A Case of Trigeminal Neuralgia and Neurogenic Hypertension Due to Megadolichobasilar Artery Anomaly

Ken Ikeda 1; Ken-ichi Hosozawa 1; Yasuo Iwasaki 2; Eijiro Satoyoshi 2; Eijiro Wakasugi 1; Akira Miyamoto 1; Akira Kuwajima 3; and Masaki Tamura 3

1 Department of Neurology, Division of Brain Check-up and 2 Department of Health Check-up, PL Tokyo Health Care Center, and 3 Department of Neurology, Toho University Ohmori Hospital

ABSTRACT

We report neuroradiological findings in a unique case with megadolichobasilar artery and trigeminal neuralgia and neurogenic hypertension. A 39-year-old man with hypertension and trigeminal neuralgia received the first physical check-up in PL Tokyo Health Care Center.

Physical check-up suggested moderate degree of obesity, severe degree of hypertension, hyperlipidemia and hyperuricemia. Neurological examination showed paresthesia in the right lower face, auditory disturbance in the right side and horizontal nystagmus to the right direction. Magnetic resonance imaging showed the dilated and tortuous basilar artery compressing the pons and the left ventrolateral medulla oblongata. Magnetic resonance angiography (MRA) demonstrated megadolichobasilar artery anomaly. The resource images of MRA revealed compression to the root entry zone of the right trigeminal nerve by the ectatic basilar artery and the neurovascular contact of the right vestibulocochlear nerve.

Megadolichobasilar artery anomaly causes dysfunction of the cranial nerves, cerebral ischemia and hemorrhage. Our neuroimages indicate that the megadolichobasilar artery compresses the root entry zone of the ipsilateral trigeminal nerve, the vestibulocochlear nerve and the left ventrolateral medulla, leading to trigeminal neuralgia, vestibulocochlear deficits and marked hypertension in our patient. Thus, the resource images of MRA have benefits for pathognomonic evaluation of the neurovascular structure.

Key Words Megadolichobasilar Artery; Trigeminal Neuralgia; Neurogenic Hypertension

INTRODUCTION

Megadolichobasilar artery describes the tortuosity, elongation and dilation of the basilar artery. This vascular anomaly frequently induces involvement of the cranial nerves, cerebral ischemia and hemorrhage and the prognosis of symptomatic patients was poor. Recent reports describe magnetic resonance angiography (MRA) with noninvasive diagnostic value for megadolichobasilar artery. We encountered a patient with trigeminal neuralgia and neurogenic hypertension due to megadolichobasilar artery. Here we report those neuroimages in such a unique patient.

CASE REPORT

A 39-year-old man with current smoking received the first physical check-up in PL Tokyo Health Care Center. His previous history showed hypertension from 25 years of age and his mother also had hypertension. Carbamazepine (200 mg/day, p.o.) was given to him for trigeminal neuralgia in the right face. However, the degree of neuralgia exacerbated for recent six months. On physical examination, body mass index was increased to 32.9 kg/m² and blood pressure was 164/130 mm Hg. Serum levels of triglyceride (normal<150 mg/dl) and high-density lipoprotein cholesterol (normal>40 mg/dl) were 353 and 39, respectively.

Serum levels of uric acid (normal<7.0 mg/dl) were increased to 8.1. Urinalysis disclosed severe degree of proteinuria and hyaline casts. Funduscop was Keith-Wagener Ila group. Audiometry suggested mild dysfunction in the right side at 2,000 Hz. Those results of physical check-up suggested moderate degree of obesity, severe degree of hypertension, hyperlipidemia and hyperuricemia. Treatment with valsartan (80 mg/day, p.o.) was started immediately. He requested specific consultation for trigeminal neuralgia and transferred to department of neurology in our clinic. Neurological examination showed paresthesia in the right lower face. On neuro-ophthalmologoe examination, horizontal gaze nystagmus was observed to the right direction.

NEUROIMAGES

Magnetic resonance imaging (MRI) was used by 1.5 tesla Stratis II (Hitachi Medical Co., Japan). T1-weighted (TR/TE=400/20 msec), T2-weighted (TR/TE=4,750/120 msec) and fluid-attenuated inversion recovery (TR/TE/T1=10,000/2,200/100 msec) images were obtained. MRI showed the dilated and tortuous basilar artery compressing the pons (Fig. 1) and the left ventrolateral medulla oblongata (Fig. 2). MRA was applied by three-dimensional time-of-flight technique. A slice thickness was 0.6 mm and the matrix size was 140×140. MRA demonstrated megadolichobasilar artery anomaly (Fig. 3). The resource images of MRA revealed compression to the root entry zone of the right trigeminal nerve by the ectatic basilar artery (Fig. 4 (A)) and the neurovascular contact of the right vestibulocochlear nerve (Fig. 4(B)).

Fig. 1 Axial T1-weighted (A), T2-weighted (B) and fluid-attenuated inversion recovery (C) images show the pons compressed by the dilated and tortuous basilar artery.
Ikeda et al.: A Case of Trigeminal Neuralgia and Neurogenic Hypertension due to Megadolichobasilar Artery Anomaly

Fig. 2 Axial T2-weighted imaging shows neurovascular contacts of the left ventrolateral medulla oblongata by the dilated basilar artery.

Fig. 3 Anteroposterior (A) and axial views (B) of MRA demonstrate megadolichobasilar artery anomaly.

Fig. 4 (A) Axial MRA resource imaging shows that the ectatic basilar artery markedly compresses the root entry zone of the right trigeminal nerve (arrow). (B) Axial MRA resource imaging shows neurovascular contact of the right vestibulocochlear nerve (arrow) and the megadolichobasilar artery.

introduced our patient to department of neurosurgery in a university hospital.

DISCUSSION

The variable causes of trigeminal neuralgia are listed as dental, paranasal, orbital, cutaneous and neurosurgical disorders. The causative diagnosis of trigeminal neuralgia in our patient was made as megadolichobasilar artery on brain MRI and MRA. The resource imaging of MRA assisted to confirm the detailed pathognomonic location between the trigeminal nerve, the vestibulocochlear nerve and megadolichobasilar artery. Megadolichobasilar artery anomaly is defined as the tortuosity, elongation and dilation of the basilar artery. This vascular anomaly compresses the neighboring cranial nerves so that trigeminal neuralgia, vertigo, hemifacial spasm or palsy and deafness occur frequently. This vascular anomaly also causes cerebral ischemia and hemorrhage. Previous reports show the poor outcome of cognitive function and high mortality in patients with megadolichobasilar artery.\[1,2\] Congenital deficiency of the elastic lamina and the reticular fibers in the media plays an important role for the pathogenesis of megadolichobasilar artery.\[1\]. Neuropathological hallmark are marked dilation of the internal lumens, severe degree of atheromatous changes and intimal thickening in the basilar artery\[2\]. Thus, environmental factors also contribute to progression of this vascular anomaly. Several patients are reported to have severe degree of hypertension in a similar pattern to our patient.\[2\]

Otherwise, neurogenic hypertension results from pulsatile neurovascular compression of the left ventrolateral medulla.\[7,8\] Brain MRI indicated compression of the left medulla oblongata by megadolichobasilar artery in our patient. Those neurovascular compression support possible neurogenic hypertension in our patient. The mechanism of neurogenic hypertension could be associated with intractable hypertension in a part of patients with megadolichobasilar artery anomaly. Furthermore, our neuroimages point out that megadolichobasilar artery compresses the root entry zone of the ipsilateral trigeminal and contacts the root entry zone of the ipsilateral vestibulocochlear nerves, leading to trigeminal neuralgia and vestibulocochlear deficits in our patient. Thus, the resource imaging of routine MRA is a useful sequence for detection of the neurovascular structure around the brainstem.

REFERENCES


--- 67 ---