

## Inverse Takotsubo Syndrome Resulting from a Fall, Malleolar Fracture, Anesthesia, Surgery, or Complicating Pulmonary Embolism?

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To the Editor:

The interesting case report of Lee et al.<sup>1)</sup> published in the December 2013 issue of the Journal, of a 43-year-old woman who suffered inverted takotsubo syndrome (TTS) (left ventricular apical hyperkinesis with midventricular and basal hypokinesis/akinesis) in the setting of complicating pulmonary embolism (PE), following surgery for a malleolar fracture, managed surgically under spinal anesthesia, spurs one to delve in the real cause of TTS in this patient; accordingly one wonders whether the emotional upheaval (with consequent adrenergic sympathetic surge) from falling from a ladder, physical stress of pain from suffering a malleolar fracture, spinal anesthesia, surgical management of the fracture, or PE, all, or one or more of the above, in any combination, was the actual trigger of TTS in this otherwise healthy woman. More and more cases of TTS following PE are being reported in the literature, but TTS is also common in association with accidents, pain, fractures, anesthesia, various invasive procedures, and surgery, as can be shown by browsing the large research output on TTS.<sup>2)</sup> The present case reminds one about the ambivalence in attributing a case of TTS to a urological instrumentation, or the resultant sepsis, in a recently published report.<sup>3)</sup> The electrocardiogram (ECG) included in this case report is not of much help to ascertain the onset of TTS (ST-segment elevation and attenuation of the voltage of the QRS complexes, early in the illness,<sup>4)5)</sup> with deep T-wave inversions with QTc prolongation in

subsequent evolution. Indeed the prevalence of the T-wave inversions have been found to be lower in patients with the inverse TTS, as compared with the typical apical TTS variant.<sup>6)</sup> Careful scrutiny of history, with timing of the suspected triggers, and frequent assessment of biomarkers, recording of ECGs, and performing echocardiograms, will improve our abilities in detecting the real trigger of TTS in reported cases.

### References

1. Lee SH, Kim DH, Jung MS, et al. Inverted-takotsubo cardiomyopathy in a patient with pulmonary embolism. *Korean Circ J* 2013;43:834-8.
2. Reynolds HR, Srichai MB, Iqbal SN, Slater JN, Mancini GB, Feit F, et al. Mechanisms of myocardial infarction in women without angiographically obstructive coronary artery disease. *Circulation* 2011;124:1414-25.
3. Madias JE. Takotsubo syndrome resulting from urosepsis, or urinary catheter insertion? *Int J Urol* 2013. [Epub ahead of print]
4. Madias JE. Electrocardiogram in myocardial edema due to Takotsubo syndrome. *J Electrocardiol* 2012;45:795-6.
5. Madias JE. Transient attenuation of the amplitude of the QRS complexes in the diagnosis of Takotsubo syndrome. *Eur Heart J Acute Cardiovasc Care* 2014;3:28-36.
6. Song BG, Chun WJ, Park YH, et al. The clinical characteristics, laboratory parameters, electrocardiographic, and echocardiographic findings of reverse or inverted takotsubo cardiomyopathy: comparison with mid or apical variant. *Clin Cardiol* 2011;34:693-9.

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