Case Report

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Pharyngeal-Brachial-Cervical variant Guillain-Barre Syndrome in Children: A Case Report and Review of the Literature

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Introduction

Guillain-Barre Syndrome (GBS) is a post-infectious neuropathy typically described as a bilateral ascending paralysis of the lower extremities. There are, however, multiple lesser known subtypes of the syndrome that can affect both adult and pediatric populations. The Pharyngeal- Brachial-Cervical (PCB) variant is one of the rarer forms, which presents with weakness of the neck, oropharynx, and upper extremities. This atypical presentation can be confused with other diagnoses, and early detection is important for preventing potentially life-threatening complications. To date, only ten cases of this entity have been reported in children. Below we report on a 15-year-old female who presented with left arm weakness who subsequently progressed to classic GBS and review the literature on this GBS variant in children.

Case Presentation

A 15-year-old female presented to the emergency department with proximal and distal left arm weakness beginning one day prior to presentation without concomitant paresthesia, numbness, or pain of the same limb. The weakness was unremitting, did not vary in severity with use of the limb, and was refractory to analgesics. In addition, she complained of an associated headache, neck pain, and generalized body aches. The week prior she had been ill with a cough and rhinorrhea. Her mother had been ill with bronchitis two weeks prior as well. Upon review of systems she denied loss of consciousness, change in mental status, fever, changes in vision, abdominal symptoms, chest pain, shortness of breath, or any other neurologic symptomology. She denied any recent travel nor vaccination. Her family history was significant for systemic lupus erythematosus in a maternal uncle and cousin. She denied alcohol use and admitted to smoking marijuana occasionally. She was sexually active with one partner with whom condoms were used regularly.

Her vital signs in the emergency department were: temperature 96.6 degrees Fahrenheit (nl 97.8-99.1), heart rate 101 beats per minute (nl 60-100), respiratory rate 14 breaths per minute (nl 12-18), blood pressure 126/65 mmHg (nl 90/60 - 120/80), oxygen saturation on room air 100% (nl 94-100%). Except for slight fatigue, her physical exam was within normal limits. She was oriented to person, place, and time. Her pupils were of equal size and reactive to light with extraocular movements intact, visual fields full, a symmetrical face, midline tongue, and intact sensation in V1-V3 bilaterally. Tenderness was noted over the posterior cervical area of her neck, and decreased range of motion was noted in her left upper extremity secondary to pain. She had 3/5 strength in her left upper extremity and 4/5 strength in all other extremities with 2+ reflexes throughout. No dysmetria, tremors or fasciculations were noted. Her unassisted gait was normal. Magnetic resonance imaging (MRI) of her brain and cervical spine without contrast was unremarkable as were a complete blood count, basic metabolic panel, respiratory viral panel and flu test. Upon admission she was treated with naproxen and methocarbamol and discharged home after one day her when her strength returned to 5/5 in all extremities.

Two days after discharge, the patient returned to the emergency department complaining of weakness in all four extremities, inability to ambulate, an episode of incontinence, and shortness of breath.

Upon examination, she was alert and oriented. Her vital signs were: temperature 96.1 degrees Fahrenheit, heart rate 121 beats per minute, respiratory rate 16 breaths per minute, blood pressure 133/80 mmHg, oxygen saturation 86% on room air. Cardiac and pulmonary examinations were unremarkable. She had 3/5 strength in her upper extremities, 1/5 strength in her lower extremities, 0+ reflexes globally, with sensation, gag reflex and anal tone being preserved. Repeat pulse oximetry showed an oxygen saturation of 89% on four liters of oxygen. The patient was intubated, a nasogastric tube and urinary catheter were placed, and she was admitted to the pediatric intensive care unit.

Abnormal laboratory values included an elevated white blood cell count of 27.31 th/mm^3 (nl 4.8-10.8) with 85% segmented neutrophils (nl 42.2-75.2). Otherwise, the remainder of her complete blood count, complete metabolic panel, creatine kinase, erythrocyte sedimentation rate, C-reactive protein, myoglobin, and electrocardiogram were within normal limits. An opacity in the right mid-lung field on chest x-ray was suggestive of an aspiration pneumonia. MRI of her brain showed ventricles and cortical sulci as normal in size for the patient's

age. There was no acute intracranial hemorrhage, extra-axial fluid collection, or midline shift. There was no evidence for pathologic intracranial enhancement. There was no diffusion abnormality to suggest acute or subacute infarct. There was normal signal flow present within the major vascular structures. The patient's cervical, thoracic, and lumbar spine were similarly unremarkable with no cord compression, expansion, signal abnormality or abnormal enhancing masses or lesions. A lumbar puncture was performed on the second day of admission showed a cerebrospinal fluid (CSF) protein level of 43.1mg/dL (nl 15-45 mg/dL) and two well defined gamma restriction bands suggestive of Guillain-Barre Syndrome. Repeat lumbar puncture could have been confirmatory but was not performed. Her CSF ganglioside complex GD1A was not detected (Ref <1:800); GT1a and GQ1b were not tested for. Antibodies for the acetylcholine receptor antibody test were also negative. Electromyography testing showed diffuse, severe sensorimotor polyneuropathy, demyelinating in nature.

She was treated with intravenous immunoglobulin, and was extubated on hospital day six, at which time her neurologic exam showed 3/5 strength in her upper extremities, 2/5 in her lower extremities and 1+ reflexes in her lower extremities. By day seven she tolerated room air and a soft puree diet. She was transferred on day twelve for intensive rehabilitation to another facility.

Discussion

Guillain-Barre syndrome (GBS) and its variants, are a group of diseases characterized by neuropathy and weakness. Pathology occurs following infection when the body's immune system becomes self-reactive, damaging nerve axons and/or myelin. Muscle weakness and decreased deep tendon reflexes are the classic signs of GBS. While the World Health Organization's diagnosis criteria are exclusively clinical, supplemental diagnosis is made by cerebrospinal fluid (CSF) analysis, electromyogram (EMG) and nerve conduction studies, as well as ganglioside antibodies levels. In most patients, CSF analysis will show cytoalbuminologic dissociation - elevated protein with less than 50 cells/ul [1]. The timing of CSF findings varies with 88% of patients at three weeks found to have elevated protein compared to 49% on the first symptomatic day of [2]. In regard to ganglioside antibodies, Anti-GT1a and anti-GM1b prove to be the most useful markers in diagnosis [3]. In our case, EMG of the upper and lower extremities performed showed an absence of motor and sensory response demonstrating demyelinating polyneuropathy. Due to the demyelinating nature of the EMG findings, an atypical chronic inflammatory demyelinating polyneuropathy (CIDP) could have been a possible diagnosis, as acute-CIDP can mimic GBS [4].

Most decisions regarding diagnosis and care of children have been extrapolated from studies on adults [5]. EMG studies are comparable to adults, and MRI is often utilized [6,7]. The prognosis of GBS in children is generally better, and recovery is quicker [8]. GBS is also more common in the adult population. One study found a 20% increased incidence for every ten years in age [9]. Small scale studies and case reports suggest GBS in children should be managed similarly to adults, with intravenous immunoglobulin or plasmapheresis [5]. Intravenous immunoglobulin is often preferred in pediatric populations due to ease of administration and its decreased side effects [10].

Pharyngeal Cervical Brachial (PCB) variant is one of multiple GBS variants and subtypes. It was first described by Allan Rooper in 1986 [11]. His three cases, along with those that followed, describe a post-infectious paralysis involving the neck, shoulder, and swallowing musculature [11,12]. One study suggested PCB variant is part of a spectrum of diseases including GBS, Miller Fisher syndrome - a GBS variant presenting with ophthalmoplegia, ataxia and areflexia, and Bickerstaff Encephalitis - a brain stem encephalitis characterized by encephalopathy and hyperreflexia [13]. The diagnosis of "pure PCB" in an analysis of 100 patients found these three attributes: progressive weakness of the arms, neck and oropharynx, hyporeflexia in the arms, and no weakness of the legs. However, only 13/100 of the patients fit their description of "pure PCB". The remaining cases analyzed showed some degree of overlap with other GBS variants [14]. It had been suggested elsewhere that these GBS variants are a part of a greater anti-GQ1b syndrome [15].

While there is a lack of any large scale pediatric GBS studies, one retrospective review of 34 pediatric GBS cases aimed to identify clinical variants. They found 2 (4.6%) to be the PCB variant. Of note, both remained with residual paresis after treatment, unlike all of their typical GBS cases. They concluded that children with variant, non-classic GBS developed more rapid and severe symptoms compared to typical or classic GBS [16].

To date, we have found nine previous case reports of PCB variant in the pediatric population. Findings have been organized into the chart below:

Authors	Age, Sex	Presenting complaint	Weakness +/-					Antibodies
			Arm	Neck	Oropharynx	Leg	Face	
Rooper 1986 [11]	19, M	Dysphagia, blurred vision	+	+	+		+	
MacLennan et al 2004 [17]	12, M	Dysphagia	+		+	+	+	
Mogale et al 2005 (A) [18]	10, M	Arm weakness	+	-		-	-	
Mogale et al 2005 (B) [18]	3, F	Neck stiffness	+	+	+	+	+	
Furiya et al 2000 [19]	15, M	Ataxic gait, diplopia	+	+	+	+	+	anti-GQ1b anti-GT1a
Murakami et al 2006 [20]	15, F	Dysarthria, and arm weakness	+	+	+	+	+	anti-GT1a
Herguner et al 2008 [21]	16mo, M	Difficulty breathing, arm weakness	+	+	+			
Thapa et al 2009 [22]	7, M	Dysphagia, poor head control	+	+	+	-		

Uysalol et al 2013 [23]	5, M	Dysarthria, arm weak, dysarthria	+		+	+	-	anti-GD1aanti-GD1b
Hamidon 2006 [24]	19, F	dysphagia	-	-	+	-	-	

In comparing our own case to what has been written thus far on PCB variant, a few findings were notable. Arm weakness, present in our patient, was in Nagashima's analysis the most common complaint at 29.0%. However, our patient never exhibited dysphagia, dysarthria, or any signs oropharyngeal weakness, which were shown to be the second most common symptom at 17% [14]. Arm and oropharyngeal weakness were also the two most common symptoms recorded in the table above. Though not an initial complaint, leg weakness and gait issues did arise later in our patient's course. And while Rooper's initial PCB variant descriptions suggested a lack of leg weakness, we would not be the first to suggest that the presence of leg weakness does not exclude the diagnosis of PCB variant [14,17]. GD1A antibody was not detected in our patient, and neither GT1a nor GQ1b antibodies were tested for, thus eliminating insight into potential antiganglioside associations. Management and eventual recovery of our patient was routine given the diagnosis and circumstances of the case.

Conclusion

This case serves as a reminder to keep Guillain-Barre Syndrome as part of the differential diagnosis when a child presents with any neurological deficit. The GBS subtypes with their unique signs and symptoms are multiple and may be unfamiliar to physicians. We would recommend any patients similar to the case described be monitored closely for signs of GBS progression. Our analysis of PCB variant case studies did not suggest any consistent unifying chief complaints, although arm weakness was very common. Perhaps future studies might better distinguish or define the apparent overlapping between syndrome subtypes. Additionally, further pediatric-focused research into treatment efficacy of IVIG or plasmapheresis and the sensitivities/specificities of anti-ganglioside antibodies for GBS variants would prove useful.

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