LETTER TO THE EDITOR

The non-acute coronary syndrome related ST-elevation patterns (NASTEP) conundrum: War helmets, Greek letters, and... “shark fins”

Dear Editor,

We greatly appreciated the interest shown by Madias regarding our article “Lambda-wave ST-elevation is associated with severe prognosis in stress (takotsubo) cardiomyopathy” published on this journal (Tarantino et al., 2018).

We would like to go through Madias’ notes in the same order.

1. All the patients of the lambda wave (LW) cohort presented as suspected ST-elevation acute myocardial infarction via primary PCI network; therefore, compared to the control group, their arrival was relatively earlier.
2. Lambda wave probably shares in our cohort the same electrophysiological mechanism than “spike helmet” sign (SHs), as noted (Madias, 2018; Samadov, Gasimov, Aliyev, & Isayev, 2018). However, we can hypothesize substantial differences between LW in TTS (takotsubo syndrome) with both SHs sign and LW initially described by Kukla, Jastrzebski, Sacha, & Bryniarski (2008) and Riera, Ferreira, Schapachnik, Sanches, & Moffa (2004). From a clinical perspective, despite the general poor prognosis characterizing subjects with LW electrocardiogram, LW aspect was originally associated with malignant arrhythmias; in our study, severe ST-elevation was, instead, predominantly associated with hemodynamic instability. Additionally, ST-elevation in our population occurred in elderly women (mean age 81 years, range 73–86) with TTS, whereas the LW and SHs apparently regarded mainly younger males (mean age 59 years, range 26–82) (Kukla et al., 2008; Riera et al., 2004; Samadov et al., 2018), in different clinical settings. Furthermore, if compared with “classic” LW by Riera et al. and Kukla et al., electrocardiograms found in our cohort are characterized by a less evident notch between QRS and ST, and ST-elevation amplitude often exceeding R-wave amplitude, just resembling more a “shark fin” than either LW or SHs (Figure 1). Our “shark fin” sign, instead, in some aspects rather reminds “tombstone” ST-elevation, an electrocardiogram pattern associated with proximal stenosis of the left anterior descending coronary artery and large anterior ischemia (Sinha, Dasgupta, & Lyons, 2004). However, “shark fin” sign might hypothetically feature high-risk hemodynamics in TTS patients

with transient severe left ventricular dysfunction transient left ventricular dysfunction rather than represent just myocardial ischemia real myocardial ischemia. Therefore, ST-elevation exceeding R wave amplitude - which is probably initially attenuated by TTS itself (Madias, 2014), and ST-elevation amplitude exceeding R-wave amplitude, probably transiently attenuated by TTS (Madias, 2014), could be useful in distinguishing two different electrocardiographic patterns. Furthermore, tall J-waves are known to possibly anticipate ST-elevation in TTS (Santoro et al., 2013).

3. It might be therefore of extreme interest to investigate possible correlations between gender, age, and specific electrocardiographic morphologies which stem from different pathophysiological pathways, all falling into the wider spectrum of nonacute coronary syndrome related ST-elevation patterns (NASTEP), but with different etiologies and different electrophysiology.
4. Eighty percent of LW patients suffered from cognitive decline, therefore it was nearly impossible to objectively and reliably record the real incidence of chest pain. The principal symptom in two patients was chest/epigastric discomfort, which was considered as an angina equivalent.
5. Because of unstable hemodynamics, nitroglycerin was not tested. However, intravenous diuretics administered to treat pulmonary congestion could explain the fluctuant pattern of ST-elevation, probably through the same mechanism of nitroglycerin that is preload variations.
6. Serial transthoracic echocardiograms were obtained at the presentation and every other day in each patient as per protocol. The LW group presented only typical apical ballooning with basal hyperkinesia.
7. We totally agree that a noninvasive method to assess sympathetic status would be helpful to better monitor in-hospital stay and prevent complications. Future studies can be jointly carried out in this direction.

Unfortunately, pre-TTS electrocardiograms can be compared in only two patients [one already reported in Figure 4b (Tarantino et al., 2018), and a transient TTS-related reduction of QRS amplitude was notable. Moreover, two patients out of five deceased during in-hospital stay, therefore no electrocardiogram could be

Reply to “Other correlates of “lambda wave” in patients with takotsubo syndrome?”

FIGURE 1 Lambda wave ("shark fin") pattern in two different patients with Takotsubo syndrome and unstable hemodynamics. Please note the characteristic minimal notch separating QRS complex from ST and the ST-elevation amplitude exceeding R-wave amplitude

obtained after discharge. The remainders were followed up via telephone follow-up.

War helmets, Greek Letters and shark fins: the conundrum of nonacute coronary syndrome related ST-elevation patterns (NASTEP) still remains largely unresolved.

DISCLOSURES

No conflict of interest to disclose.

ORCID

Nicola Tarantino <http://orcid.org/0000-0002-9770-8675>

Francesco Santoro <http://orcid.org/0000-0001-9909-6513>

Natale Daniele Brunetti <http://orcid.org/0000-0001-9610-7408>

Nicola Tarantino¹

Francesco Santoro^{1,2}

Matteo Di Biase³

Natale Daniele Brunetti¹

¹Department of Medical and Surgery Science, University of Foggia, Foggia, Italy

²Cardiology Department, Ospedale "L. Bonomo", Andria, Italy

³GVM Group, Cardiology Department, Ospedale "Santa Maria", Bari, Italy

Correspondence

Francesco Santoro, Department of Medical and Surgery Science, University of Foggia, Foggia, Italy.

Email: dr.francesco.santoro.it@gmail.com

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