Occipital Neuralgia & Cervicogenic Headache

Occipital neuralgia and cervicogenic headache have similar anatomy and treatment.

By Andrew C. Young, MD

Occipital neuralgia and cervicogenic headache are causes of posterior-predominant headache treated in the outpatient setting. The clinical presentations of these 2 conditions have similar features because of converging anatomic pain pathways involving the nociceptive afferents of C1, C2, and C3 spinal nerves and the trigeminocervical complex. Shared clinical features include occipital headache, neck pain, and fronto-orbital pain. Local anesthetic blocks have a dual role in providing diagnostic support and therapeutic relief.

Case 1. Occipital Neuralgia

Case Presentation

BK is 42 and presented with a 3-month history of posterior headache episodes she described as predominantly sharp, shooting pain with associated pins-and-needle sensation over her posterior neck and head. She also noticed radiating aching pain that traveled to her forehead. Associated symptoms included mild light sensitivity, although when asked, she said she had no phonophobia, nausea, or vomiting. These episodes lasted from a few seconds to minutes and occurred suddenly without warning. She had no recent trauma, neck injury, or neck manipulation.

Diagnostic Evaluation

On examination, BK reported discomfort with palpation over the posterior scalp region innervated by the greater and lesser occipital nerves. Although her clinical presentation was most concerning for occipital neuralgia, the differential diagnosis included migraine, cervicogenic headache, Arnold-Chiari malformation, posterior fossa or cervical mass, and vascular lesions. Brain and cervical spine MRIs were ordered and showed no evidence of intracranial or cervical spinal cord lesions.

Management

Occipital nerve block was recommended for diagnostic and therapeutic purposes. BK responded well to bilateral greater and lesser occipital nerve blocks with more than 90% pain relief.

Follow-Up Care

BK maintained 90% pain relief for 8 weeks, at which time her headache episodes returned. A repeat occipital nerve block was performed and the same therapeutic response was achieved.

Clinical Features

Occipital Neuralgia

Occipital neuralgia, as defined by the International Classification of Headache Disorders 3rd edition (ICHD-3),[1] is described as unilateral or bilateral paroxysmal pain in the distribution of the greater, lesser, and third occipital nerves. The pain is frequently characterized as severe, stabbing, and sharp and typically lasts a few seconds to minutes. Sensory changes over the posterior scalp can include allodynia, hyperesthesia, or hypoesthesia. Individuals with occipital neuralgia may also experience pain in the fronto-orbital area, reflecting trigeminocervical interneuron connections and referred pain pathways.

On physical examination, a positive Tinel sign may be present with tenderness to percussion or palpation along the course of the occipital nerves. The etiology of occipital neuralgia can be varied, including whiplash injury, vascular compression, schwannoma, and myofascial entrapment.[2-5]

Cervicogenic Headache

The ICHD-3 defines cervicogenic headache as headache caused by a cervical spine disorder that usually, but not invariably, is accompanied by neck pain.[1,6] This includes headache arising from the neck that radiates posteriorly to anteriorly reaching the supraorbital and frontal temporal areas. The pain is nonpulsating, dull, tightening, or pressing,[7] and typically unilateral but can also present bilaterally.

On physical exam, patients may have a limited range of motion of the neck. Provocative maneuvers such as palpation over the upper cervical or occipital regions and neck movements, including flexion, extension, and lateral rotation may worsen symptoms.[8] The primary pain generators in this diagnosis can involve cervical facet joints, cervical disc disease, cervical fractures, infection, rheumatoid arthritis, and

Case 2. Cervicogenic Headache

Case Presentation

JY is age 50 and presented with new-onset posterior neck pain and headache after a fall with headstrike 5 months ago. She described persistent intense, aching, right-posterior neck pain that traveled superiorly and subsequently developed into a headache. JY's headache was predominantly on the right-posterior skull, radiating anteriorly into her forehead without photophobia, phonophobia, nausea or emesis. JY also noted muscle tension and pain over her neck and shoulder. She reported no new weakness, numbness, or paresthesias in her arms.

Diagnosic Evaluation

JY's neck pain and headache were exacerbated with neck rotation and extension. The Spurling maneuver was negative and did not produce radicular symptoms in the right upper extremity. Cervicogenic headache was most likely and the differential diagnosis for posterior headache and neck pain also includes migraine, tension-type headache, occipital neuralgia, Arnold-Chiari malformation, posterior fossa or cervical mass, and vascular lesions. JY's brain and cervical spine MRIs that showed a cervical disc bulge at C2 to C3 and cervical facet hypertrophy C2 to C3 and C3 to C4.

Management

JY reported only mild benefit with ibuprofen and acetaminophen analgesics and from physical therapy over the past several months. She was prescribed oral duloxetine 30 mg/day and tizanidine 4 mg up to twice daily as needed.

Follow-Up Care

JY returned 1 month later with persistent pain that continued interfering with sleep and function. A cervical medial branch block with third occipital nerve block and potential follow-up radiofrequency ablation was recommended. JY reported >90% pain relief with the initial cervical medial branch block and third occipital nerve block. She received radiofrequency ablation 2 weeks later that provided durable pain relief for more than 9 months of follow-up.

cervical spondylosis. Headaches should have a temporal relationship to the cervical spine disorder and improve in parallel with treatment of the underlying etiology. The ICHD-3 suggests independent classification for headaches arising from whiplash injury, cervical radiculopathy, and cervical myofascial pain, but these etiologies also involve the same nociceptive pathways of the trigeminocervical complex.

Overlapping Diagnostic Criteria

In both occipital neuralgia and cervicogenic headache, ICHD-3 diagnostic criteria include resolution of headache after appropriate diagnostic anesthetic block. Occipital neuralgia blockade can be performed in the clinic with a greater and lesser occipital nerve block.[9] Ultrasound-guided blockade can also be performed to target proximal sites of the greater and lesser occipital nerve at C1 and C2.[10] Cervicogenic headache is thought to be largely mediated by sensory nerve branches innervating C1-2, C2-3, and C3-4 cervical facets. Referral to a pain interventionalist can be considered for a fluoroscopy-guided block of the atlanto-axial joint, third occipital nerve (Figure 1), and upper cervical medial branch nerves.[11-13]

Anatomic Considerations

Occipital neuralgia is mediated by the greater, lesser, and third occipital nerves. The greater occipital nerve arises from the medial branch of the C2 dorsal ramus and provides sensation to the medial occiput. The lesser occipital nerve arises from ventral rami of C2 and C3 spinal nerves and provides innervation to the lateral occiput. The third occipital nerve is a superficial medial branch of the C3 dorsal ramus; it innervates the C2-3 facet joint and the parasagittal region below the superior nuchal line covering the upper neck and lower scalp.[14] These occipital nerves are branches of the upper cervical spinal nerves that synapse onto second order neurons in the trigeminocervical complex in the upper cervical spinal cord. The trigeminocervical complex also shares sensory afferent contributions from ophthalmic division of the trigeminal nerve (V1) and dural afferents (Figure 2).[6,15-18] The convergence of these sensory pathways allows for the expression of referred pain. A person with occipital neuralgia may have posterior headache generated from greater occipital nerve compression but also experience frontal-orbital headache from the V1 distribution as referred pain. Likewise, cervicogenic headache is mechanistically a referred pain disorder where upper cervical spinal pathology produces localized neck pain with concomi-

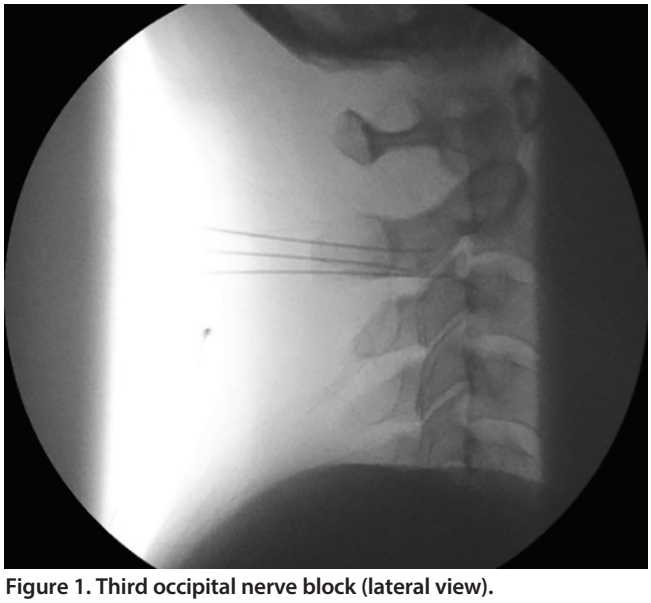

Figure 1. Third occipital nerve block (lateral view).

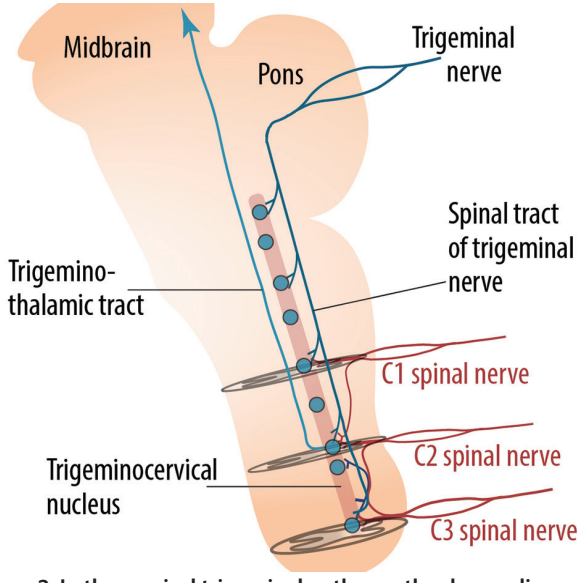

Figure 2. In the cervical trigeminal pathway, the descending fibers interact with spinal nerves in the spinal tract and the ascending trigeminothalamic tract carries information back to the thalamus, midbrain, and cortex.

tant referred pain to the posterior scalp and supra-orbital and frontal headache regions (Figure 3). Of note, other pathologies sharing the same anatomic space can mimic occipital neuralgia and cervicogenic headache. The differential diagnosis includes vertebral artery aneurysms, dural arteriovenous fistula, cervical cord angiomas, myelitis, and multiple sclerosis. Brain and cervical spine imaging can be helpful to evaluate for structural, infectious, infiltrative, and demyelinating lesions.[19]

Treatment Modalities

Evidence for nonpharmacologic management strategies for occipital neuralgia and cervicogenic headache is limited, but both may benefit from physical therapy and transcutaneous electrical stimulation (TENS).[20,21] Initial pharmacologic therapies typically involve nonsteroidal anti-inflammatory drugs (NSAIDs), tricyclic antidepressants, muscle relaxants, and neuropathic agents, but these have not been systemically evaluated.

For individuals with occipital neuralgia or cervicogenic headache that does not respond to conservative management, interventional treatments may be considered. Occipital nerve blocks have been shown to offer transient relief that may last a few weeks extending to several months in 15% to 36% of patients.[22,23] OnabotulinumtoxinA injections have also been investigated, although found ineffective for cervicogenic headache in a Cochrane review.[24] Pulsed radiofrequency therapy and radiofrequency ablation may provide longer more durable relief by inducing targeted nerve dysfunction or creating a focal lesion.[25] A few studies demonstrated intermediate benefit with pulsed radiofrequency for occipital neuralgia.[26,27] Radiofrequency ablation of the third occipital nerve may also be helpful in treating cervicogenic headache[28,29] in cases where the C2-C3 zygapophysial joint is implicated as a pain generator. Side effects of mild ataxia, numbness, and temporary dysesthesia have been reported with radiofrequency ablation. Neuromodulation with subcutaneous occipital nerve stimulator has been shown effective for refractory occipital neuralgia.[30] Invasive surgical approaches, including neurolysis and dorsal root entry zone lesioning, can be considered for those with refractory occipital neuralgia or cervicogenic headache, although the duration of effects is variable.[31]

Conclusion

Occipital neuralgia and cervicogenic headache are secondary headache disorders that share similar clinical features of posterior headache, neck pain, and referred fronto-orbital pain. The underlying etiologies of these distinct headache disorders share a common nociceptive afferent pathway involving the trigeminocervical complex. A comprehensive clinical

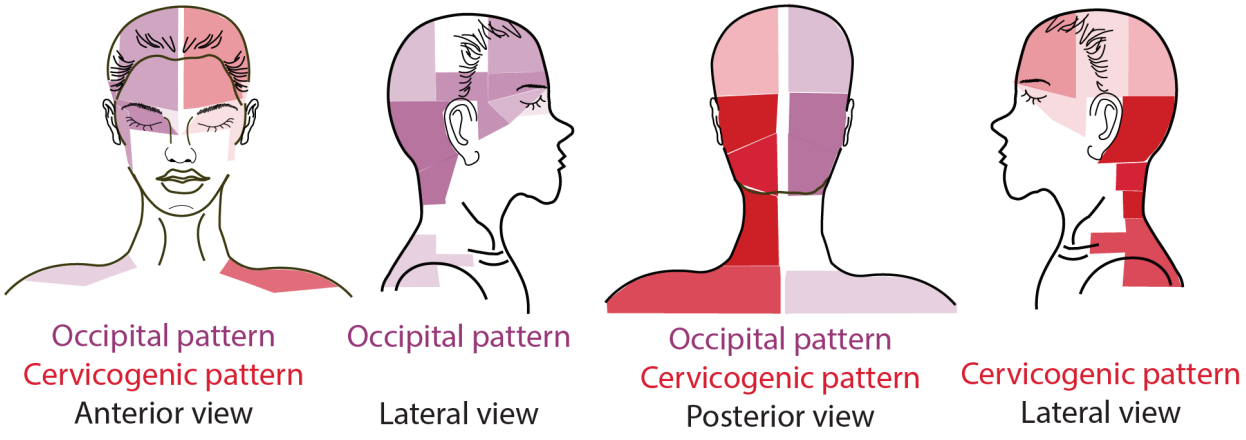

Figure 3. Occipital headache distribution is posterior within the innervation of the greater and lesser occipital nerves and with referred fronto-orbital pain. Cervicogenic headache distribution involves the neck, shoulders, and posterior head with referred pain that can encompass the temporal, frontal, and orbital regions.

history, appropriate provocative maneuvers, and diagnostic local anesthetic blocks can help differentiate these diagnoses. Treatment should be targeted to the underlying pathophysiology and may require nonpharmacologic therapies, medical management, and interventional and surgical measures. ■

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Disclosures
ACY reports no disclosures