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Multiple sclerosis lesion in the medulla oblongata in a patient with takotsubo cardiomyopathy



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We read with great interest the case report by Biesbroek et al. of a 29-year-old man with reverse takotsubo cardiomyopathy (TC) associated with multiple sclerosis (MS) [1]. While this link remains unclear, we can speculate in their case that the demyelinated brain lesions inferred with the normal sympathetic neural regulation, subsequently leading to sympathetic overactivation [1]. Following their report and discussion, we would like to report a similar case of reverse TC, who had an MS lesion in the brainstem, which is important for the regulation of the autonomic nervous system.

A 30-year-old woman with a prior history of MS was admitted to our hospital because of dysesthesia in the right upper and lower limbs, vertigo, occipital headache, nausea, vomiting, and chest pain and palpitations. The right-sided numbness occurred 7 days before admission. The patient's symptoms gradually became worse with the appearance of vertigo and nausea, and dysesthesia radiated to the right side. On the day of admission, she suffered from chest pain and palpitations and was brought by ambulance to the emergency department of our hospital. On admission, she was alert and oriented and showed left gaze-evoked nystagmus and right-sided hemihypesthesia. Her blood pressure was 180/115 mm Hg. ECG showed significant ST-segment depression in the inferolateral leads with frequent premature atrial

and ventricular contractions. Brain computed tomography scan revealed inhomogeneous hypodense areas in the medulla oblongata, indicating a relapse of MS. Although the patient's cardiac enzyme levels were normal on admission, serum levels of creatine phosphokinase and its MB isoenzyme levels were increased to 422 IU/L and 37 IU/L on day 2, respectively. There was no significant coronary lesion on coronary angiography, but left ventriculography showed basal and mid-ventricular akinesis with apical hyperkinesis, suggesting reversed TC (Fig. 1). Three-day courses of high-dose intravenous corticosteroids therapy was performed three times, and the patient's neurological symptoms recovered with slight dysaesthesia. Left ventricular dysfunction was also normalized on day 17.

Both Biesbroek et al. and we experienced reversed takotsubo cardiomyopathy following the occurrence of new MS lesions. In our case, brain MRI showed an acute MS lesion with gadolinium enhancement in the medulla oblongata (Fig. 2). We previously reported the abnormal activation in the brain regions, including the brainstem, in patients with TC [2,3]. TC has been reported to occur in patients who suffered a vertebrobasilar stroke [4] and acute disseminated encephalomyelitis involving the medulla oblongata [5,6]. Thus, it is reasonable to consider that the MS lesion in the medulla oblongata was associated with the occurrence of TC in our case. The lesions of the medulla oblongata in TC may be associated with the damage of the autonomic nervous system such as the solitary nucleus. Indeed, the solitary nucleus is the primary regulatory region of the parasympathetic nervous system [7], and its dysregulation is associated with sympathetic arousal in patients with hypertension, heart failure and sleep apnea [7–9]. Moreover, damage to the solitary nucleus in experimental animals leads to marked elevation of blood pressure and heart rate [10]. These lines of evidence suggest that the MS lesion in the medulla oblongata extended to the solitary nucleus, interfered with the normal sympathetic neural regulation with subsequent occurrence of TC via sympathetic overactivation. The association between acute brainstem lesion and TC may also shed light on the pathophysiology of TC induced by other psychiatric and neurological conditions [11,12].

In conclusion, the present case suggests the association between the MS lesion in the medulla oblongata and the occurrence of TC, indicating the importance of brainstem lesions in the pathophysiology of TC.

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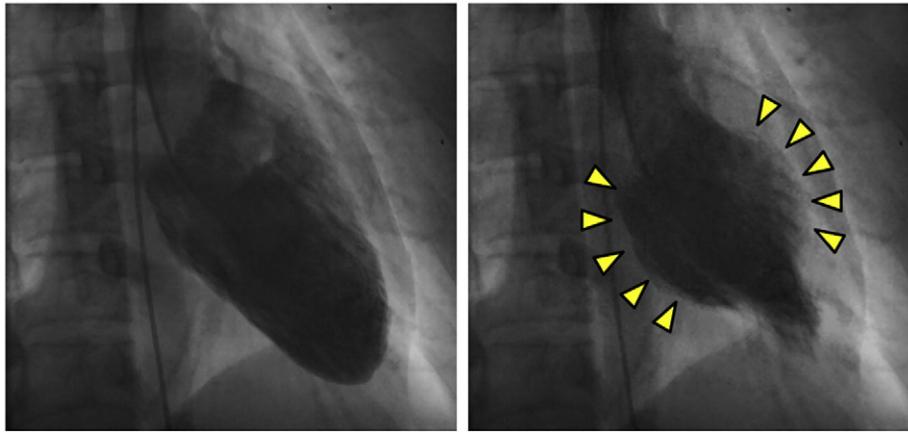


Fig. 1. Left ventriculogram in diastolic (left) and systolic (right) phase on day 2. Basal and mid-left ventricular akinesis was noted in systolic phase (yellow arrowheads).

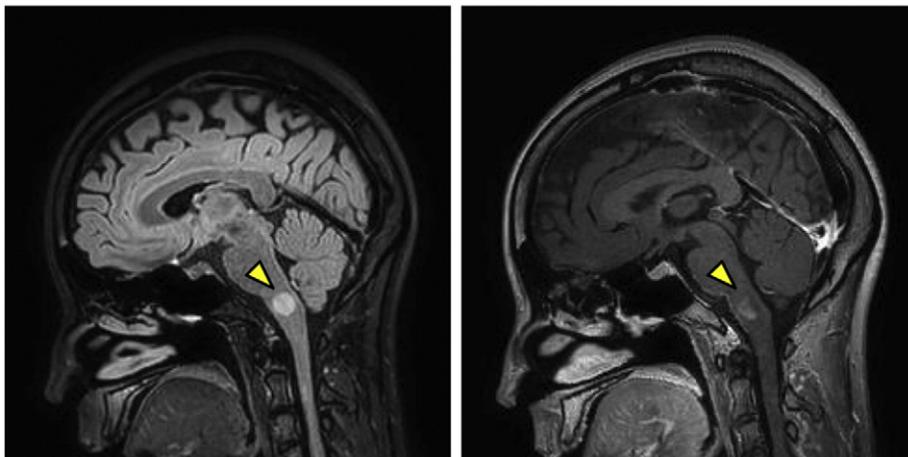


Fig. 2. Brain MRI showed the lesion with hyperintensity on fluid-attenuated inversion recovery (left) and gadolinium enhancement (right) on day 30.

Conflicts of interest

The authors declare no conflicts of interest.

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