial Infarction, Cardio Vascular Diseases, Ischemic Pain.

I. INTRODUCTION

In India the mortality burden caused by non communicable diseases is enormous. This enormous change is attributed to increase in the number of Cases of Cardiovascular diseases and risk factors of cardio-vascular diseases. The estimated prevalence of CVDs in India is estimated to be 54.5 million.¹ One in 4 deaths in India are now because of CVDs with ischemic heart disease and stroke responsible for >80% of this burden. Occurrence of cardio vascular diseases can be controlled by controlling the risk factors, but more important aspect is to prevent the mortality among patients already suffering with cardiovascular diseases. Definitive treatment and strict compliance to treatment regimen and lifestyle modifications are necessary to reduce this burden. This is possible by increasing the ability and understanding of individuals to seek medical care. Most of the people are unaware of the underlying threats in their body and the condition is only understood after an acute MI attack. Hence Like pharmacological treatment, diagnostic tests are also crucial in improving healthcare delivery².

The new cases of myocardial infarction has is highly differential in the world. As per a study conducted in Spain to determine the incidence of Coronary heart diseases, among men around 300.6 men among 1,00,000 were found affected with cardiovascular diseases every year, whereas this rate was very low among women where only 47.9

among 1,00,000 were found to be affected by cardiovascular diseases. In India the incidence rate of myocardial Infarction is really mind boggling. For every 1,000 men around 64.37 suffer from myocardial Infarction. The more surprising part is the incidence ranges among men between 29 to 69 years. Myocardial Infarction was believed to be a disease of old age but now it is affecting the men starting from the age 29 years. The study noted that 30% low level of incidence was noted among people with moderate consumption of alcohol. Many studies on determining the risk factors of Myocardial Infarction are conducted in Developed countries but the amusement is more cases of cardiovascular diseases are found in developing countries.⁴

Indians have been noted to more risky for Ischemic heart disease as compared to others as per results of many research studies.⁵

Meta-analysis reports of many studies show that there has been a reduction in the prevalence of cases of cardiovascular diseases in developed countries but the incidence of heart related problems like chest pain is increasing especially in younger generation. The awareness programmes has reduced the number of cases but the stressful lifestyle has been boosting in the rate of occurrence of new cases. Many patients in the Emergency department admitted with chest pain not related to heart, the pain related to reduced blood supply, will present a very less risk to life in acute situation but the people who do not have a diagnostic history especially the cardiac related investigation are not present portray a higher level of risk to life. Hence in such conditions patients who present to emergency department with a complaint of chest pain the measurement of troponin levels are a definitive diagnostic measures.⁶

Troponin level is a very good indicator for differential diagnosis among patients with myocardial infarction. This early identification can help in early implementation of treatment. India is house for second largest amount of population in world. Medical service to such an enormous population is a biggest challenge, where the non-communicable diseases have rooted indefinitely. Cardiovascular disease has been a common part of every Indian family. There is need of withholding Myocardial Infarction at its early stage. Customarily patients with suspected myocardial ischaemia are conceded for screening tests to exclude the possibility of myocardial infarction,

generally dependent on eventual measurement of indicator of heart attack. Generally, the markers utilized were vague chemicals delivered from myocardial cells and different tissues, like skeletal muscle and liver. But now troponin level serve as a more specific marker in identification of myocardial infarction.⁷

II. IMPORTANCE OF TROPONIN LEVELS

Troponin is a protein released into blood after heart attack. Heart attack stimulates the release of troponin in blood. There are 3 different types of troponin, out of these two subunits troponin I and troponin T are obtained from myocardial muscles. In a normal person the troponin levels are so low that they cannot be measured by biochemical measures. Troponin levels do not rise in any kind of chest pain which is not related to heart attack. If a person undergoes myocardial infarction they there will be steep rise in troponin levels indicating heart attack. The serum level of troponin I and troponin T are to be specifically observe for differential diagnosis of myocardial infarction. As these are released when ever any damage occurs to myocardial muscle. In case of myocardial infarction the poor blood supply to myocardium damages the myocardium. The rise in troponin levels can begin within 4 hours of myocardial damage and the rise keeps high even upto 14 hours of myocardial damage. In a normal person the troponin levels can be below 99th percentile in a serum test. If the troponin levels are recorded above this level then it is understood that there has been some damage to myocardium.

III. INTERPRETATION OF TROPONIN LEVELS

Though a rise in troponin levels are often an indication of a heart attack, there are a number of other reasons why levels could elevate. Other factors that could contribute to high troponin levels include intense exercise, burns, extensive infection, like sepsis, medication myocarditis, an inflammation of the heart muscle, pericarditis, endocarditis, cardiomyopathy, heart failure, kidney disease, pulmonary embolism, diabetes, hypothyroidism, stroke, intestinal bleeding.

If troponin levels are low or normal after experiencing chest pain, patient may not have experienced a heart attack. If troponin levels are detectable or high, the likelihood of heart damage or heart attack is high.⁸

The level of troponin that indicates a heart attack is the level above the reference range. For example if the normal reference range is listed as 0.00 – 0.40. Then 0.41 is technically positive although very weakly so, and 10 is very positive. Levels above the reference range may mean heart damage, but there are other causes also. An increased troponin level must always be correlated with chest pain. Chest pain, apprehension and increased troponin levels indicate the presence of Health attack.⁹

One of the areas of concern is how long the troponin levels are elevated in a patient with Myocardial infarction, when will the rise ignites. Technically Serum levels increase within 3-12 hours from the onset of chest pain, peak at 24-48 hours, and return to baseline over 5-14 days. Highly sensitive assays can now detect cardiac troponin in patients with acute myocardial infarction (MI) with a high degree of certainty. This has led to the change in clinical practice guidelines to recommend relying solely on the results of sensitive or high-sensitive troponin I or troponin T assays for diagnostic and prognostication purposes in patients with symptoms suggestive of acute MI. Serum levels increase within 3-12 hours from the onset of chest pain, peak at 24-48 hours, and return to baseline over 5-14 days. Baseline measurement of troponin levels followed by serial measurements of troponin 3 hours afterward should be performed; both the absolute value of the troponin level as well as the degree of change in the troponin level should be considered. This has been associated with better performance in an accurate diagnosis of acute MI.¹⁰

IV. CONCLUSION

It is very important to mark the presence or absence of Myocardial infarction in a patient with chest pain to begin the definitive treatment. Hence troponin levels measurement is crucial in differential diagnosis and marking the extent of myocardial damage.

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