Concomitant Guillain-Barré Syndrome and Acute Transverse Myelitis in an Older Adult-A Case Report

Ching-I Wu [1,2], Chia-Lun Wu [1,2], Kuo-Hsuan Chang [2,3], Wen-Yi Huang [1,2]

Abstract

Purpose: Guillain-Barré syndrome concomitant with spinal cord involvement, which is defined as Guillain-Barré syndrome and acute transverse myelitis overlap syndrome, is rarely seen in the elders. Here we present a 68-year-old female patient who developed Guillain-Barré syndrome, as well as acute transverse myelitis at the same episode.

Case report: This patient developed acute weakness of lower limbs, which then rapidly became tetraplegia and hyporeflexia within 5 days. She also had impaired pinprick and vibration sensations below T4, as well as urinary and defecation incontinence. The nerve conduction studies revealed a motor-sensory axonal neuropathy. Cerebrospinal fluid analysis showed albuminocytological dissociation and elevated IgG index. The spinal magnetic resonance imaging study revealed heterogeneously contrast-enhanced, long-segmental intramedullary lesion from C2 to T3. Other laboratory findings, including blood anti-aquaporin 4 antibody, were not remarkable. The patient's tetraplegia was gradually improved by plasmapheresis and methylprednisolone pulse therapy.

Conclusion: Although Guillain-Barré syndrome and acute transverse myelitis overlap syndrome is occasionally seen in young adults, it could still occur in the elderly patients. Plasmapheresis and steroid pulse therapy could be beneficial to improve functional outcome of patients with this immune-mediated neurological disease.

Keywords: Acute transverse myelitis, Demyelinating disease, Guillain-Barré syndrome, treatment.

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INTRODUCTION

Guillain-Barré syndrome (GBS) and acquired inflammatory diseases of the central nervous system such as acute transverse myelitis (ATM) are commonly viewed as distinct disease entities [(1)]. Although these neuroinflammations are usually confined to either the peripheral or central nervous system, coexistence of GBS and ATM are still reported in a limited number of case reports [(2)]. The GBS and ATM overlap syndromes are

From the [1]Department of Neurology, Chang-Gung Memorial Hospital, Keelung branch, Taiwan; [2]Department of Medicine, College of Medicine, Chang Gung University, Taiwan; [3]Department of Neurology, Chang-Gung Memorial Hospital, Linkou branch, Taiwan.

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Correspondence to: Wen-Yi Huang, MD. Department of Neurology, Chang-Gung Memorial Hospital, Keelung branch, Taiwan.
E-mail: wyh@cgmh.org.tw

mostly seen in young adults, with mean age at onset less than 30-year-old, whereas there were only two patients older than 65-year-old had been reported in the literature [3, 4]. Here we report a 68-year-old female patient who had GBS and ATM overlap syndrome. The potential treatment and immunopathogenesis of this rare overlap syndrome are also discussed.

CASE REPORT

A 68-year-old female patient had an acute weakness of lower limbs for two days. She did not have diarrhea or respiratory tract infection, or receive any vaccines within one month. Neurological examinations found mild bilateral lower limbs weakness (Medical Research Council (MRC) scale grade 3) and left upper limbs weakness (MRC grade 3). Her cranial nerves are normal. She was normoreflexic with intact pinprick and vibration sensations. Babinski signs were negative. Her weakness rapidly progressed to tetraplegia (bilateral lower limbs: MRC grade 2, left upper limb: MRC grade 0, and right upper limb MRC grade: 2) and her deep tendon reflexes became hyporeflexic in the following 5 days. Impaired pinprick and vibration sensations (below T4), urinary and defecation incontinences were also noted. Nerve conduction studies, performed 10-days following the onset of disease, demonstrated low amplitude of compound motor action potential (CMAP) at left deep peroneal nerve, no motor and sensory response at bilateral ulnar nerves, no motor response at both median nerves, and absent H reflexes on both lower limbs (Table 1). These electrophysiological features were compatible with a motor-sensory axonal neuropathy. Somatosensory evoked potential study showed absent bilateral P40 responses with normal upper limbs sensory central conduction time, suggesting a sensory conduction defect below high cervical level (Table 2). The spinal magnetic resonance imaging (MRI) study 12-days after onset of disease

Table 1. Nerve conduction studies on the tenth days after symptom onset.

Nerve	Stimulation site	Onset latency (ms)		Amplitude(mV)		Conduction velocity (m/s)		F wave latency (ms)	
		Right	Left	Right	Left	Right	Left	Right	Left
Motor nerve conduction									
Median	Wrist	NR	NR	NR	NR			NR	NR
	Elbow	NR	NR	NR	NR				
Ulnar	Wrist	NR	NR	NR	NR			NR	NR
	Below elbow	NR	NR	NR	NR				
Peroneal	Ankle	3.7	3.8	3.4	1.9	44	40	44.5	44.5
	Fibula	9.6	10.3	3.2	2.2				
Tibial	Ankle	4.9	4.5	6.2	5.4	42	41	44.3	47.5
	Popliteal fossa	12.0	11.8	6.1	4.4				
Sensory nerve conduction									
Median	Wrist	3.1	3.4	18 μV	15 μV	55	57		
	Elbow	6.7	6.9	8 μV	7μV				
Ulnar	Wrist	NR	NR	NR	NR				
	Elbow	NR	NR	NR	NR				
Sural	Lower leg	3.5	2.7	10	10				
H reflex	No response bilaterally								
EMG	No motor unit action potential could be activated at left abductor pollicis brevis, biceps, tibialis anterior, and vastus medialis								

NR indicates no response.

Table 2. Somatosensory evoked potentials on the tenth days after symptom onset.

Nerve	N9		N13		N20		N9-N13		N13-N20	
	R	L	R	L	R	L	R	L	R	L
Median nerve	9.4	9.9	13.4	13.5	19.3	18.6	4.0	3.6	5.9	5.1

Nerve	N22		P40		N22-P40	
	R	L	R	L	R	L
Tibial nerve	NR	NR	NR	NR	-	-

NR indicates no response; R, right; L, left.

revealed a long-segmental intramedullary lesion from C2 to T3 on T2-weighted images, with heterogeneous contrast enhancement on T1-weighted images (Figure 1). Cerebrospinal fluid analysis revealed albuminocytological dissociation (WBC: 3 cells/μl, protein: 44 mg/dl) and high IgG index (0.81). The hemogram, liver, renal and thyroid functions (TSH, Free T4), electrolytes (Na, K, Ca, P, Mg), vitamin B12 level as well as glycohemoglobin were normal. Blood levels of heavy metals (As, Pb, Hg), were also normal. Mycoplasma, cytomegalovirus, human herpes virus, human T-lymphotropic virus, and human immunodeficiency virus infection were not detected in blood. Stool culture did not grow Campylobacter jejuni. Tumor markers including CA125, CEA, and alpha-fetoprotein were within normal range. Autoimmune surveys, including rheumatoid factor, antinuclear antibody, C3 and C4, and serum immunofixation electrophoresis were normal. Anti-aquaporin 4, anti-ganglioside (anti-GM1-3, anti-GD1a and 1b, anti-GT1b, anti-GQ1b) and paraneoplastic (anti-Amphiphysin, anti-CV2, anti-Ma2/Ta, anti-Ri, anti-Yo, anti-Ho, anti-Recoverin, ant-SOX1, anti-Titin, anti-Zic4, anti-GAD65, and anti-Tr) auto-antibodies were all negative. These findings confirmed the diagnosis of GBS and ATM overlap syndrome.

The patient received 5-times plasmapheresis 11 days after onset of disease, and then had methylprednisolone

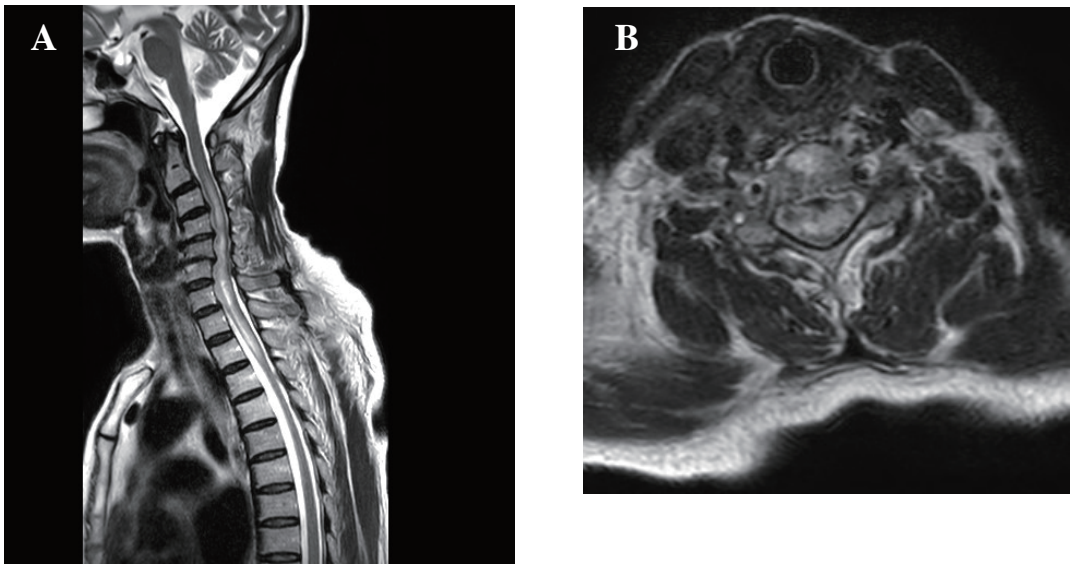

Figure 1. Spinal cord magnetic resonance imaging (MRI). (a) Sagittal T2-weighted MRI obtained on day 13 of symptom onset revealed increased intramedullary intensity lesion at the level of C2 to T3. (b)Transverse section of spinal MRI at C6 revealed mild cord edema with increased signal within the central gray matter of the spinal cord.

pulse therapy (1000 mg once daily) for another three days. Mild improvement of muscle strengths (upper limbs: MRC grade: 3, lower limbs: MRC grade: 3) was seen following treatment. The nerve conduction studies 25 days after onset of disease showed sensory responses on bilateral ulnar nerves, absent motor responses on bilateral median nerves, reduced CMAP amplitudes on bilateral deep peroneal and left tibial nerves, and absent H reflexes on both sides, still compatible with a motor-sensory axonal neuropathy. This case report followed the Declaration of Helsinki and was approved by the Medical Ethics Committee of CGMH, Taipei, Taiwan (IRB 201801916B0).

DISCUSSION

This patient demonstrated rapid progression from paraplegia to tetraplegia with urinary incontinence, areflexia and a sensory level at T4 within 5 days. These clinical presentations may be seen in myelopathies such as acute cord compression, spinal shock or myelitis, or peripheral neuropathies such as GBS, vasculitic, alcoholic, nutritional or toxic neuropathies. Asymmetric neuropathy, as presented in the NCV study, is also commonly seen in GBS at the beginning of the disease [5-9]. Although other systemic diseases, such as leprosy, sarcoidosis and vasculitis [10,11], could demonstrate asymmetric neuropathy, these diseases were excluded by our laboratory examinations. The presence of albuminocytological dissociation in CSF further supported the diagnosis of GBS. Although a pseudo-sensory level, probably by inflammation at multiple nerve roots corresponding to sensory levels, is rarely reported in GBS [12], the spinal MRI result of this patients further confirmed that the patient had GBS and ATM overlap syndrome.

The mean age at onset of GBS and ATM overlap syndrome, reviewed by a case series recruiting 23 patients recently, is 21.3 years old [2]. In the reported cases of GBS and ATM overlap syndrome, only three elder patients were recruited (64, 70 and 77 years old, respectively)[3,4,13]. Our patient, at the age of 68 years old, is the third old patient with this overlap syndrome had been reported before. Compared to other reported elderly cases, our patient did not have any precipitating factor while the other three elderly patients all have the history of receiving influenza vaccine. Besides, electrophysiology studies of the 4 elderly cases including our patient all revealed acute axonal polyneuropathy, which may related to poor outcome in elderly cases since acute axonal polyneuropathy is associated with worse outcome in the review paper[2]. Two of them are axonal motor polyneuropathy[3,4] while one revealed acute axonal motor sensory polyneuropathy with markedly predominant motor impairment[13] may suggested GBS and ATM overlap syndrome may tend to have influence on motor nerve.

GBS could be triggered by abnormal immune response to an antecedent infection, which in turn cross-reacts with peripheral nerve components particularly ganglionsides including GM1, GD1a and GT1b [14]. These gangliosides are also widely found in central nervous system[15]. In this case we did not detect auto-antibodies against these ganglionsides. In the previously reported GBS and ATM overlap syndrome in the elderly, only one 70-year-old patient has been detected having anti-GM1 antibody in his serum[3]. Other unidentified components expressed in both axons and spinal cord could be the target for immune response in GBS and ATM overlap syndrome.

The myelitis in high cervical level may develop respiratory distress [16]. However, a number of cases reports showed that longitudinal extensive transverse myelitis involving upper cervical segments may not develop respiratory distress [17-20]. Our spinal MRI showed an asymmetric myelitis with heterogeneous contrast enhancement. Several motor functions may be preserved in this patient with partial transverse myelitis.

The treatment for GBS and ATM overlap syndrome remains elusive. A few younger patients receive intravenous immunoglobulin and prednisolone, and had satisfactory outcome [21,22]. Plasma exchange also demonstrate effects in pediatric patients[23]. The two reported elderly patients were treated with intravenous immunoglobulin, methylprednisolone and plasmapheresis[3,12], while the other was treated with intravenous immunoglobulin and methylprednisolone[4]. However, all of them still cannot walk after long-term follow-up. Our patient demonstrates partial improvement of muscle strength after rehabilitation but still revealed tetraparesis and cannot walk independently. More clinical studies are warranted to evaluate the effects of different therapeutic strategies.

CONCLUSION

We present an old female patient with GBS and ATM overlap syndrome. In such cases, combined plasmapheresis and methylprednisolone therapy may be beneficial, and the recovery may be delayed and incomplete.

Conflicts of Interest/Disclosures

There is no financial or other conflict of interest in relation to this research and its publication.

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