

# The “Spiked Helmet Sign”, a Mimic of ST-Elevation Myocardial Infarction in Post-Nephrectomy Ileus

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**Abstract:** There are many causes of ST-elevation on electrocardiogram (ECG). ECG changes in the setting of intra-abdominal pathology is a rare and under characterised and includes the “spiked helmet sign”. We report a rare case of the “spiked helmet sign” that presented with ST-elevation in the precordial leads due to post-operative ileus.

**Keywords:** nephrectomy; post-operative complication; cardiology; electrocardiogram

A 64-year-old man who underwent an open left radical nephrectomy for renal cell carcinoma was reviewed on day three post-operatively for dyspnoea (SpO<sub>2</sub> 85% on room air), tachycardia (120 bpm), nausea, and abdominal distension. He was found to have ST-elevation on bedside ECG (Figure 1). Cardiac investigations, including serum troponins and coronary angiography, were unremarkable.

An upward baseline shift starting prior to the onset of the QRS complex prior to ST-elevation was seen on ECG (Figure 1). This dome and spike morphology has led to the naming of this ECG variant the “spiked helmet sign” (SHS), as it has a similar appearance to the German military spiked helmet, the Pickelhaube [1].

Computed tomography (CT) of the abdomen demonstrated a grossly distended fluid-filled stomach and small bowel, consistent with ileus (Figure 2). Following nasogastric decompression, the patient stabilised, and the ECG changes normalized (Figure 3).

SHS is described as a marker of non-cardiac critical disease [1], with intra-abdominal and intra-thoracic pathology with ST changes found in inferior and precordial ECG, respectively [2–9]. This example shows precordial SHS with an intra-abdominal rather than intra-thoracic cause. Gastric distension, ileus, small bowel obstruction, and bowel perforation are all intra-abdominal pathologies that have been linked to SHS [2–7]. Intra-thoracic pathologies associated with SHS include pneumothorax and aortic dissection [7–9]. Although the mechanism of SHS is not well understood, intra-thoracic or intra-abdominal pressure resulting in pulsatile epidermal stretch [1] and marked prolongation of the QT interval [10] are both postulated mechanisms of SHS. In all reported cases, SHS changes on ECG resolve upon treatment of the underlying pathology [2–9].

Post-operative patients with ST-elevation on ECG must first undergo cardiac investigation to rule out life-threatening STEMI. Ileus is a common post-operative complication following abdominal surgery and SHS due to ileus demonstrates the importance of considering wide differential diagnoses for ST-elevation in the post-operative setting.



**Citation:** Wynn, J.; McCafferty, J.; Forsyth, R. The “Spiked Helmet Sign”, a Mimic of ST-Elevation Myocardial Infarction in Post-Nephrectomy Ileus. *Soc. Int. Urol. J.* **2024**, *5*, 93–96. <https://doi.org/10.3390/siuj5020015>

Received: 6 November 2023

Revised: 10 December 2023

Accepted: 10 December 2023

Published: 4 April 2024



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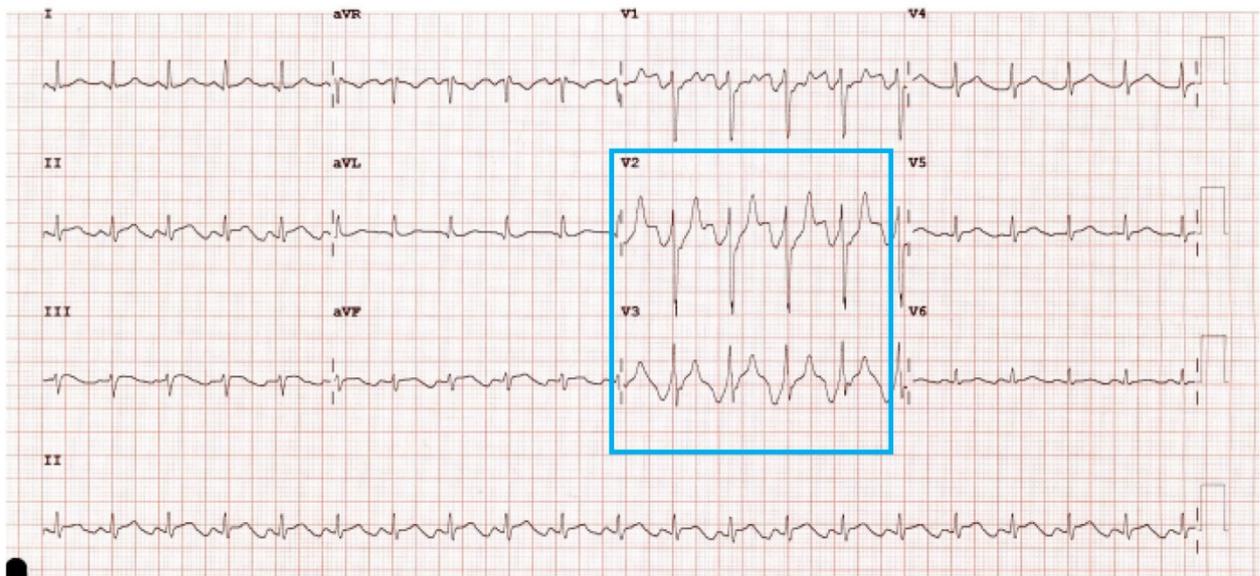
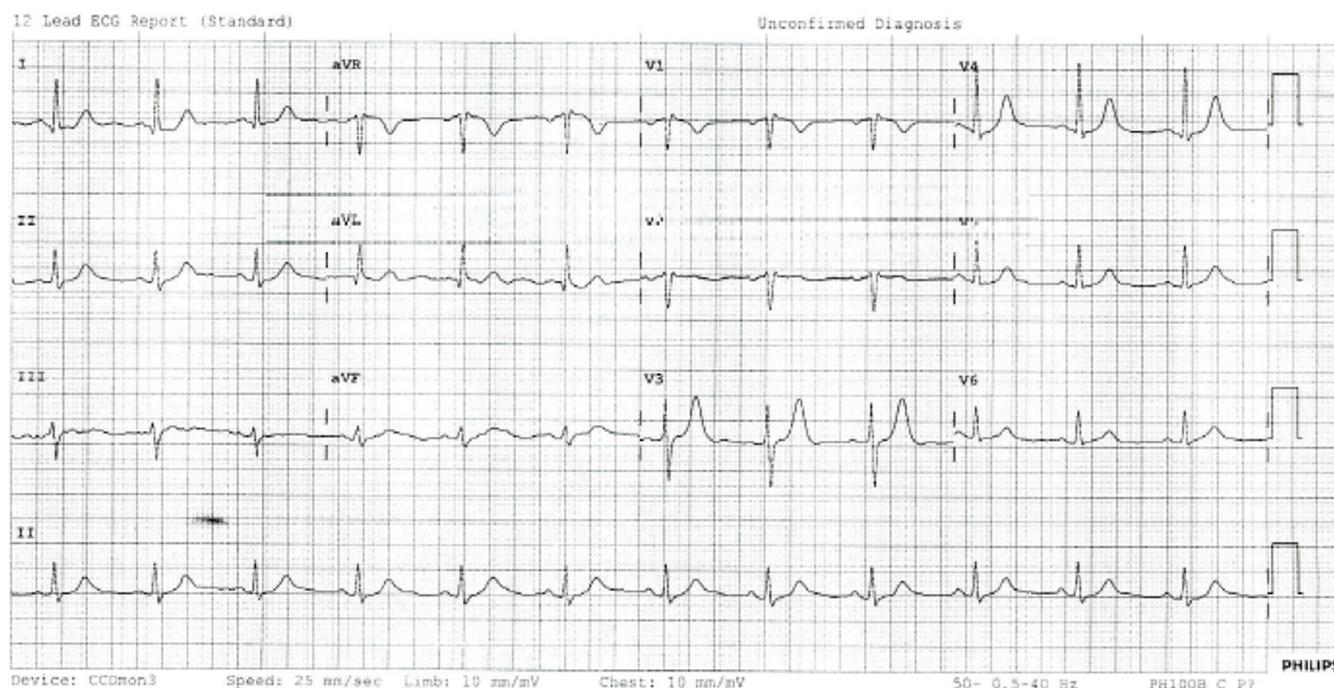


Figure 1. ECG with ST-elevation, consistent with spiked helmet sign in precordial leads (blue box).



Figure 2. Sagittal and axial views of distended stomach and small bowel on CT, consistent with ileus.



**Figure 3.** Resolution of ECG findings after treatment of ileus.

**Author Contributions:** Writing—original draft preparation, J.W.; writing—review and editing, J.M.; resources, J.M.; supervision, R.F. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no external funding.

**Institutional Review Board Statement:** Ethical approval was not required since anonymity is assured in this study and there are no risks associated.

**Informed Consent Statement:** Informed consent has been obtained to have this case published from the patient.

**Data Availability Statement:** The data presented in this study are available on request from the corresponding author.

**Conflicts of Interest:** The authors declare no conflict of interest.

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