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NON-OPIOID MANAGEMENT OF POST-ANEURYSMAL SUBARACHNOID HEMORRHAGE HEADACHE: A CASE REPORT ON THE USE OF GREATER OCCIPITAL NERVE BLOCK

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Background: In the acute phase, aneurysmal subarachnoid hemorrhage headaches (SAHs) are often difficult to manage. Clinical guidelines advise utilizing multimodal pain management but do not make specific recommendations. We present a case of aneurysmal subarachnoid hemorrhage-related headache that was found to respond to greater occipital nerve blocks.

Case Report: A 35-year-old woman was admitted to the clinic for aneurysmal subarachnoid hemorrhage. When admitted, she reported severe headaches that were unresponsive to pain medication. After she received bilateral greater occipital nerve blocks, her pain was immediately reduced by 50%.

Conclusion: Emerging evidence suggests that peripheral nerve blocks may serve as an effective mode of pain management for patients with aneurysmal subarachnoid hemorrhage-related headaches. Further research is needed to evaluate the effectiveness and safety of peripheral nerve blocks in this patient population.

Key words: Aneurysmal subarachnoid hemorrhage headache, greater occipital nerve, peripheral nerve block, headache

BACKGROUND

One of the pathognomonic features of aneurysmal subarachnoid hemorrhage (aSAH) is the classic "thunderclap headache," often described as the worst headache of the patient's life. However, despite how frequently patients with aSAH are affected, little is known about managing these headaches effectively. Current guidelines regarding the management of acute aSAH by the American Heart and Stroke Association advise multimodal pain management but do not make any specific recommendations (1). The lack of clear evidence-based treatment options is likely due to the paucity of high-quality data regarding the effectiveness of different analgesic medications for headaches in the setting of aSAH. Prior attempts to study this subject have generated mixed results, with few medications demonstrating meaningful reductions in pain scores. Furthermore, the delicate neurological status of the aSAH patient population limits clinicians' ability to utilize more powerful analgesic agents, such as opioids, given their sedative properties. There remains a need for alternative treatment options that provide meaningful pain relief to patients with aSAH without compromising their neurological status or interfering with treatment. Recent literature has suggested that peripheral nerve blocks may be an effective method of providing such relief, though further research is needed to establish their large-scale efficacy (2,3). The following case report describes the clinical course of a patient who received significant pain relief from a bilateral greater occipital nerve (GON) block following an aSAH.

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CASE

A 35-year-old woman presented to the hospital after experiencing a syncopal episode preceded by a worsening headache over several days. A computed tomograph scan of her head showed a subarachnoid hemorrhage with hydrocephalus, for which she underwent EVD placement and diagnostic cerebral angiography with stent embolization of a blister aneurysm of the right internal carotid artery (ICA). After awakening from anesthesia, the patient reported severe bilateral headaches that she described as a "deep pressure" in the occipital region radiating down her neck.

Although the patient did have a history of migraines, she typically described them as "pounding," unilateral on the right temporal region, always preceded by an aura of nausea, and lasting for only 24-36 hours. In the past, she had managed her migraines successfully using aspirin and, in severe cases, ketorolac. During this hospitalization, however, her headaches persisted over 3 weeks, exhibiting minimal response to intravenous fentanyl, intravenous hydromorphone (of the Dilaudid brand), dexamethasone, ketorolac, intravenous and oral acetaminophen (specifically, Tylenol), and aspirin. Given the refractory nature of the patient's condition, the neurology department was consulted to perform bilateral GON blocks.

The patient's left GON was localized using anatomical landmarks, approximately one-third of the distance between the occipital protuberance and the mastoid process. Using a 25-gauge needle, 3 mL of a mixture containing 0.5 mL of 80 mg/1 mL of methylprednisolone and 2.5 mL of bupivacaine (branded as Marcaine) 0.25% was injected on the left occipital area notch. Pressure was applied after the injection to minimize bleeding and to spread the anesthetic subcutaneously. The same procedure was subsequently performed on the right. The patient tolerated these procedures well, without any adverse reactions. After her injections, the patient reported greater than 50% pain relief, which ensued immediately and lasted approximately 12 hours, allowing her to sleep through the night.

DISCUSSION

The mechanism behind the severity of acute aSAH-related headache is thought to be multifactorial (4). Following a bleed, hemoglobin and its breakdown products, as well as multiple inflammatory cytokines released by glial cells, occupy the subarachnoid space, which likely contributes to meningeal irritation. A study by Xu et al (5) found that increased levels of pro-inflammatory cytokines within the cerebrospinal fluid of patients with aSAH had statistically significant associations with increased pain scores. Increased bleed volume was also found to be associated with severer headaches and analgesic failure in studies conducted by Glisic et al and Bouchier et al, respectively (6,7). Furthermore, patients with aSAH often undergo surgical or endovascular interventions to control their bleeding. These procedures can lead to postoperative pain, which likely exacerbates patients' headaches. Other sequelae of aSAH, such as vasospasm and hydrocephalus, may also contribute to increased headache severity, though their role is less clear (8).

Controlling these headaches, particularly in the acute setting, is often challenging. Opioids, though powerful analgesics, have sedative properties that can further compromise respiratory drive and mask critical changes in patients' neurological exams. Nonsteroidal antiinflammatory drugs (NSAIDs), due to their antiplatelet properties, can potentially worsen patients' bleeds. Instead of administering either type of medication, clinicians frequently attempt to provide supplemental pain control using alternatives such as corticosteroids, Tylenol, Fioricet, and antiseizure medications (9). However, the literature supporting their efficacy in this patient population is limited. Dhakal et al attempted to elucidate the comparative effects of gabapentin to those of a placebo on pain scores in patients with aSAH, but the researchers were unable to detect a statistically significant difference (10). Similarly, Kardon et al did not find corticosteroids to have a statistically significant effect on patients' daily mean pain scores or daily opioid usage (11). Findings such as these likely contribute to the lack of clear guidelines regarding the management of headache pain in cases of aSAH and demonstrate the need for alternative, effective treatment options.

The use of PNBs for headache-related pain is not new. Clinicians rely on them frequently to treat disorders such as migraines, cluster headaches, and cervicogenic headaches. More recent literature has expanded to begin exploring the utility of PNBs for the purpose of pain control in aSAH-related headaches. A case series of 7 patients by Smith et al found that pterygopalatine fossa blocks had a statistically significant effect on pain scores (12). Another observational study by Rajagopalan et al (13) found that patients who received bilateral greater occipital, lesser occipital, and supraorbital nerve blocks in addition to standard management had significantly lower pain scores than did patients in the control

group. The potential mechanism behind the efficacy of these blocks may lie in the sensory innervation of the meninges, which are often irritated and act as pain generators in aSAH. The meninges of the anterior and middle cranial fossa are innervated by the ophthalmic and maxillary division of the trigeminal nerve (14). However, the meninges of the posterior fossa are thought to receive sensory innervation from the nerves of the upper cervical spine, from which the GON also originates (15-17). This anatomical relationship provides insight into how blockage of the GON may have interrupted nociceptive signaling and provided our patient with symptomatic relief from her occipital headache. While further research is needed to establish whether the results experienced by patients like the one in this case report can be replicated, PNBs may prove to be a new cornerstone in the treatment of aSAH-related headaches if larger studies demonstrate similar findings.

CONCLUSIONS

Headaches in the acute phase of aSAH are often severe and difficult to manage. To reiterate, current guidelines advise multimodal pain management but do not make any specific recommendations. Although providers rely typically on opioids, steroids, acetaminophen, and antiepileptics, the efficacy of these medications in the setting of SAH is limited. Moreover, the risk of central nervous system depression and increased bleeding—particularly with opioids and NSAIDs—further constrain safe dosing options. Evidence has begun to emerge, however, that peripheral nerve blocks may provide effective pain management in this population. Our findings further demonstrate the need for large-scale studies to assess the efficacy and safety of peripheral nerve blocks for aSAH patients with refractory headaches.

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