



BMH Med. J. 2025;12(4):62-66. **Case Report**

Unexpected Lower Limb Pain After Lumbar Sympathectomy in Pediatric CRPS: A Possible Steal Phenomenon?

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Abstract

Complex Regional Pain Syndrome (CRPS), a debilitating chronic pain condition, is increasingly recognized in children, often presenting after trauma like sprains, fractures, or even minor injuries. While rarer than in adults, pediatric CRPS predominantly affects adolescent girls, often in the lower extremities. Diagnosis can be challenging, as standard adult criteria may not fully apply. Early diagnosis and multidisciplinary treatment are crucial for restoring function and improving outcomes, which are generally better than in adults. This case report highlights the complexities of pediatric CRPS management, detailing a young child's severe lower limb pain post-otter bite. Despite conservative efforts, a lumbar sympathetic block (LSB) was attempted. Unexpectedly, pain worsened post-block, suggesting a rare "steal phenomenon" complication not well-documented. This case emphasizes the need for pain physicians to be vigilant for unusual CRPS etiologies in children and prepared for unforeseen challenges in their management.

Keywords: Complex regional pain syndrome, complication, multidisciplinary, neuropathic pain, pain clinic, sympathetic block

Introduction

Complex regional pain syndrome (CRPS) is a debilitating chronic pain condition distinguished by pain intensity disproportionate to the inciting event. Various studies have outlined the differences between adult and pediatric CRPS.[1] However, there remains a paucity of pediatric CRPS literature focusing on etiology, treatment modalities and prognosis. The condition can be very distressing for the child in terms of physical, psychological and emotional pain. It is not only a challenge to children and their parents to cope up with but also to physician with respect to diagnosis and definitive treatment.

Multidisciplinary therapy is the cornerstone of pediatric CRPS management. Lumbar sympathetic block (LSB) offers immediate relief and is generally considered safe. However, robust research on

interventional management and complications in children is notably insufficient. This article highlights an unexpected pediatric CRPS etiology and a challenging, paradoxical complication: the "steal phenomenon" following LSB. This rare occurrence, where sympathetic blockade paradoxically worsens pain, is not well-documented in CRPS. This case underscores the crucial need for vigilance regarding unusual presentations and unforeseen challenges in pediatric CRPS management.

Case Report

The parents of a young child provided informed consent for the publication of this case for educational purposes. The patient presented to our pain clinic with a 1.5-month history of severe pain and swelling in his left foot. The onset of pain was attributed to an otter bite sustained while the child was playing in water.

Prior to presentation, the child had undergone an initial course of conservative management, including rest, non-steroidal anti-inflammatory drugs (NSAIDs), and anticonvulsants, prescribed by referring physicians. Immobilization of the left ankle with a cast was also performed for two weeks by an orthopedic surgeon. Despite these interventions, no pain relief was observed. Over the subsequent weeks, the pain escalated in intensity, characterized by the child as a constant, burning sensation rated 10/10 on the Numeric Rating Scale (NRS). The pain was exacerbated by light touch and slight movement, leading to marked functional impairment; the child ceased moving his left foot and became wheelchair-bound. Parental history revealed no developmental delay or prior seizure history.

Upon physical examination, the patient exhibited several signs consistent with the Budapest criteria for CRPS type 1:

- Sensory: Diffuse tenderness and allodynia were elicited over the left foot and ankle.
- Vasomotor: The left foot and ankle were swollen, and the skin appeared discolored compared to the right foot (**Figure 1**). A temperature asymmetry was noted, with the left foot measuring 23.5 degree C and the right foot 22.8 degree C.
- Sudomotor/Edema: Significant edema was present in the left foot and ankle.
- Motor: Range of motion (ROM) in the left ankle joint and toes was markedly restricted due to pain. No obvious muscle wasting of the left lower extremity was observed.



Figure 1: Left foot showing swelling and color changes

Distal pulses in both feet were normal. Hematological investigations, including a complete blood count (CBC), C-reactive protein (CRP), and erythrocyte sedimentation rate (ESR), were within normal limits, effectively ruling out infectious or rheumatological etiologies. Magnetic resonance imaging (MRI) and nerve conduction studies of the left lower extremity were also unremarkable. Based on these comprehensive findings, a diagnosis of CRPS type 1 was established, and a left lumbar sympathetic block was scheduled.

On the day of the procedure, a left-sided lumbar sympathetic block (LSB) was performed at the L4 level under strict aseptic precautions and fluoroscopic guidance. The patient received local anesthesia and 1 mg of midazolam for sedation. A 22G, 10cm needle was advanced, and its tip position at the anterolateral aspect of the L4 vertebra was confirmed fluoroscopically. After verifying adequate contrast dye spread in both lateral and antero-posterior views (**Figure 2** and **Figure 3**, respectively), 15 mL of 0.25% bupivacaine with 40 mg triamcinolone was injected following negative aspiration for blood.



Figure 2: Dye spread in lateral view.



Figure 3: Dye spread in antero-posterior view.

The procedure itself was uneventful. However, immediately post-procedure, the child developed severe pain in his left lower extremity, exceeding his pre-procedure pain (NRS 10/10). Palpation revealed the left lower extremity was markedly warmer than the right (6-degree difference), yet significant allodynia persisted, leading to inconsolable distress. Despite intravenous administration of 400 mg ibuprofen and subsequently 50 mg tramadol, no significant pain relief was achieved. The child required sedation with 30 mg propofol and was kept under observation for 24 hours. Bowel or bladder dysfunction was ruled out, and objective neurological examination revealed no abnormalities. The pain gradually resolved after 14 hours with continuous analgesic administration. The child was discharged and scheduled for a 7-day follow-up.

After 7 days, the child presented with reduced left lower extremity swelling, comparable color and temperature to the right, and slight pain (NRS 4/10). Ankle and toe ROM improved but remained restricted, and fear of pain kept the child wheelchair-bound. Physiotherapy was initiated. At 14-day follow-up, the child was ambulating independently with complete resolution of swelling and color changes (**Figure 4**), no pain, and normal ankle and toe ROM, indicating successful functional restoration and adherence to physiotherapy.



Figure 4: Swelling and color changes of left foot subsided.

Discussion

Pediatric Complex Regional Pain Syndrome (CRPS) presents a significant clinical challenge, stemming from both limited research and diagnostic complexities. While often triggered by trauma, injury, or surgery - as exemplified by our unusual case following an otter bite - the precise etiology and pathophysiology of this chronic pain condition remain largely unknown. A major hurdle lies in diagnosis. Unlike adult CRPS, which utilizes well-established Budapest criteria, a definitive diagnostic tool for children is still lacking. [2]

A multidisciplinary approach is widely recognized as the most effective treatment strategy. This typically involves early and aggressive physical and occupational therapy to restore function and reduce hypersensitivity, alongside psychological interventions like CBT to address pain coping and associated distress. For cases where conservative management falls short, interventional techniques offer a promising avenue for pain relief and restoring limb function. [3] While existing literature on interventional modalities in pediatric CRPS is limited, studies have shown encouraging results. [4] Lumbar sympathetic block (LSB), for instance, is a viable option for lower limb CRPS. The rationale for sympathectomy stems from the concept of "sympathetically maintained pain" in CRPS. Although rare complications such as post-sympathetic neuralgia, motor weakness, subarachnoid, and intravascular injections have been reported in isolated case reports, the overall benefits often outweigh these infrequent risks.

This article delves into an unusual immediate post-sympathectomy complication: the immediate onset of excruciating pain post-lumbar sympathetic block. This phenomenon sharply contrasts with the more commonly described post-sympathectomy limb pain, which is typically characterized by a pain-free interval of 10-14 days, localized to the proximal limb, worse at night, and attributed to deafferentation hyperexcitability and central sensitization. [5] The absence of this characteristic pain-free interval in our patient is a crucial differentiator, prompting us to rigorously rule out other potential causes.

Neuronal injury ranges from temporary numbness/weakness due to local anesthetic spread (resolving in hours) to rare, severe deficits like transient paraplegia. [6] Unlike proposed vascular steal, severe neuronal injury often presents with objective motor/sensory findings verifiable by electrophysiological studies (EMG/NCS). Our case proposing vascular steal explicitly noted no deficits in strength and lack of objective neurological findings, distinguishing it from typical neuronal injury.

This discussion critically analyses the vascular steal phenomenon as a rare, largely theoretical complication following lumbar sympathetic block (LSB) in pediatric Complex Regional Pain Syndrome (CRPS). While LSB aims to improve perfusion, the concept of paradoxical "steal" leading to deep tissue ischemia is based on extremely limited evidence. The sole case report involved an adult patient, presenting with immediate, severe "stabbing" pain post-procedure, notably without objective strength deficits, and resolving spontaneously within 2-3 days. [7] No documented cases exist in the pediatric CRPS population within the provided literature. This extreme rarity suggests it is either exceptionally uncommon or frequently misdiagnosed. While the general concept of vascular steal is established in other contexts (e.g., AV fistulas, free flaps) [8-9], its direct application as an LSB complication causing deep tissue ischemia remains theoretical.

The immediate, severe "stabbing" pain after LSB in our patient might be due to sudden revascularization, preferentially shunting blood to superficial tissues (skin, subcutaneous tissue, muscles) at the expense of deeper structures like bone and deep muscles, causing localized ischemia. This mechanism suggests a paradoxical redistribution of LSB-induced vasodilation, distinct from structural shunts seen in other vascular steal syndromes.

Distinguishing the proposed vascular steal from other common post-LSB pain causes is crucial for accurate diagnosis.