Case Report

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Spiked Helmet Sign: A Dreadful Pattern in ECG

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Abstract

Electrocardiogram has been one of the oldest diagnostic modality for myocardial infarction. In last five years, pseudo ST elevation in critically ill patients in the form of "spiked helmet sign" has been studied [1-6]. Spiked helmet sign has been associated with non-cardiac illnesswith raised intra-thoracic pressure or raised intra-abdominal pressure[1-6]. We report one such case, encountered in our accident and emergency department, with ECG showing spiked helmet sign.

Keywords: Spiked Helmet Sign; Electrocardiogram.

Case

A 64 year old man, known diabetic and hypertensive, presented to emergency department with complaints of chest pain radiating to right lower neck since 1 week. His complaints aggravated since one hour associated with blurring of vision and gait instability. He was drowsy but arousable (GCS 14/15 E3,V5,M6).

His vitals were heart rate 98/min, feeble; BP 70 mmHg systolic, respiratory rate 16/min, SpO2 95% on room air, random blood sugar 422mg/dl. An ECG demonstrated right bundle branch block with J point elevation in V2, V3 and V4 resembling spiked helmet pattern (Figure 1).

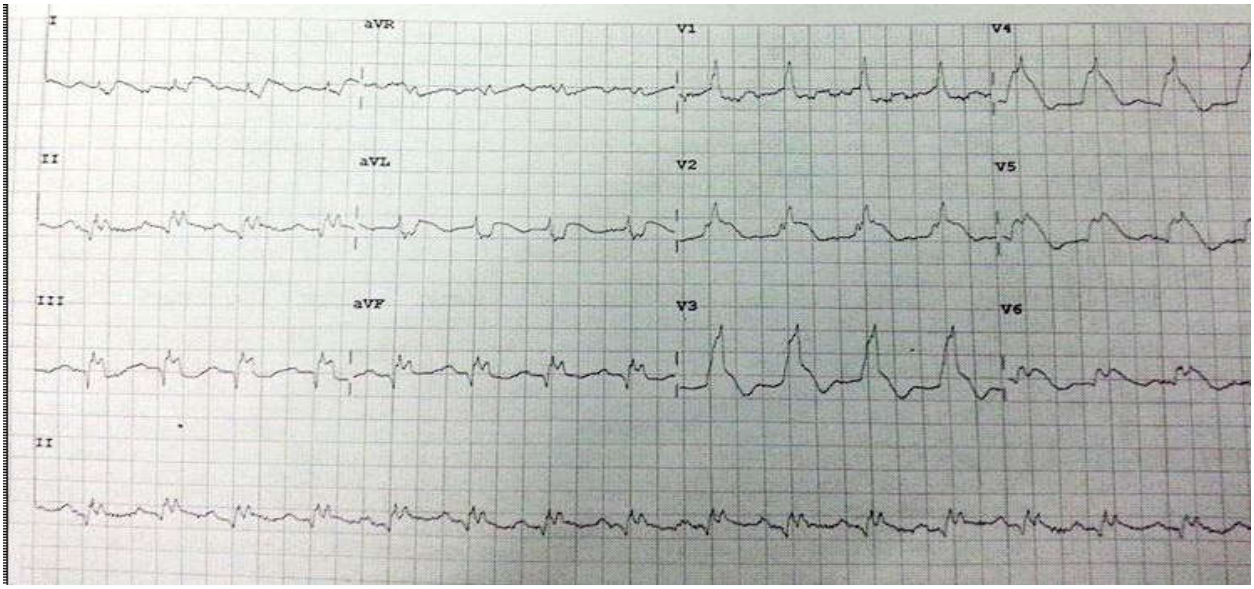

Fig. 1: Spiked Helmet Sign in V2, V3, V4.

Fig. 2: Pickelhaube: The German spiked military hat. Note the similarity in the ECG waveform in leads V2-V4 IN Figure 1.

Patient was started on intra venous normal saline, O2 by nasal cannula at 2L/min, tab disprin 350mg, tab clopidogrel 300mg, tab atorvastatin 80mgand injection human actrapid insulininfusion was started at 0.1U/kg/ hour.

Fifteen minutes later, he had an episode of loss of consciousness that lasted for one minute. He became drowsy and disoriented, elective intubation was done with rapid sequence intubation drugs, etomidate and succinyl choline. Ten minutes later he went into pulseless electrical activity (PEA). Immediate cardio-pulmonary resuscitation (CPR) was started as per the American heart association'sadvanced cardiac life support protocols. His initial rhythm was PEA that lasted for 25 minutes, then pulseless ventricular tachycardia for 15 minutes. He received three defibrillation shocks of 200J. He eventually went into asystole. Patient was declared dead sixty minutes from time of onset of CPR as there was no return of spontaneous circulation.

Diagnosis

Based on the clinical history chest pain, ataxia and blurriness of vision in an uncontrolled hypertensive patient, our primary differential diagnosis was aortic rupture secondary to aortic dissection. PEA as the first rhythm in cardiac arrest also corroborates a non-cardiac aetiology[9].

Littmann et al in 2011 discussed a new ECG finding characterized by dome and spike pattern which comprised of upsloping of baseline starting before the QRS complex and ending after it. The resultant pattern appears like German military spiked helmet (figure 2.) He studied 8 different cases with this ECG finding that were critically ill, ranging from sepsis, respiratory failure, cardiac tamponade, bowel perforation, dilated cardiomyopathy and anoxic brain damage. Six out of eight patients died in 1 to 10 days after the ECG finding (mean of 5.5 days); the two discharged were debilitated. Tomcansyi et al published cases with spiked helmet sign, namely epigastric distension, traumatic aortic dissection and pneumothorax [2,3]. Hibbs et al (2016) showed association of giant Jwaves along with ST segment elevation, mimicking spiked helmet sign in patient of acute gastric distension[6].

The underlying physiology behind the ECG pattern is uncertain,Littmann et alpostulatethe role of the diaphragm through repetitive epidermal stretch associated with an increase in intra-abdominal pressure/ intra thoracic pressure and pulsatile diaphragmatic irritation causing a baseline shift that is in concert with the cardiac cycle[5,7,8]. Spiked helmet sign in precordial leads and limb leads is associated with intra-thoracic pathology and intra-abdominal pathology, respectively [1-6].

Studies have shown high mortality of patients with ECG showing spiked-helmet sign [1]. In our case, the patient had chest pain radiating to neck for one week, ataxia and blurriness of vision since one hour and presented to the emergency department, with ECG changes. Spiked helmet sign has been shown to be associated with impending death [1-6]. The presence of spiked helmet sign does not have good sensitivity or specificity for ST elevation myocardial infarction. Early recognition of this pattern can help in prompt clinical management of the patient.

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