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**Vertebrobasilar artery dissection manifested as** **Millard-Gubler syndrome in an** **ischemic young stroke patient: A case report**

Li *et al*. MGS with VAD

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**Abstract**

***BACKGROUND***

Millard-Gubler syndrome (MGS) is caused by a lesion in the brainstem at the level of the facial nerve nucleus, and it is also a rare ventral pontine syndrome. Vertebrobasilar artery dissection (VAD) is an uncommon cause of ischemic stroke. To the best of our knowledge, this is the first case reporting the coexistence of MGS and VAD in an acute ischemic young stroke patient.

***CASE SUMMARY***

We herein described an unusual case of acute ischemic young stroke patient, presenting with acute right peripheral facial palsy, right abducens palsy and contralateral hemihypesthesia, indicating as MGS. After receiving dual antiplatelet therapy with aspirin and clopidogrel, as well as rosuvastatin, the patient recovered significantly. The high-resolution magnetic resonance imaging (MRI) indicated a diagnosis of VAD.

***CONCLUSION***

Our finding further demonstrated high-resolution MRI is a useful technique to early detect underlying dissection in posterior circulation ischemic stroke.

**Key words:** Millard-Gubler syndrome; Vertebrobasilar artery dissection; Ischemic stroke; Case report

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**Core tip:** Millard-Gubler syndrome (MGS) is caused by a lesion in the brainstem at the level of facial nerve nucleus, and it is also a rare ventral pontine syndrome. We herein described an unusual case of acute ischemic young stroke patient presenting as MGS. The high-resolution magnetic resonance imaging (MRI) indicated a diagnosis of vertebrobasilar artery dissection (VAD). This is the first case reporting the coexistence of MGS and VAD in an acute ischemic young stroke patient. Our finding further demonstrated high-resolution MRI is a useful technique to early detect underlying dissection in posterior circulation ischemic stroke.

Li XT, Yuan JL, Hu WL. Vertebrobasilar artery dissection manifested as Millard-Gubler syndrome in an ischemic young stroke patient: A case report. *World J Clin Cases* 2018; In press

INTRODUCTION

Millard-Gubler syndrome (MGS) is one of uncommon pontine-crossed syndromes, and it involves facial nerve nucleus, abducent nerve, and the corticospinal tract. It is characterized by paralysis affecting the face and the abducent nerve on the side of the lesion and central hemiplegia on the opposite side[1]. It has been reported that MGS could be found in patients with brainstem tumor such as cavernous angioma[2-4], primary meningeal hemangiopericytoma[5], neurocysticercosis[6]. As far as we know, only 5 cases reported MGS caused by cerebral infarction[1,7-10]. Vertebrobasilar artery dissection (VAD) is an uncommon cause of ischemic stroke, especially in posterior circulation ischemic stroke[11]. To the best of our knowledge, this is the first report about the coexistence of MGS and VAD in an acute ischemic young stroke patient, using the technique of high-resolution magnetic resonance imaging (MRI). Herein, we described an unusual case of posterior circulation ischemic stroke, indicating as MGS caused by VAD.

CASE PRESENTATION

***Chief complaints***

A 49-year-old male presented with dizziness and slurred speech for two days.

***History of present illness***

Two days before admission, the patient experienced sudden dizziness and nausea, followed by slurred speech, dysphagia, and choking. Before the onset of the illness, he didn’t suffer from fever or cervical pain.

***History of past illness***

He suffered from hypertension for seven years. There was no other vascular risk factor or family history.

***Physical examination***

On admission, his neurological examination revealed right peripheral facial palsy, right abducens palsy, and left hemihypesthesia, suggesting the presence of MGS. Besides, dysarthria, absent gag reflex and positive bilateral Babinski’s signs were also detected. The other cranial nerves and motor exam were normal. On admission, his blood pressure was 141/85 mmHg.

***Laboratory testing***

The laboratory tests showed elevated plasm cholesterol (7.83 mmol/L), glycosylated hemoglobin (9.0%) and homocysteine (15 μmol/L), and normal low density lipoprotein (1.4 mmol/L). For the blood routine, his white blood cell was mildly elevated (10.63 × 109/L) and other items were normal.

***Imaging examination***

The chest X-ray film showed mild pneumonia. The parameters of MR examination were as follows from 3-Tesla system (Discovery MR750, GE Medical Systems, Milwaukee, Wis., United States): MR angiography (MRA) (repetition time 21 ms; echo time 3.4 ms; slice thickness 0.9 mm), axial T2-weighted (repetition time 5838.7 ms; echo time 107.3 ms), axial T1-weighted imaging (repetition time 1800 ms; echo time 27.7 ms), axial diffusion weighted imaging (DWI) (repetition time 3000 ms; echo time 65.3 ms, b value 1000), and coronal fluid-attenuated inversion recovery sequences (repetition time 7500 ms; echo time 121.1 ms). Brain MRI revealed acute multifocal infarctions in pons, ventral of medulla oblongata, right middle cerebellar peduncle and left occipital lobe (Figure 1A-C). Brain MRA without contrast agent indicated the occlusion of left vertebral artery and the severe stenosis of proximal right vertebral artery (Figure 1D). The high-resolution MRI with contrast enhancement showed luminal irregularities with eccentric periluminal hematoma, indicating the dissection of basilar artery and left vertebral artery (Figure 2).

**FINAL DIAGNOSIS**

According to the typical symptoms, physical examination and imaging manifestations, this patient was diagnosed as acute ischemic stroke presenting as MGS causing by the VAD.

**TREATMENT**

The patient was given dual antiplatelet therapy with aspirin and clopidogrel, as well as rosuvastatin.

**OUTCOME AND FOLLOW-UP**

Nine days after his admission, he recovered significantly and was discharged from our department with mild residual right facial palsy and left hemihypesthesia.

**DISCUSSION**

MGS is caused by a lesion in the pons at the level of the facial nerve nucleus. This lesion involves the facial nerve nucleus, the abducent nerve, and the corticospinal tract. Clinical features include ipsilateral peripheral facial palsy, ipsilateral abducens paralysis, contralateral hemidysesthesia and central hemiplegia causing by the lesion of the ventrolateral pons. To date, there are only 5 case reports of MGS due to cerebral infarction[1,7-10] (Table 1). One case reported that a 56-year-old male presented with left lower facial paralysis and hemiparesthesia on the right side, and brain MRI revealed an acute infarct in left ventral pons[1]. Another case was a 63-year-old man, who presented left hemiparesis and right facial paralysis involving the lower facial muscles and the orbicularis oculi but sparing the frontalis muscle. DWI indicated acute infarction in ventro-medial aspect of the medulla[7].

VAD has been found more frequently in patients with posterior circulation ischemic stroke[12]. The technique of MRA, a non-invasive technique for dynamic assessment of the cranial circulation, is routinely used in stroke work up to detect arterial occlusion. In addition, high-resolution MRI has been used to explore vascular diseases, with good advantage in diagnosis of the dissection, and it can help to give more information about the etiology of cerebral infarction[13,14]. By using the combined high-resolution MRI, we speculated that the acute multifocal infarctions were caused by the dissection of basilar artery and left vertebral artery.

To the best of our knowledge, this is the first report about the coexistence of MGS and VAD in an acute ischemic young stroke patient. Our case raised the importance that the utility of high-resolution MRI with fat saturation might be a useful tool to early detect the dissection in posterior circulation ischemic stroke, especially in young patients.

**CONCLUSION**

As for the acute ischemic stroke in young patient, artery dissection should be considered in the clinical works. High-resolution MRI with fat saturation is an important and useful tool to early detect the dissection, especially in posterior circulation ischemic stroke. Further studies are needed to warrant their potential findings and applications of high-resolution MRI, black blood T2-weighted MRI (angiitis, branch disease, *etc*.) and fat-saturation MRI (dissections) in stroke differential diagnosis and follow up.

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**Table 1 The characteristics of Millard-Gubler syndrome cases causing by cerebral ischemic stroke from prior literatures**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Author** | **Time** | **Age，yr** | **Sex** | **Medical History** | **Physical Examination** | **MRI** | **MRA** | **Others** |
| Yasuda Y *et al*[9] | 1993 | 60 | male | NA | right peripheral facial nerve palsy, left hemiparesis, tongue deviated to the left, exaggerated deep tendon reflex and equivocal left Babinski’s reflex | cerebral infarction in the right ventral pons | occlusion of both vertebral arteries |  |
| Matlis A *et al*[8] | 1994 | 76 | male | hypertension, ischemic heart disease, type II diabetes mellitus | slight dysarthria, peripheral right facial palsy, flaccid left hemiparesis, brisk left deep tendon reflexes and positive left Babinski’s reflex | cerebral infarction in the right anteromedial pons | NA |  |
| Onbas O *et al*[1] | 2005 | 56 | male | NA | left facial paralysis, right hemiparesthesia and exaggerated deep tendon reflexes | acute cerebral infarction in the left ventral part of the pons | stenosis of basilar artery  |  |
| Rose DZ *et al*[10] | 2010 | 45 | male | HIV | horizontal diplopia, left facial paralysis and right hemiparesis | acute cerebral infarction in the left pons | unremarkable | MRSA meningo-vasculitis causing by the restricted diffusion of pus in the subarachnoid space |
| Ahdab R *et al*[7] | 2013 | 63 | male | diabetic and hypertensive  | right facial palsy involving the lower facial muscles andthe orbicularis oculi but sparing the frontalis muscle and left hemiparesis | acute cerebral infarction inthe ventro-medial aspect of the medulla and limited to the rightpyramid | diffuse atherosclerotic changes of the basilar trunkwith multisegmental mild to moderate narrowing, especially in thedistal third |  |

MRI: Magnetic resonance imaging; MRA: Magnetic resonance angiography; NA: Not available; HIV: Human immunodeficiency virus; MRSA: Methicillin-resistant Staphylococcus aureus.

**A**

**B**

**C**

**D**

**Figure 1 Brain magnetic resonance imaging and magnetic resonance angiography showed multiple infarctions and occlusion and stenosis of vertebral artery.** A-C: Diffusion weighted imaging showed acute multifocal infarctions in pons, ventral of medulla oblongata, cerebellopontine angle and left occipital lobe; D: Brain magnetic resonance angiography indicated the occlusion of left vertebral artery and the severe stenosis of proximal right vertebral artery.

**A**

**C**

**B**

**D**

**Figure 2 High–resolution magnetic resonance imaging showed the dissection of basilar artery and left vertebral artery.** A, B: The eccentric periluminal hematoma of basilar artery; C, D: The eccentric periluminal hematoma of left vertebral artery.