

## **CARDIAC ENZYME LEVELS IN PATIENTS WITH SURGICAL CONDITIONS PRE-SURGERY**

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**Relevance.** Cardiac-specific enzymes, such as creatine kinase MB (CK-MB), troponin I, and troponin T, play a crucial role in assessing the condition of the heart muscle and detecting myocardial damage. Elevated levels of these enzymes in patients with acute surgical pathology may indicate the presence of cardiac complications, which requires special attention and adjustments in the treatment strategy. Preoperative determination of cardiac-specific enzyme levels allows for the assessment of the risk of cardiovascular complications during the perioperative period and enables timely preventive measures to be taken. (1,2)

The aim of this study is to investigate the levels of cardiac-specific enzymes in patients with surgical pathology before undergoing surgical intervention and to analyze their correlation with treatment outcomes.

**Research Material.** The study compared the results between military and civilian individuals with acute surgical abdominal pathology, depending on the presence of intra-abdominal hypertension (IAH). The study included 232 patients with emergency surgical abdominal diseases and injuries, treated in the intensive care units of the Republican Scientific Center for Emergency Medical Care of the Ministry of Health of the Republic of Uzbekistan and the Military Hospital of the Ministry of Health of the Republic of Uzbekistan from 2021 to 2024.

The main group (MG) consisted of 112 military patients (48.3%). This group was further divided into two subgroups: Subgroup A, which included 39 patients (34.8%) with intra-abdominal hypertension (IAH+), and Subgroup B, which included 73 patients (65.2%) without intra-abdominal hypertension (IAH-), as shown in Table 1. The comparison group (CG) consisted of 120 civilian patients (51.7%). Subgroup A of CG included 49 patients (40.8% of the CG) with intra-abdominal hypertension, and Subgroup B of CG included 71 patients (59.2%) without intra-abdominal hypertension, as shown in Table 1.

Table 1

Distribution of patients into groups and subgroups

groups by groups	A subgroup, patients with VBG		B subgroup, patients without IAH		total	
	n	%	n	%	n	%
OG- main group, patients are military personnel	39	34,8%	73	65,2%	112	48,3%
GS comparison group, civilian patients	49	40,8%	71	59,2%	120	51,7%

Note: IAH intra-abdominal hypertension.

**The research methods included:** biochemical blood tests, measurement of intra-abdominal pressure using a Faley catheter according to the S.E. Bradley and G.P. Bradley method, statistical processing of the results. Laboratory results. The levels of cardiac enzymes in GS patients with IAH+ (GS subgroup A) were significantly higher compared to patients from the comparison group, indicating a high risk of myocardial infarction (Table 11). Troponin I: In subgroup A GS —  $0.38 \pm 0.12$  ng/ml. In subgroup A OG —  $0.20 \pm 0.10$  ng/ml. In subgroup B GS —  $0.18 \pm 0.09$  ng/ml. In subgroup B OG —  $0.09 \pm 0.04$  ng/ml. CPK-MB: In subgroup A GS —  $250 \pm 25$  U/l. In subgroup B OG —  $190 \pm 18$  U/l. In subgroup B GS —  $180 \pm 17$  U/L. In subgroup B OG —  $140 \pm 15$  U/L. LDH: In subgroup A GS —  $470 \pm 50$  U/L. In subgroup A OG —  $410 \pm 45$  U/L. In subgroup B GS —  $400 \pm 42$  U/L. In subgroup B OG —  $350 \pm 40$  U/L. Among patients with elevated troponin I ( $> 0.2$  ng/ml) and CPK-MB ( $> 200$  U/L) levels, there was an increased incidence of myocardial infarction.

An increase in the level of cardiac-specific enzymes significantly correlates with the development of myocardial infarction in patients with acute abdominal pathology, especially in the presence of intra-abdominal hypertension and concomitant cardiovascular pathology.

Table 2.

Troponin I, CPK-MB and LDH levels

Subgroup	Troponin I (M ± σ, ng/ml)	CPK-MB (M ± σ, U/L)	LDH (M ± σ, U/L)
A-OG	0.20 ± 0.10	190 ± 18	410 ± 45
V-OG	0.09 ± 0.04	140 ± 15	350 ± 40
A-GS	0.38 ± 0.12	250 ± 25	470 ± 50
B-GS	0.18 ± 0.09	180 ± 17	400 ± 42

The results of the study also showed that an acute increase in IAP causes more pronounced changes in central and intracardiac hemodynamics compared to a chronic increase in IAP, which was diagnosed only in the GS. In acute IAP, the decrease in cardiac output was 20%, while in chronic increase, this figure was about 10%. This is due to the fact that an acute increase in IAP leads to a sharp disruption of venous return and an increase in afterload, which causes a significant decrease in cardiac output and an increase in central venous pressure.

The ejection fraction in patients with acute IAP decreased to 42%, indicating a significant impairment of cardiac contractility. In chronic IAP, this figure remained at 48%, indicating smaller changes caused by cardiac adaptation to increased load. However, even in chronic IAP, signs of diastolic dysfunction were noted, which was observed in 58% of patients. Patients with chronic increased IAP show a smaller decrease in cardiac output compared to patients with acute IAP, which is associated with partial development of adaptive mechanisms. Blood pressure in patients with acute increased IAP is often reduced due to a sharp deterioration in systemic circulation, while patients with chronic IAP have more stable figures. CVP increases both in acute and chronic increased IAP, but in acute increased IAP, a more significant increase in CVP is observed. Cardiac enzyme levels (troponin I, CPK-MB) are elevated in both conditions, but myocardial injury is greater in acutely elevated IAP (Table 2). These data indicate greater myocardial injury in acutely elevated IAP.

**Conclusions.** Acute increase in IAP is associated with a sharp decrease in cardiac output, arterial hypotension and a more pronounced increase in CVP. Elevated levels of cardiac-specific enzymes indicate greater myocardial damage with acute increase in IAP. Chronic increase in IAP is accompanied by less pronounced hemodynamic disturbances. Patients with chronic increase in IAP have more stable blood pressure indicators, a smaller increase in CVP and lower levels of cardiac-specific enzymes, indicating partial adaptation of the heart to increased IAP.

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