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Ultrasound-Guided Stellate Ganglion and Interscalene Blocks for Refractory Pediatric Parsonage-Turner Syndrome: A Case Report and Clinical Implications

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Background: Parsonage-Turner syndrome (PTS) is an uncommon inflammatory brachial plexopathy; pediatric and bilateral cases are rare, and evidence for managing refractory pediatric pain is limited.

Case Report: A previously healthy 6-year-old girl developed sudden severe left upper-limb pain with progressive wrist-drop in August 2023; by October, the right arm was affected. Nerve conduction studies/electromyography confirmed brachial plexopathy and magnetic resonance imaging showed diffuse thickening of left C5-C7. Laboratory tests were unremarkable, except for an isolated anti-glycosphingolipid monosialo-2 antibody. Oral corticosteroids, tramadol, and 2 intravenous immunoglobulin doses produced limited benefit, and corticosteroids caused mood disturbance. In October 2023, ultrasound-guided stellate ganglion (C6) and interscalene (C5-C6) blocks with 4-6 mL of 0.25% bupivacaine under general anesthesia were performed. At one week, she reported ~85% pain relief; analgesics were reduced to paracetamol.

Conclusions: In refractory pediatric bilateral PTS, regional stellate ganglion and interscalene blocks provided rapid, substantial analgesia; prospective studies should define indications and long-term outcomes.

Key words: Parsonage-Turner syndrome, brachial neuritis, pediatric pain management, stellate ganglion block, interscalene block, regional anesthesia, nerve block, case report, ultrasound

BACKGROUND

Parsonage-Turner syndrome (PTS), also called neuralgic amyotrophy, is an uncommon neurological disorder of uncertain etiology (1). The estimated prevalence of the syndrome is about 1.64-3.00 cases per 100,000, but this likely underestimates the true burden because the condition is frequently misdiagnosed (2,6). It is usually unilateral, beginning with severe shoulder-girdle pain and often progressing to patchy sensory disturbances and proximal weakness in the affected upper limb (1). However, some studies (3) have reported that initial symptoms can occasionally present bilaterally. It occurs more frequently in men than women and is most commonly diagnosed between the ages of 30 and 70 years (2). Diagnosis can be difficult, as pain may present atypically and weakness is often delayed or obscured by intense pain (4). Electromyography (EMG) helps in localization of the neurological lesion and can confirm a diagnosis of PTS, while magnetic resonance imaging (MRI) is useful to exclude other causes of shoulder pain—for example, rotator-cuff tears, impingement, labral pathology, or masses at the spinoglenoid or suprascapular notches (5). Acute neuropathic pain in

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PTS is typically treated with long-acting opioids and nonsteroidal anti-inflammatory drugs (e.g., diclofenac), while resultant musculoskeletal pain is managed with physiotherapy. Oral corticosteroids may reduce pain, and limited evidence also suggests some patients may benefit from intravenous immunoglobulin (IVIG), although larger studies are needed to confirm efficacy. If conservative measures fail, surgical options, such as decompression and microneurolysis, have been reported to improve pain and upper-limb stability (6). Our case highlights the successful use of ultrasound-guided stellate ganglion and interscalene blocks to control severe pain in PTS in a pediatric female patient, suggesting a useful alternative when systemic therapies are ineffective or poorly tolerated.

CASE PRESENTATION

A 6-year-old female patient, previously healthy and developmentally normal, presented with acute onset of severe pain in her bilateral upper limb, which was initially in left arm presented in early August 2023, along with left-hand weakness, unable to supinate forearm. By her second visit in October, similar pain had developed in her right upper limb. The pain was sudden in onset, radiating all the way down to her left hand in left upper limb and later to elbow in right upper limb. She was unable to describe her pain. The pain was intermittent in nature, with each episode lasting for an hour or 2 hours, aggravated at night, and was partially relieved with oral tramadol. Her pain was associated with hyperesthesia and decreased motor activity. During this time, she also became increasingly irritable, anxious, and experienced difficulty sleeping. There was no history of recent trauma, infection, or surgery. The patient has an unremarkable past medical history. She has a strong family history of autoimmune disease, as psoriasis, with no known comorbidities.

On examination, she appeared restless and was guarding both shoulders. She was noncooperative for gait examination. Her vital signs were within normal limits. Motor examination revealed a complete wrist-drop on the left side (Fig. 1) with marked forearm muscle wasting and severe restriction of shoulder movement. The right arm exhibited a milder wrist-drop with occasional fasciculations in the forearm. Reflexes could not be assessed on the left due to pain, while on the right, they were present but reduced. Detailed sensory testing could not be performed due to pain and poor cooperation.

Initial laboratory workup, including complete blood count, erythrocyte sedimentation rate, C-reactive protein, antinuclear antibody, and rheumatoid factor, was unremarkable. The rheumatology team performed a comprehensive autoimmune and infectious workup because of a strong family history of autoimmune disease; all tests were unremarkable, except for an isolated positive glycosphingolipid monosialo-2 (GM2) antibody without clinical or genetic correlation. The patient had involvement of both upper limbs, with no history of trauma and normal imaging findings, which made traumatic plexopathy, thoracic outlet syndrome, and Pancoast tumor unlikely. Phrenic nerve involvement was unlikely, given no respiratory symptoms, normal oxygen saturation, and a normal respiratory exam. X-rays of the cervical spine and shoulders did not reveal any abnormalities. Electrophysiological data, including nerve conduction studies (NCS) and EMG, were consistent with brachial plexitis. MRI of the brachial plexus demonstrated diffuse thickening of the left C5-C7 roots, trunks, cords, and divisions, indicating inflammatory plexitis as shown in Fig. 2.

Given the acute, severe pain followed by progressive motor weakness, absence of systemic illness, ruling out differential diagnosis and imaging consistent with an inflammatory process, a diagnosis of idiopathic inflammatory brachial plexopathy—also known as PTS—was made. The patient received initial treatment at start of October when she was admitted for 6 days, during which she received a trial of oral steroids, tramadol, along with 2 doses of IVIG. However, her response was limited, and she developed mood disturbances, became irritable, and anxious while on steroids. Due to persistent pain and the need to reduce systemic therapy, ultrasound-guided stellate ganglion and interscalene nerve blocks were performed under general anesthesia on October 27, 2023. The stellate ganglion block was performed at the C6 level using 0.25% bupivacaine, and the interscalene block also involved 0.25% bupivacaine, each 4-6 mL around the C5-C6 nerve roots.

At her follow-up one week after the stellate and interscalene blocks, the patient reported 85% pain relief. Her pain medications were reduced to just paracetamol. She was referred for physiotherapy. Steroids and antihypertensives were tapered off. The patient was completely off steroids in early November. Our case highlights that interscalene and stellate ganglion blocks can be effective pain-management options for PTS, when IVIG and corticosteroids are insufficient.

DISCUSSION

PTS occurs more frequently in men than women and is most commonly diagnosed between the ages of 30 and 70 years (2). However, ours is a unique case of a pediatric female patient of 6 years of age. PTS usually presents unilaterally and may run an acute or a chronic course (7), while our patient presents with rare bilateral symptoms of acute onset. In PTS, patients develop muscle weakness and atrophy; the pain often persists for days to weeks and frequently awakens them from sleep (8). Our patient has limited motor activity, including hand weakness, unable to supinate forearm, muscle wasting, and wrist-drop along with severe pain.

Fig. 1. Left upper limb of the patient showing wrist-drop.

The cause of PTS is unknown; it is generally thought to arise from an autoimmune reaction triggered by a preceding illness or environmental events, such as strenuous activity, vaccination, surgery, or childbirth. In roughly half of cases, no clear precipitant is identified (5), as this case is idiopathic with no known etiology, including no history of trauma, recent infection, surgery, or any autoimmune marker. PTS can occasionally affect the phrenic nerve (9), but our patient showed no respiratory symptoms or compromise, so phrenic involvement was unlikely. Most patients lack identifiable genetic alterations; however, recurrent episodes suggest a hereditary predisposition and are classified as hereditary PTS (10), but we found no genetic marker tied to hereditary PTS .

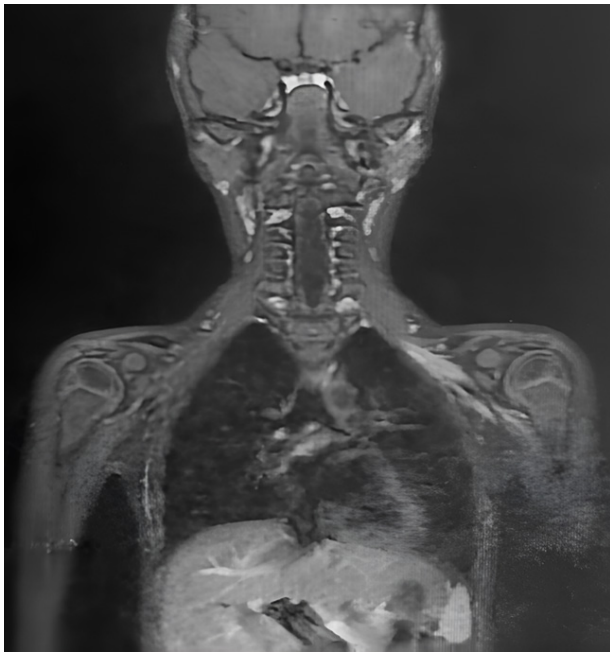

Fig. 2. MRI (coronal view) showing thickening of left brachial plexus C5, C6, and C7 roots, trunks, cords, and divisions. MRI, magnetic resonance imaging.

The diagnosis of PTS relies primarily on a thorough clinical history, detailed symptom assessment, physical examination, and muscle testing, with confirmation possible through neurophysiological studies. Some authors note that unnecessary testing is sometimes performed, adding cost and inconvenience for patients (2). MRI is valuable both for excluding alternative diagnoses and for supporting the diagnosis of PTS (11). The patient in our case report has EMG and NCS consistent with plexopathy and MRI showing diffuse thickening of the left C5-C7 roots, trunks, cords, and divisions, indicating

inflammatory plexitis. GM2 was positive for this patient, as reported in previous case of a 6-year-old pediatric female patient (12).

No specific pharmacologic treatment exists for PTS. Because an immune mechanism is suspected, various immunotherapies—such as corticosteroids, IVIG, and plasmapheresis—have been tried in adults. Van Eijk et al (4) reported meaningful functional improvement in a cohort of 50 adults treated with oral prednisolone. A smaller series found recovery in 9 of 10 patients given IVIG combined with methylprednisolone pulses. Although additional case reports and series have described benefits with IVIG, the overall evidence remains limited and of low quality (11). Surgical options, including nerve decompression and reconstruction, have shown beneficial outcomes when conservative therapy fails, especially for mild to moderate nerve constrictions, but are controversial and not widely used (10). Our patient initially received tramadol, corticosteroids, and IVIG, but showed limited improvement in pain severity, prompting a change in management. Interscalene and stellate ganglion blocks are used to manage chronic, refractory neuropathic pain of the shoulder and upper limb (13,14). Therefore, a stellate ganglion block was administered at the C6 level, and an interscalene block was performed targeting the C5-C6 nerve roots using bupivacaine. While a previous report described PTS following an interscalene brachial plexus block (14), our patient, who received combined stellate ganglion and interscalene blocks, had no complications at 3-month follow-up. Our outcome suggests that targeted regional techniques may be safe and effective for symptomatic management, although long clinical follow-up is important to confirm the outcome (15). A dual strategy involving a sympathetic stellate ganglion block and an interscalene block was adopted to maximize analgesia while limiting potential complications, an approach that contributes to the novelty of this report. The patient's parent reported rapid and substantial pain relief following the blocks, allowing the patient to sleep and resume physiotherapy.

CONCLUSIONS

This pediatric case of idiopathic inflammatory brachial plexopathy (PTS) illustrates that ultrasound-guided interscalene and stellate-ganglion blocks achieved rapid and marked pain relief (≈85%), offering an effective alternative after inadequate response to steroids and IVIG. When performed by clinicians skilled in pediatric regional anesthesia with proper monitoring, these ultrasound-guided regional techniques may serve as an alternative to systemic steroids and opioids for treatment of PTS. High-quality prospective research and longer follow-up will be essential to define optimal indications and sustained effectiveness of these interventions.

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