E CONF SERIES

International Conference on Educational Discoveries and Humanities
Hosted online from Moscow, Russia
Website: econfseries.com 16th April, 2025

DIAGNOSTICS ON ACUTE MYOCARDIAL INFARCTION: CARDIAC TROPONIN BIOMARKERS

Nabiyeva F.S.
Senior Lecturer of the Department of Clinical Laboratory Diagnostics,
Samarkand State Medical University

Yakubova D.M.
Assistant of the Department of Clinical Laboratory Diagnostics,
Samarkand State Medical University

Abduvoxidova D.B.
Cadet of the Department of Clinical Laboratory Diagnostics,
Samarkand State Medical University

Annotation
Troponins are proteins that are integral components of the contractile mechanism of muscle, including cardiac muscle. The measurement of cardiac troponins is used primarily to assist in the diagnosis or exclusion of myocardial injury. The article reports on the role of troponins in the laboratory diagnosis of myocardial infarction.

Keywords: biomarkers, troponins, highly sensitive troponins, myocardial infarction.

Acute myocardial infarction (AMI), commonly referred to as a heart attack, remains one of the leading causes of death worldwide. Timely diagnosis and effective management are crucial in reducing mortality and improving patient outcomes. One of the most significant advancements in the diagnosis of AMI is the use of cardiac biomarkers, specifically cardiac troponins (cTn). These biomarkers have revolutionized the diagnostic approach to acute coronary syndromes (ACS), offering high sensitivity and specificity for detecting myocardial injury [1,4].
Biomarkers are substances found in the blood that indicate the presence of disease or injury. In the case of AMI, biomarkers help identify myocardial injury and

differentiate between various types of chest pain, guiding clinical decision-making. While many biomarkers exist, cardiac troponins (cTn) have become the gold standard for diagnosing AMI [2,3].

Cardiac troponins are proteins found in cardiac muscle cells that regulate muscle contraction. There are three types of troponins: troponin I (cTnI), troponin T (cTnT), troponin C (cTnC). Of these, troponin I and troponin T are the most commonly measured in clinical practice for diagnosing AMI. These proteins are released into the bloodstream when the heart muscle is damaged, making them highly sensitive markers of myocardial injury [5].

Cardiac troponins are highly specific to cardiac muscle, meaning their presence in the blood is almost exclusively linked to myocardial injury. Unlike other general markers of inflammation or muscle injury, such as creatine kinase-MB (CK-MB), cardiac troponins provide a more accurate and reliable indication of heart muscle damage [2, 6].

The key features of cardiac troponins in AMI diagnosis are: high sensitivity, high specificity, prolonged elevation and risk stratification. Advantages of cardiac troponins**:**

- Early detection: troponins can be detected early after myocardial injury, enabling prompt intervention;

- Precision: their high specificity and sensitivity make them a reliable tool in differentiating AMI from other conditions:

- Prognostic value: elevated troponin levels correlate with worse outcomes, allowing for better risk stratification.

Despite their significant role, cardiac troponin tests are not without challenges. Recent developments in high- sensitivity troponin assays have further enhanced their diagnostic power, reducing the time required for detection and improving early diagnosis. However, ongoing research aims to refine these tests, reduce the occurrence of false positives, and improve their utility in less typical presentations of AMI.

Additionally, combining troponin testing with other diagnostic tools, such as advanced imaging techniques or newer biomarkers- high-sensitivity C-reactive protein or copeptin, is an area of active research. This multi-modal approach could

improve diagnostic accuracy, particularly in patients with atypical presentations or those at high risk of AMI but without obvious symptoms [4, 5,].

Conclusion

Cardiac troponins have undoubtedly transformed the diagnostic landscape for Acute Myocardial Infarction, providing a gold standard for detecting myocardial injury with both high sensitivity and specificity. As troponin assays continue to evolve and new technologies emerge, the potential for earlier, more accurate diagnoses and improved patient outcomes continues to grow. With ongoing advancements, the role of cardiac troponins in clinical practice is only expected to increase, enhancing our ability to detect, manage, and treat heart attacks in real-time.

References:

1. Chaulin A.M., Duplyakov D.V. MicroRNAs in Atrial Fibrillation: Pathophysiological Aspects and Potential Biomarkers // Internat
2. Grigoryeva J, Suvorova G, Chaulin A, Chem-idronov S, Vankov V, Kulakova O, Bovtunova S. Con-cerning some morphofunctional aspects of the uterine cervical ripenening. Archiv Euromedica. 2020. Vol. 10, no. 4. P. 41-47. http://dx.doi.org/10.35630/2199-885X/2020/10/4.10
3. Nabieva F. S., Fayzullayeva K. B., Rayimova F. S. The importance of enzyme immunoassay in the diagnosis of infectious diseases //Central Asian Research Journal for Interdisciplinary Studies (CARJIS). – 2022. – Т. 2. – №. 10. – С. 46-49.
4. Yakubova D. M., Nabiyeva F. S., & Murtazayeva N.B. (2025). New aspects of diagnostics of myocardial infarction. Web of Medicine: Journal of Medicine, Practice and Nursing, 3(2), 239–242.
5. Душанова Г. А. и др. Современное состояние проблемы массовых иммунологических обследований //Образование и наука в России и за рубежом. – 2020. – №. 12. – С. 62-74.
6. Набиева Ф. С., Душанова Г. А., Бобокулов О. О. Значение иммуноферментного анализа в диагностике инфекционных заболеваний //Вестник науки и образования. – 2021. – №. 4-1 (107). – С. 54-56.