Percutaneous Cervical Sympathetic Block for Pain Control after Internal Carotid Artery Dissection. A Report of Two Cases

Omar Saeed, MD, Asif A. Khan, MD, Nabeel A. Herial, MD, Emrah Aytac, MD, and Adnan I. Qureshi, MD

1Zeenat Qureshi Stroke Institute, St. Cloud, MN 56303, USA
2University of Illinois College of Medicine, Rockford, IL 60612, USA
3University of California, San Diego, La Jolla, CA 92093, USA
4University of Minnesota, Minneapolis, MN 55455, USA

Abstract

Background—Medical treatment of cranio-cervical pain can be suboptimal in patients with internal carotid artery (ICA) dissection. We report the use of cervical sympathetic block for treatment of pain in two patients with ICA dissection.

Case Reports—A 58-year-old man and a 43-year-old woman presented with severe cranio-cervical pain associated with left and right ICA dissection confirmed by magnetic resonance imaging and cerebral angiography. Due to suboptimal control of pain with medical treatment, cervical sympathetic block was performed under fluoroscopic guidance using 20 ml of bupivacaine injected lateral to the posterior aspect of sixth vertebral body in both patients. On self-reported pain scale, the 58-year-old man reported improvement in pain intensity from 8/10 pain to 0/10 within 1 h of blockade. The patient remained relatively pain free for the 24-h post blockade. Mild recurrence of pain was noted on Day 2. The 43-year-old woman reported improvement in pain intensity from 6/10 pain to 0/10 within 1 h of blockade. The patient remained pain free for five days with recurrence to previous intensity.

Conclusion—Cervical sympathetic blockade in patients with ICA dissection may be an effective option in the event of suboptimal pain control with medical treatment; however, the technique may be limited due to relatively short duration of action.

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Keywords

Internal carotid artery (ICA); dissection; cervical sympathetic block; neck pain; headache; Horner’s syndrome; sympathetic pain

INTRODUCTION

The most common presentation of internal carotid artery (ICA) dissection is head and neck pain, and depending on the site of dissection, the pain can radiate to many different locations, including facial, cervical, or even the auricular regions. The pain has been known to last anywhere from 90 min to 30 days, and can be very severe in intensity [1,2]. It is secondary to excessive stimulation of sympathetic pain pathways that are located in the vicinity of the involved segment of the ICA due to stretching of wall caused by the dissection [3]. The current practice involves use of pharmaceutical analgesics,
such as non-steroidal anti-inflammatory medication and narcotics [4,5], although failure rates can be high [5].

We describe two cases who presented with severe headache, which were later found to have an ICA dissection and underwent cervical sympathetic block for pain control.

CASE REPORT

Patient 1

A 57-year-old man presented with severe throbbing left-sided headache with radiation into his neck and associated blurred vision in the left eye. He also complained of ear pain since the previous month. He tried several oral non-steroidal anti-inflammatory medications with little benefit. On physical examination, his left pupil measured approximately 4 mm and the right pupil was approximately 7 mm. There was also slight ptosis of the left eyelid consistent with ipsilateral Horner’s syndrome. In addition, his electrocardiogram showed sinus bradycardia, and the patient had no other neurological deficits on examination. The patient continued to complain of severe headache and neck pain despite multiple doses of intravenous (IV) and oral narcotic analgesics including oxycodone/acetaminophen combination and hydromorphone. A diagnostic catheter angiogram was performed which demonstrated tapering stenosis with irregularity sparing the carotid bifurcation consistent with ICA dissection [see Figure 1(A)] and maximum stenosis measuring 83% using Zeenat Qureshi Stroke Institute (ZQSI) criteria [6,7].

Patient 2

A 43-year-old woman developed right ICA dissection six months ago with initial manifestation consisting of

Figure 1. (A) Oblique view: arterial dissection (arrow) extending from cervical segment to petrous segment of left ICA in Patient 1. (B) Lateral view: arterial dissection (arrow) extending from cervical segment to petrous segment of right ICA in Patient 2.
right Horner’s syndrome and followed by worsening right-sided headaches. Since the initial occurrence, the patient had intractable headaches with variable response to medications. The headache was described as right sided with sharp characteristics varying between 3–6/10 intensity daily involving right cranial and orbital regions. The headache was persistent and sometimes interfered with sleep. The patient was unable to work due to the severe headaches. There was improvement in lumen diameter at site of arterial dissections based on findings of magnetic resonance angiogram (Day 2 since initial symptom occurrence), catheter angiogram (Day 10), and catheter angiogram (Day 40). A diagnostic catheter angiogram performed on Day 40 demonstrated minimal stenosis with irregularity sparing the carotid bifurcation [see Figure 1(B)] and maximum stenosis measuring 54% using ZQSI criteria [6,7]. The patient continued to complain of severe headaches despite multiple doses of IV lidocaine infusions, IV dihydroergotamine, local botulinum injections, and IV/oral Ketorolac. The patient reported 6/10 intensity headache prior to the procedure. On physical examination, the patient had no other neurological deficits.

**PROCEDURE**

A cervical sympathetic blockade with fluoroscopic guidance was performed to improve pain control [see Figure 2(A and B)]. The appropriate side of the neck was prepped and draped while the patient remained in supine position.
position; 3 ml of 1% of lidocaine was administered locally in the subcutaneous tissue. A 20-gauge spinal needle was advanced under fluoroscopic guidance, lateral, and anterior to the cervical 6th vertebral body while laterally manually displacing the ICA away from the needle trajectory. The needle placement was confirmed by injection 0.75 and 2 ml of radio-opaque omnipaque with linear contrast spread along the caudocephalic axis within the paravertebral fascial compartment. A total 10 ml of 0.25% bupivacaine was then injected over 5 min followed by fluoroscopically confirmation of needle position. Another 10 ml of 0.25% bupivacaine was then slowly injected over 5 min. The needle was then removed, and pressure was applied to the lateral aspect of the neck.

**POST PROCEDURE RESPONSE**

On immediate post-procedural assessment, Patient 1 reported a significant reduction in headache pain. On self-reported pain scale, the patient reported improvement in pain intensity from 8/10 pain to 0/10 within 1 h of blockade. The patient remained relatively pain free for the 24-h post blockade. Mild recurrence of pain was noted on Day 2. On telephonic follow-up on Day 5, he reported that the pain was only concerning when he was lying down but was relatively pain free when standing up or sitting upright. Adequate pain management from then onward was continued with oral ibuprofen.

Patient 2 reported complete resolution of headache immediately after procedure. The effectiveness of sympathetic blockade was confirmed by post-procedure development of ptosis and miosis in the right eye, which lasted for 6 h post procedure. On telephonic follow-up on Day 3, she reported that she was headache free. On telephonic follow-up on Day 7, the patient reported that on Day 5, the pain had started again and now was at the same intensity as pre-procedure pain. She requested another block procedure be performed which was not performed due to lack of persistent relief in her case.

**DISCUSSION**

To the best of our knowledge, we did not find any case reports or studies that described the use of cervical sympathetic blockade for pain control in a patient who presented with ICA dissection. A previous study demonstrated effectiveness of cervical sympathetic blockade for pain control after thyroidectomy with reduction of symptoms including post-operative nausea and vomiting [8]. Others have described the use of cervical and stellate sympathetic ganglion block for pain control follow-

We observed a consistent and complete resolution of pain following sympathetic blockade in both patients. The current data suggest that sympathetic activity is impaired in ICA dissection; therefore, further reduction in activity by blockage may not reduce pain [12]. The pain in ICA dissection can be associated with autonomic hyperactivity secondary to impaired post-ganglionic cervical sympathetic fibers such as those seen with cluster headaches [15,16]. It is possible that initial injury may result in inflammation within the plexus leading to hyperexcitability of certain sympathetic pathways such as those seen in Herpes Zoster infection; therefore, sympathetic blockade is beneficial [17]. The effect lasted for at least five days in both patients, which is consistent with duration of relief seen with sympathetic blockade for other indications [18].

**CONCLUSION**

The use of cervical sympathetic blockade for pain control showed short-term benefit in our patient with ICA dissection. Further studies are warranted to assess the effectiveness of ipsilateral cervical sympathetic block in patients with cervical and facial pain associated with underlying ICA dissection.

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