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ULNAR NERVE STRETCH INJURY POST CERVICAL EPIDURAL STEROID INJECTION: A CASE REPORT

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Background: For successful outcomes, interventional pain management procedures commonly require the patient to be prone under fluoroscopy. Nerve injuries can occur from stretching, compression, or direct nerve insult.

Case Report: In this case report, we describe a patient receiving a cervical epidural steroid injection while prone over a 17-minute period. He immediately postoperatively reported one-sided severe hand pain and spasm in his lateral fingers. He initially reported cervical radicular pain on the contralateral side, which the patient said felt better immediately after being injected with a mixture of lidocaine, ropivacaine, and dexamethasone into the C5-C6 epidural space. He was sent to the emergency department to rule out a hematoma or any other new pathology; his cervical magnetic resonance image was identical to his baseline preprocedure magnetic resonance image. A variety of medications were administered, including a methylprednisolone dose pack, hydrocodone, gabapentin, and methocarbamol. He was seen in the clinic the following week. At that time he reported ongoing hand pain; an electromyography test was consistent with his physical examination, which showed ulnar dermatome pain and weakness. All symptoms resolved within 2 weeks, and all sensation and motor strength returned to baseline.

Conclusion: Brachial plexus injury can occur when a patient is prone. In order to minimize nerve injury, care should be taken when positioning patients about to receive an interventional pain management procedure..

Key words: Brachial plexus injury, interventional pain management, prone position, ulnar nerve, hand pain

BACKGROUND

Interventional pain management procedures, including epidurals, are commonly performed around the world on patients with discogenic pain. Cervical epidural steroid injections (CESIs) are performed for patients who have chronic neck pain caused by cervical radiculopathy or spinal stenosis after the patient has failed conservative treatments. The injection is usually composed of the nonparticulate corticosteroid dexamethasone and a local anesthetic to target inflammation and to provide pain relief. Recent evidence suggests the overall incidence of any neurological complication after either interlaminar or transforaminal CESIs is approximately 4-5 patients out of every 1,000 (1). While most complications are self-limiting, careful technique and patient positioning are essential to ensure the injection's safety and efficacy.

Peripheral nerve injuries are not a well-established complication of CESIs, although they are well documented in intraoperative and other procedural contexts in

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association with patient positioning (2). We, therefore, present a case of ulnar nerve neuropathy following a CESI for a patient with chronic neck pain, emphasizing the importance of position-related precautions during procedures outside of the perioperative context.

CASE REPORT

A 45-year-old man with C5–C7 cervical spinal stenosis and chronic neck pain radiating to the right upper extremity underwent a C5-C6 percutaneous CESI under C-arm fluoroscopic guidance. The patient was lying prone with his neck slightly flexed, using an Oakworks Interventional Supine Pillow System (Oakworks, Inc.) (Fig. 1). His arms were positioned by their sides and the forearms were pronated. His hands extended beyond the edge of the positioning pillow and rested on the operating table in mild wrist hyperextension. The area was prepped and draped sterilely using chlorhexidine gluconate and isopropyl alcohol and a fenestrated drape. The location was determined under fluoroscopic guidance.

A 27G, 1.25-inch needle was used to anesthetize the needle entry site and subcutaneous tissues. Using the loss-of-resistance technique, a 20G, 3.5-inch Tuohy needle was advanced through the ligamentum flavum. Once the needle tip was thought to be in the desired position, iohexol 300 was injected to confirm only epidural spread and no vascular runoff. Anteroposterior (Fig. 2) and contralateral oblique views confirmed the spread. A total of 0.5 mL of 1% lidocaine, 2 mL of 8 mg of dexamethasone, and 0.5 mL of 0.5% ropivacaine was administered. The procedure lasted 13 minutes, and since the patient was positioned 4 minutes before it began, he was in that position for a total of 17 minutes.

The patient was then turned over and placed on a stretcher to be sent to the recovery room. Immediately following the procedure, he reported new onset severe pain, numbness, and tingling in his left arm, concentrated in his hand. He had associated weakness in his left hand, particularly the fourth and fifth digits. His previous radiculopathy symptoms in his right upper extremity were resolved with the injection.

We sent him to the emergency department later that evening because he continued to report pain and muscle spasm. This decision was made related to concerns for spinal or epidural hematoma, cervical spinal cord injury, cervical nerve root injury, or other serious complications from the CESI.

A neurologic examination later that evening in the emergency department revealed 3/5 motor strength in his left hand with numbness and tingling that excluded his left thumb. Magnetic resonance imaging (MRI) performed at 12 hours postinjection showed C5–C7 mild spinal canal stenosis and moderate right neural foraminal stenosis secondary to a disc osteophyte complex and uncovertebral hypertrophy, respectively, which was unchanged from his previous MRI. He reported a slight improvement in his

Fig 1. Oakworks Interventional Supine Pillow System used for the cervical epidural steroid injection.

Fig. 2. Anteroposterior fluoroscopic view showing appropriate epidural contrast medium spread.

symptoms the following day and was discharged with oral hydrocodone/acetaminophen 10 mg/325 mg every 8 hours as needed and oral methocarbamol 500 mg every 12 hours as needed for symptom management.

Since there were no acute findings on MRI and some improvement in symptoms, he returned to our pain clinic the following week and was re-examined. His principal diagnosis was an acute stretch injury of the ulnar nerve related to prolonged hyperextension of the wrist vs vulnerable elbow positioning during his injection. He was prescribed additional medications, including oral gabapentin 300 mg 3 times per day and a methylprednisolone dose pack of 4 mg tablets in a 6-day taper (total of 21 pills). He was referred to neurology for an electromyography test, which showed a 32% left-right amplitude difference for the ulnar motor nerve (Fig. 3).

DISCUSSION

Interventional pain management procedures such as CESIs typically require prone positioning and utilize prone head cushions. CESIs are considered a safe and established intervention for managing cervical radiculopathy that has not responded to conservative therapy. The post-CESI complication rate can reach 17%, with most of these being self-limited symptoms, including neck pain, stiffness, vasovagal reactions, or headache (3). The current evidence does not commonly describe peripheral neuropathies as potential complications from CESIs. However, in patients undergoing general anesthesia for any surgical procedure, perioperative peripheral nerve injury is well-recognized, although the incidence is < 1% (4). The most updated report from the American Society of Anesthesiologists states that perioperative ulnar neuropathy is most commonly associated with elbow flexion, forearm pronation, and direct pressure over the ulnar groove (2). Supination of the arm has been shown to minimize external pressure put on the ulnar nerve at the elbow compared to pronation and neutral positions (5). Therefore, careful positioning can mitigate potential nerve injury (5,6).

Our patient was placed prone for his CESI, thereby increasing the risk for ulnar neuropathy at the elbow. He also had his hands hyperextended during the procedure, which further increased his wrist's ulnar nerve entrapment at the entrance to the Guyon canal. His symptom distribution, combined with the electromyography results, suggests his acute left upper extremity pain and paresthesias were due to an ulnar nerve injury.

This case reflects the importance of patient positioning during any procedure. Performing a thorough history and physical assessment; emphasizing body habitus and tolerability of the anticipated procedural position; implementing positioning strategies; using protective padding; and performing a postprocedure physical evaluation can all aid in preventing peripheral nerve injury (2). This is the first case reporting an ulnar nerve injury from a CESI in the world medical literature.

CONCLUSIONS

Peripheral nerve injuries during procedures not performed in an operating room are often underrecognized and underreported. This is possibly related to delayed symptom onset or the lack of a follow-up. As CESIs continue to increase, it is essential to emphasize proper patient positioning as part of procedural preparation to minimize the risk of peripheral neuropathy or brachial plexus injury.

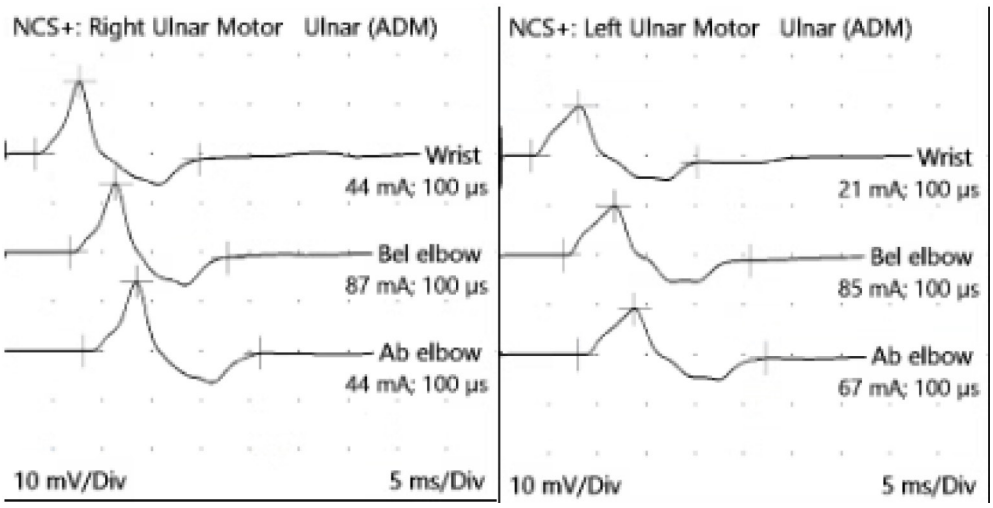

Fig. 3. Electromyography results comparing right and left ulnar motor amplitude.

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