



# Deadly ECG Sign: An Aspect to Recognize in the Settings of STEMI

**Ali A. Eljazouli <sup>a\*</sup>, Anas A. Maaroufi <sup>a</sup>,  
Mohamed M. Nachid <sup>a</sup>, Ismail I. Benhar <sup>a</sup>  
and Rachida R. Habbal <sup>a</sup>**

<sup>a</sup> Cardiology Division, Ibn Rochd University Hospital, Casablanca-20250, Morocco.

## **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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**Case Report**

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## **ABSTRACT**

**Learning Objectives:** Learn how to identify and differentiate the shark fin EKG pattern from other EKG patterns and abnormalities. Explore the potential diagnostic and prognostic implications of the shark fin EKG pattern, including its association with increased risk of arrhythmias and sudden cardiac death.

**Background:** The Lambda-wave ECG, also known as the Shark fin or Thombostone pattern, has been linked to ST-elevation myocardial infarction's (STEMI) hazardous implications. It is characterized by merged QRS, ST, and T waves, forming a 'triangular QRS-ST-T waveform' or 'giant R waves.' This treacherous signature poses an alarming risk, with chances of cardiogenic shock and ventricular fibrillation leading to fatality. To tackle this peril, implementing swift thrombolysis or percutaneous intervention for reperfusion is critical for successful treatment. For optimal outcomes, the preferred setting to utilize ventricular assist devices is the ICU. Misdiagnosis can happen and be seen as either wide complex tachycardia or ECG changes induced by hyperkalemia. Imperative to prevent severe complications, early detection and treatment are crucial. We are reporting three cases of this Ekg pattern.

\*Corresponding author: E-mail: [eljazouli@hotmail.fr](mailto:eljazouli@hotmail.fr);

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## 1. INTRODUCTION

Early in acute MI, there is a morphological variant referred to as shark fin ST-segment elevation, which reflects extensive myocardial injury and predicts a grave clinical outcome [1]. Its occurrence has been noted in 10-26.1% of patients.

Rarely, an electrocardiogram (ECG) pattern can form when the QRS, ST segment, and T wave fuse together, resulting in a high-risk condition called Tombstoning fin ECG myocardial infarction. Typically, this occurs when the left main coronary is obstructed and can lead to cardiac arrest and cardiogenic shock, making death a significant risk [2,3].

This ECG pattern is the subject of our report, which encompasses three cases.

## 2. CASE PRESENTATION

The median age of patients was 57 years (with a range of 55-60 years). The patients were all men, with only two suffering from diabetes and one with a history of hypertension and smoking. Patient 2 had a medical history of hyperlipidemia and hyperuricemia.

Each patient exhibited typical chest pain symptoms five hours prior to admission. Upon

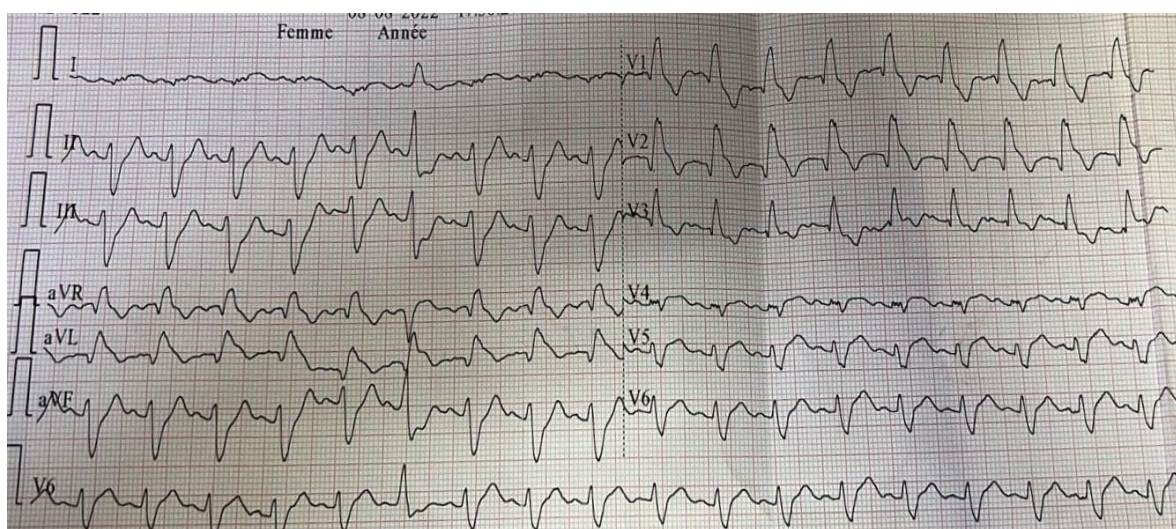
admission, patients 1 and 3 experienced cardiogenic shock, while patient 2 suffered from severe pulmonary congestion.

Upon analysis of the EKG results (Figs. 1, 2 and 3), it was determined that all patients had sinus rhythm. Additionally, they exhibited a BBD-like pattern featuring giant R waves and triangular ST elevation with a median of 5mm. The median QRS duration of 90 ms was consistent with a sharkfin pattern .

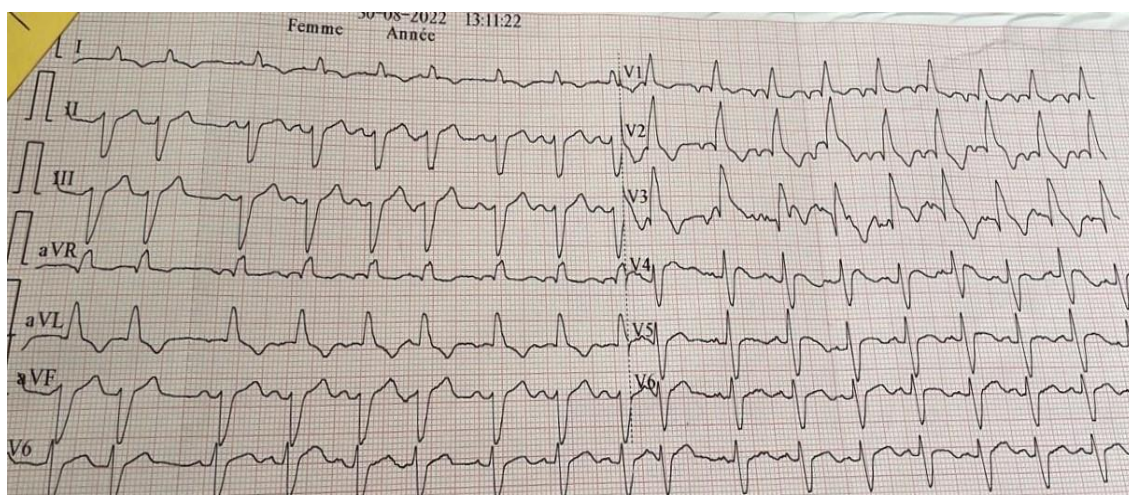
A bed echo was realized in all patient wish showed a sever LV dysfunction patient 2 and patient 3 were taken for percutaneous coronary intervention (PCI) with stenting to proximal LAD for patient 2 and left main in patient 3, patient 1 died in the emergency room patient 2 and patient 3 preseted death several horus after pci (patient 2 presented a cardiogenik chock , and patient 3 a severe ventriculare arrythmia).

## 3. DISCUSSION

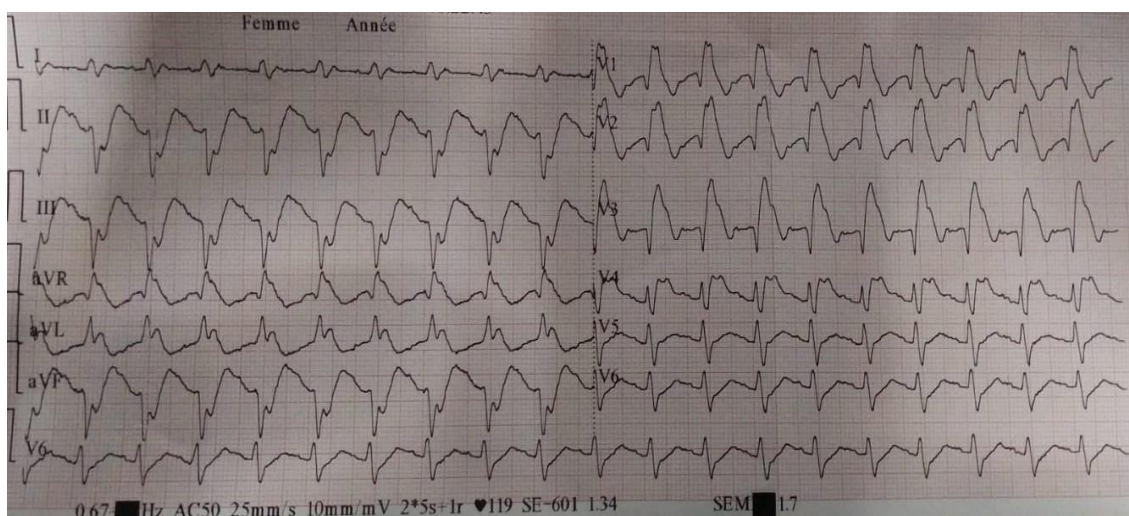
Massive myocardial damage can be indicated by morphologic variants like Tombstoning ST segment elevation (Tomb ST) during the early phase of acute anterior wall STEMI. Some patients may also display changes in ST segment elevation amplitude and morphology. These observations have been noted in certain cases [4,5].



**Fig. 1. Patient 1 EKG**



**Fig. 2. Patient 2 EKG**



**Fig. 3. Patient 3 EKG**

Dubbing it 'tombstoning,' Wilmaratna first identified the tombstone-like, curved ST segment elevation present in myocardial infarction (MI) patients [6]. Later, Guo et al. would revise the criteria for tombstoning [7]. The ST segment elevation criteria for tombstoning are: a) Nonexistent R wave or an R wave with minimal amplitude (<0.04 s duration), b) upward convex ST segment that blends into the descending R or ascending QS/QR, c) the peak of the ST segment surpasses that of the R wave and d) the ST segment converges with the T wave.

Regarding the coronary angiography findings of patients with TOMB-STEMI, Guo et al. suggested that patients with tombstoning have severe occlusion of the LAD artery) and usually involving either left circumflex or right coronary artery but more often both.

Wilmaratna associated tombstoning ECG pattern with the following complications. Six patients with tombstoning ECG pattern experienced  $\geq 3$  complications and 4 patients died within 7 days.2 Huang et al. reported reduced LV function and high mortality in patients with tombstoning ECG pattern [8]. Mortality in TOMB-STEMI is 26-38.2% [9,10].

Tombstoning ST-segment elevation has always been correlated with unfavorable outcomes, yet the exact origin of this correlation still remains somewhat obscure. Darrell, a renowned scientist in the field, theorizes that poor collateral circulation and/or diffuse coronary artery disease, insufficient myocardial protection in pre-infarct angina, and an increase in wall tension may all be contributing factors. Other experts, like Dr. Jones and Dr. Smith, have also suggested these

mechanisms [7-11] in conjunction with the hasty onset of myocardial injury.

Due to rapid myocardial damage, insufficient collateral flow, inadequate myocardial protection from pre-infarct angina, and increased wall tension, patients diagnosed with tombstoning STEMI pose a challenge to the prognosis. This is further compounded by diffuse coronary artery disease. Despite revascularization, limited myocardial recovery increases the risk of PCI failure.

#### 4. CONCLUSION

Blending together, the QRS and T-wave form a Shark Fin through a distinct ECG phenomena known as contiguous ischemia, which corresponds to coronary anatomy in certain leads. Accurately identifying this sign is crucial and relies on specific techniques to correctly discern the J-point's characteristic morphology. Overlooking this electrocardiographic indication of acute coronary occlusion should never occur. ST-Deviation, resulting in extreme blurring, yields this essential manifestation. Significant mortality seems to be linked to the presence of the sign, necessitating immediate recognition and emergency reperfusion. Lack of literature on the topic emphasizes the importance of awareness.

For an intensive care unit equipped with ventricular assist devices, AMI with SFE management ought to be swift and assertive [12]. This is necessary to tackle imminent cardiogenic shock and boost the patient's chances of recovery. The ECG pattern linked with STEMI and both electrical and hemodynamic instability often has a low survival rate. Patients with this pattern are at risk of ventricular fibrillation and/or cardiogenic shock, indicating a poor prognosis. With a greater occurrence of ventricular fibrillation, particularly in the early stages of these cases [13].

#### CONSENT

As per international standard or university standard, patient(s) written consent has been collected and preserved by the author(s).

#### ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

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There is no acknowledgment for the present study.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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