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Letter to the Editor

Considerations on Hyperthyroidism as a Trigger for Apical Ballooning in a Postmenopausal Tibetan Woman

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Letter to the Editor

We read with interest the article by Zhang *et al.* about a 65-year-old Tibetan woman living at an altitude of 3200 who was admitted with chest and abdominal pain, elevated body temperature, and restlessness, which was attributed to hyperthyroidism with a thyroid-stimulating hormone level of 0.001 ^[1]. The examinations revealed Takotsubo syndrome (TTS), sinus tachycardia, elevated troponin levels, extensive ST-elevation, apical ballooning, an apical thrombus, and mild alkalosis ^[1]. After administration of propranolol, irbesartan, rivaroxaban, and methimazole, the patient recovered completely at the three-month follow-up examination ^[1]. The study is interesting, but some points should be discussed.

The first point is that triggers for TTS other than hyperthyroidism were not taken into account and were not sufficiently ruled out. TTS is most commonly triggered by emotional stress (e.g. grief, shock, anger, happy heart syndrome) or severe physical stress (e.g. surgery, acute illness, infection, medication).

The second point is that causes of intraventricular thrombus formation other than TTS have not been sufficiently ruled out ^[1]. Intraventricular thrombus formation is usually attributable to myocardial infarction, left ventricular aneurysm, dilated cardiomyopathy, ventricular tachycardia or fibrillation, lupus erythematosus, rheumatoid arthritis, leukemia, severe infections, thrombocytosis, medications (e.g., cocaine, tamoxifen), and TTS ^[2, 3]. It was not reported whether the index patient was SARS-CoV-2 positive at admission or during her hospital stay, whether she had pulmonary embolism, suffered from a hereditary coagulation disorder, or developed arrhythmias other than sinus tachycardia.

Third, the patient's medical history and family history were not sufficiently documented ^[1]. Was the patient a smoker, did she suffer from hyperlipidemia or obesity, or was she inactive? Was the coagulation disorder already known before the intraventricular thrombus formation was detected? Was there any evidence of primary cardiomyopathy, hereditary coagulation disorders, goiter, thyroid dysfunction, or thrombocytosis in the family history?

The fourth point is that the cause, course, and outcome of the agitation were not sufficiently explained ^[1]. Was it ruled out that the agitation was caused by anxiety, depression, bipolar disorder, psychosis, infection, respiratory failure, withdrawal from alcohol, nicotine, illegal drugs, dementia, seizures, traumatic brain injury, hyperthyroidism, hospitalization, abuse, torture, nutrition, chronic stress, ischemic embolic stroke, or medication side effects? Did the restlessness completely resolve with thyroid-suppressive medication?

The fifth point is that the index patient suffered from hyperthyroidism, but it was hardly symptomatic. Common symptoms of hyperthyroidism include tachycardia, weight loss despite increased appetite, heat intolerance, sweating, palpitations, anxiety, irritability, tremors, fatigue, goiter, hair loss, sleep disturbances, frequent bowel movements, changes in the menstrual cycle, protruding or reddened eyes, and fatigue ^[4]. What is the reason why the index patient only showed sinus tachycardia and no other common clinical symptoms of hyperthyroidism?

The sixth point is that the cause of hyperthyroidism was not specified. We should know whether the hyperthyroidism was due to an overactive thyroid gland (e.g., Graves' disease), thyroiditis, excessive hormone intake, or a malignant disease.

The seventh point is that it was not specified whether only the systolic function or also the apical ballooning had completely regressed and after how long. TTS usually disappears within 1–4 weeks after its appearance on the echocardiogram ^[5]. After how long did the ECG abnormalities completely disappear?

Overall, all alternative triggers must be ruled out before hyperthyroidism is indicated as the cause of TTS. All other possible causes must be thoroughly ruled out before apical thrombus formation can be attributed to TTS.

Declarations**Ethical Approval:** Not applicable.**Consent to Participation:** Not applicable.**Consent for Publication:** Not applicable.**Funding:** None received.**Availability of Data and Material:** All data are available from the corresponding author.**Completing Interests:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.**Author Contribution:** JF was responsible for the design and conception, discussed available data with coauthors, wrote the first draft, and gave final approval. xx and xx: contributed to literature search, discussion, correction, and final approval.**Acknowledgements:** None.**Keywords:** Takotsubo Syndrome, Apical Ballooning, Hyperthyroidism, Apical Thrombus, Troponin**References**

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