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The Role of Caudal Epidural Steroid Injections in Diabetic Lumbosacral Radiculoplexus Neuropathy: A Case Report

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Background: Diabetic lumbosacral radiculoplexus neuropathy (DLSRPN) or diabetic amyotrophy, although relatively uncommon and typically self-resolving, often leads to a period of severe compromise in quality of life.

Case Report: We present the case of a 46-year-old woman with 6 months of bilateral lower extremity weakness and neuropathic pain, diagnosed with diabetic lumbosacral plexopathy. Her recovery course was significantly improved by receiving a caudal epidural steroid injection (ESI) to address her pain and decreased function that was not sufficiently controlled by neuropathic agents and oral opioids.

Conclusions: Caudal ESI may have a beneficial role treatment of DLSRPN to facilitate participation in a functional rehabilitation program.

Key words: Diabetic lumbosacral plexopathy, diabetic lumbosacral radiculoplexus neuropathy, diabetic amyotrophy, Bruns-Garland syndrome, proximal diabetic neuropathy, caudal epidural steroid injection, epidural steroid injection, chronic pain

BACKGROUND

Diabetic lumbosacral radiculoplexus neuropathy (DLSRPN), also known as diabetic amyotrophy (Bruns-Garland syndrome or proximal diabetic neuropathy), is a syndrome that is marked by initial asymmetric, painful, proximal muscle weakness in the lower extremities. The progression of the disorder can lead to sensory changes and areflexia, with potential to progress to the unaffected limb. The syndrome affects up to 1% of patients with diabetes (1). Usually a diagnosis of exclusion, other causes, including compressive or infiltrative pathology, need to be ruled out before a definitive diagnosis can be established. Typically DLSRPN resolves spontaneously within 2 years (1). However, pain and function loss can be addressed by utilizing amitriptyline, gabapentinoids, nonsteroidal anti-inflammatories, and opioids. Additionally, a regimen of physical and occupational therapies, bracing, and orthotics, as well as optimizing blood glucose control, can be effective in improving overall symptomatology. The role of intravenous immunoglobulin (IVIG) has been investigated, but with limited efficacy (2). Oral and intravenous pulsed corticosteroid regimens have been explored with mixed results (3). This case report will explore the role of supplementing a multimodal treatment regimen with caudal epidural steroid injections (ESIs) to treat DLSRPN.

CASE PRESENTATION

The patient is a 46-year-old woman with a medical history significant for type 2 diabetes mellitus with a hemoglobin A1C of 14.8. She presented with 6 months of bilateral lower extremity weakness and severe neuropathic pain.

She reported 10 out of 10 severe, constant pain in the

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bilateral anterior thighs and calves. Bilateral lower extremity weakness was worse in proximal muscle groups with two-fifths strength in bilateral hip flexion and knee extension and four-fifths strength in ankle dorsiflexion and plantar flexion.

The patient was initially thought to have Guillain-Barré syndrome (GBS) due to her progressive lower extremity weakness and was empirically treated with 4 days of IVIG approximately 2 months prior to initial presentation. Mobility was assisted by a rolling walker and a wheelchair for long distances. Further evaluation consisted of an unrevealing lumbar puncture. Magnetic resonance imaging of the lumbar spine and pelvis that showed no remarkable or specific findings suggestive of DLSRPN. Electromyography/nerve conduction studies revealed evidence of an acute denervating neurogenic or irritative myopathic process predominantly along bilateral L3 myotomes suggestive of radiculopathy or polyradiculopathy.

Treatment consisted of a multimodal regimen that included gabapentin 900 mg tid, methocarbamol 750 mg qid prn, amitriptyline 25 mg qhs, hydrocodone-acetaminophen 7.5/325 mg q6h prn, and prednisone 20 mg daily. Additionally, the patient was initiated on a physical therapy (PT) program. Diagnostic findings and treatment response were inconsistent with GBS or chronic inflammatory demyelinating polyneuropathy and a diagnosis of DLSRPN was suspected. Informed consent was obtained and the patient underwent caudal ESI with fluoroscopic guidance due to lack of symptomatic improvement after the above-treatment regimens.

Using the C-arm in a lateral view, the sacrococcygeal junction, sacral cornua, and sacral hiatus were identified. Lidocaine 1% was used for infiltration of the skin and subcutaneous tissue above the sacrococcygeal junction. A 6-inch 18G Tuohy needle was inserted using intermittent fluoroscopy in anteroposterior and lateral views between S3 and S4. After aspiration, contrast was injected under intermittent fluoroscopy which showed excellent epidural spread covering the bilateral lumbosacral nerve roots from L5-S2. A 10-mL mixture of 80 mg of methylprednisolone, 3 mL of preservative-free lidocaine 1%, and 5 mL of preservative-free normal saline was injected.

The patient reported 80% pain relief at the 2- and 3-week follow-up visits, and at the subsequent 6-week follow-up, the patient reported continued improvement in pain. Additionally, the patient was fitted with a left SpryStep ankle foot orthosis (Thuasne USA, Bakersfield, CA) and scheduled to resume PT for ongoing gait and mobility training. The patient reported no complications or adverse events during the procedure or in the follow-up period. At the 3-month follow-up, she had completely weaned off hydrocodone-acetaminophen 7.5/325mg. At the 6-month follow-up after working with PT, she had marked improved lower extremity strength compared to preprocedure presentation in all muscle groups. At the 2-year follow-up, the patient was asked further about how she responded to the caudal ESI. According to the patient, she had great relief with the procedure, meeting or exceeding multiple functional goals set by her therapy teams. This has resulted in increased functional independence as she has progressed in ambulation and is near pre-DLSRPN strength.

DISCUSSION

Combatting pain and weakness associated with DLSRPN can be a great challenge for physicians. Historically, 10% of patients required a wheelchair for mobility 2 years after onset (1,4). Treatment for these patients has been multimodal with goals of providing pain relief and decreasing duration of symptoms. This involves a combination of pharmacotherapy, PT, and bracing, if needed.

The most commonly used medical management involves immunotherapy—corticosteroids, IVIG, and plasmapheresis (1,5). There has been debate about whether to give diabetic patients, specifically type II, prolonged courses of corticosteroids due to the risk of transient and prolonged hyperglycemia. However, it is important to note that most patients suffering from DLSRPN have relatively good glycemic control. One study (4) gave a cohort of patients 1 gm methylprednisolone 3 times weekly with decreased dose/frequency over 12 weeks. The patients had markedly improved pain symptoms compared to control. This methodology was considered in our patient. Due to this patient's poor glycemic control at presentation (A1C 14.8) and lack of symptomatic improvement with previous systemic steroids, we elected to abstain from this method of management favoring a smaller targeted dose of steroid.

A caudal epidural approach was selected as it allows the provider to target multiple levels in the lumbosacral plexus and focus medicine at levels associated with the more significant symptoms. Initial preprocedure planning considered repeat corticosteroid injections (CSIs) after 3 months targeting cephalad T12-L2 roots of lumbosacral plexus. On a case-by-case basis, repeat CSI

may be considered if improvement is suboptimal after first injection. In our case, additional CSIs were held due to overall improvement in patient's symptomatology and functional outcomes. After the results seen in this patient, the authors suggest that caudal ESI can be a useful adjuvant for symptomatic management of DLSRPN and a great alternative to conventional management in patients with poor glycemic control.

CONCLUSIONS

There are many theories behind the etiologies and proper treatment regimens for DLSRPN. The goal common to all treating physicians is to minimize pain and enhance quality of life. The improvement of pain and function for this patient following a caudal ESI suggests interventional pain modalities may have a beneficial role in future treatment of DLSRPN.

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