



Case report

Severe orthostatic hypotension associated with lesions of the area postrema in neuromyelitis optica spectrum disorder

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ABSTRACT

Hiccups, nausea and vomiting are known as the clinical manifestations of neuromyelitis optica spectrum disorder (NMOSD) linked to lesions of the area postrema in the medullary tegmentum. Here, we describe a 74-year-old male patient with NMOSD who presented with recurrent syncope due to severe orthostatic hypotension (OH) following symptoms of hiccups, nausea and vomiting. Brain magnetic resonance imaging revealed the lesion of the area postrema and it could be responsible for the symptom of OH. Considering the numerous related reports, we suspect that the prevalence of OH is underreported in the patients with NMOSD. OH may transition into more serious conditions, so it should be evaluated carefully in all patients with NMOSD, particularly when there is a lesion of the area postrema.

1. Introduction

Neuromyelitis optica spectrum disorder (NMOSD) is a central nervous system inflammatory disorder. Most of NMO cases are associated with serum anti-aquaporin-4 (AQP4) antibody, which causes clinical features of NMOSD such as paraplegia and vision loss [1]. Hiccups, nausea and vomiting are known clinical manifestations of NMOSD linked to lesions of the area postrema in the medullary tegmentum [2]. Lesions in the area postrema where lacks a blood-brain barrier, frequently occur in NMOSD [2]. In the present report, we describe a patient with NMOSD who presented with recurrent syncope due to orthostatic hypotension (OH) following symptoms of hiccups, nausea and vomiting.

2. Case report

The patient was a 74-year-old man who experienced persistent hiccups, nausea and vomiting for 4 days, and was hospitalised in the department of gastroenterology. Gastroscopic examination showed normal findings. Eight days after admission, he fainted several times a day even while in the sitting position. Electrocardiogram and echocardiography showed no abnormalities. Blood pressure (BP) measured with the patient in the lying position was 97/60 mmHg (heart rate: 58 bpm),

and 65/51 mmHg (heart rate: 62 bpm) with the head of the bed elevated at 30-degree angle (Fig. 2A). The OH was considered to be the cause of syncope. It was suggested that OH was neurogenic in origin.

The patient was then transferred to the Department of Neurology. Brain magnetic resonance imaging (MRI) revealed a high intensity lesion at the medullary tegmentum on T2-weighted and fluid-attenuated inversion recovery images (Fig. 1), and no other lesion was found on brain or spinal cord MRI. Then, anti-AQP4 antibody blood testing using enzyme-linked immunosorbent assay (ELISA; ElisaRSR AQP4 Ab version 2; RSR Limited) indicated a positive result of 19 U/ml (normal range < 3 U/ml) [3], so the patient was diagnosed with anti-AQP4 antibody-positive NMOSD. Four weeks after admission, he was given 2 sessions of methylprednisolone pulse therapy (1 g per day for 3 days). Neurological symptoms such as hiccups, nausea, vomiting and OH improved immediately and significantly after therapy (Fig. 2B). He was maintained on immunosuppression therapy with prednisolone (initially on 40 mg daily), and was discharged from the hospital 5 weeks after the admission.

3. Discussion

There are several previous case reports that describe OH in NMOSD (Table 1). In two reports [4,5] (one report written in Japanese [4]), it

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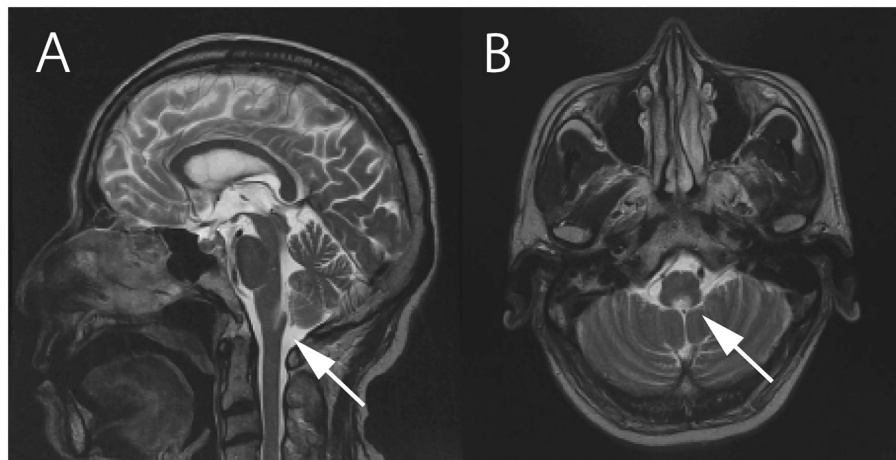


Fig. 1. Sagittal (A) and axial (B) T2-weighted magnetic resonance imaging of the brain showed a hyperintense lesion in the area postrema of the dorsal medulla (arrows).

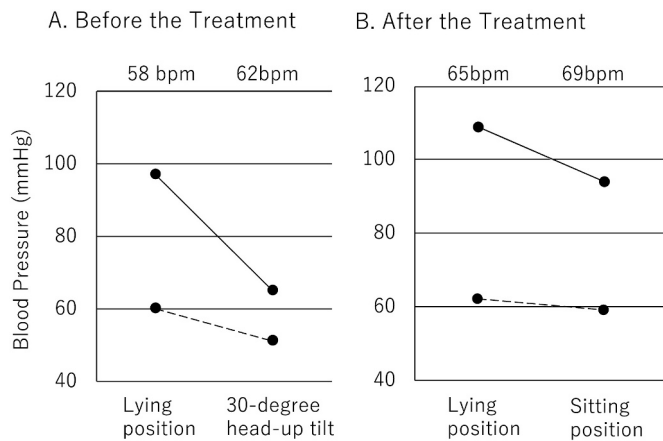


Fig. 2. Decreases in systolic (solid line) and diastolic (dotted line) blood pressures due to postural changes. Blood pressures were measured before and 3 min after the postural change. Heart rates were shown in the top of the graph. (A) Changes in blood pressure between lying position and 30-degree head-up tilt before the treatment. (B) Changes in blood pressure between lying position and sitting position after the treatment.

Table 1
Reports of orthostatic hypotension in NMOSD.

	Age, sex	Clinical manifestations	MRI findings
Ikumi et al. [4]	68, F	OH, hiccups, nausea, vomiting	Dorsal medulla
Okada et al. [5]	78, M	OH, hiccups, nausea, dysarthria, dysphagia, tetraplegia, cardiorespiratory arrest	Dorsal medulla, spinal cord (C3-4)
Furlan et al. [6]	60, F	OH, tetraplegia, neurogenic bladder and bowel	Spinal cord (C2-7), cerebral crus, thalamus
Berry et al. [7]	49, M	OH, visual hallucinations, hypothermia, bradycardia	Hypothalamus
Tanaka et al. [8]	16, F	OH, hypersomnia	Hypothalamus
our case	74, M	OH, hiccups, nausea, vomiting	Dorsal medulla

Abbreviations: F, female; M, male; OH, orthostatic hypotension; MRI, magnetic resonance imaging

was supposed that a lesion of the dorsal medulla may have affected OH. The lesions distribution in the papers were comparatively similar to that in our patient. In other reports, they reported that the causal lesion of OH in NMO was cervical spinal cord [6], and hypothalamus [7,8]. In a previous study using the tilt-table test, OH was detected in 6 out of 20 (30%) [9] and 6 out of 27 (22.2%) [10] consecutive patients with NMOSD. Therefore, OH is likely to be a common manifestation of NMOSD, which means that there could be many patients subclinically presenting with OH symptoms. A case of dorsal medullary cavernous angioma was reported to manifest symptoms of OH [11]. It was suggested that a cavernous angioma in the medullary lesion interrupted the catecholaminergic transtegmental tract arising from sympathoexcitatory C1 neurons of the rostral ventrolateral medulla [11]. The same mechanism may cause OH in our patient.

While hiccups, nausea and vomiting are well-known clinical manifestations of lesions of the area postrema in NMOSD [2], OH has not been recognised as one of them. Most importantly, OH can lead to syncope or other serious conditions, so it should be evaluated carefully in all patients with NMOSD, particularly when there is a lesion of the area postrema.

Author contributions

SS and MM were responsible for drafting and editing of the manuscript. TM, YN, SK, and IK participated in critical revision of the manuscript for intellectual content. All authors read and approved the final manuscript.

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Declaration of Competing Interest

The authors declare no competing financial interests.

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