Georgian Scientists
ქართველი მეცნიერები
Vol. 8 Issue 4(1), 2026
https://doi.org/10.52340/gs.2026.08.04(1).61



ABDOMINAL STEMI AND THE SPIKED HELMET SIGN: DIAGNOSTIC CHALLENGES IN CRITICAL CARE PATIENTS

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Introduction: Electrocardiographic (ECG) abnormalities, specifically ST-segment elevation, are traditionally diagnostic hallmarks of acute myocardial infarction (STEMI). However, non-cardiac conditions can mimic these manifestations, leading to diagnostic confusion. "Abdominal STEMI" refers to a rare clinical phenomenon where acute intra-abdominal pathologies simulate myocardial ischemia on an ECG. A key, high-acuity prognostic electrocardiographic marker associated with this presentation is the "Spiked Helmet Sign" (SHS), an artifactual waveform mimicking true ST-elevation. This study evaluates the clinical significance of abdominal STEMI and the SHS through an analysis of pathophysiological mechanisms and critical care case presentations.

Methodology: A comprehensive review was conducted on the underlying mechanisms of extra-cardiac ST-elevation and the clinical literature regarding SHS prevalence. Furthermore, two critical clinical cases were evaluated. Case 1 involved a 39-year-old male with multiple abdominal gunshot wounds and subsequent dynamic ileus exhibiting prominent SHS in leads V3–V6. Case 2 detailed a 59-year-old male post-abdominoplasty presenting with dynamic ileus and acute ST-segment elevations in inferior leads (II, III, aVF). Both patients underwent electrocardiographic monitoring, echocardiography, cardiac biomarker evaluations, and abdominal computed tomography (CT) scans to differentiate cardiac events from abdominal etiologies.

Results: In both clinical scenarios, echocardiographic assessments revealed preserved global left ventricular function (EF 58–60%) without regional wall motion abnormalities, and serial cardiac troponin tests remained negative. Pathophysiological evaluation confirmed that elevated intra-abdominal pressure and dynamic ileus caused mechanical diaphragmatic shifts, altering the cardiac axis and generating extra-cardiac signal artifacts. Gastrointestinal decompression via a nasogastric tube and targeted bowel stimulation achieved immediate resolution of the ECG

abnormalities. Literature analysis confirmed that 90% of mortality outcomes associated with SHS stem from severe non-cardiac systemic illnesses rather than true acute coronary occlusion.

Conclusion: The Spiked Helmet Sign and abdominal STEMI are critical ECG mimickers strongly tied to severe intra-abdominal pathologies like dynamic ileus rather than primary cardiac ischemia. Clinicians must recognize these atypical presentations in intensive care units to prevent unnecessary, potentially harmful invasive procedures like emergency coronary angiography. Continuous cardiac monitoring paired with immediate abdominal decompression remains the definitive diagnostic and therapeutic strategy for these high-risk patients.

Keywords: Abdominal STEMI, Spiked Helmet Sign, Dynamic Ileus, Electrocardiography Mimickers.