Helmet-Induced Occipital Neuralgia in a Military Aviator

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- BACKGROUND: Headaches among military personnel are very common and headgear wear is a frequently identified culprit. Helmet wear may cause migrainous headaches, external compression headache, other primary cranial neuralgias, and occipital neuralgia. The clinical features and the response to treatment allow distinction between the different types of head-aches. Headaches among aviators are particularly concerning as they may act as distractors while flying and the treatment options are often incompatible with flying status.
 CASE REPORT: A 24-yr-old door gunner presented with suboccipital pain associated with the wear of his helmet. He described the pain
 - as a paroxysmal stabbing sensation coming in waves. The physical exam and history supported the diagnosis of primary occipital neuralgia. Systemic pharmacological options were discussed with the soldier, but rejected due to his need to remain in flying status. An occipital nerve block was performed with good clinical results, supporting the diagnosis of occipital neuralgia and allowing him to continue as mission qualified.
 - DISCUSSION: Occipital neuralgia can be induced by helmet wear in military personnel. Occipital nerve block can be performed in the deployed setting, allowing the service member to remain mission capable and sparing him/her from systemic side effects.
 KEYWORDS: headache, compression, neuralgia, military headgear.

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hile headaches in general are very common among the U.S. general population, occipital neuralgia carries a relatively low prevalence of 3.2 per 100,000.¹ Primary headaches such as migraine headache, tension headache, and cluster headache are easily recognized by clinicians, but occipital neuralgia often eludes diagnosis or is confused with tension headache because of its location. In the military environment occipital neuralgia and other primary headaches may be triggered by the use of military helmets.^{2,4} Although there are many treatment options for the treatment of primary headaches, some treatments are not available in the deployed setting, are not compatible with flight status, or are not practical. Advanced imaging is often not available in tactical environments and clinicians must rely on the history, physical examination, and response to treatment to arrive at a diagnosis. I hereby describe a case of a military aviator presenting with occipital neuralgia triggered by helmet wear and propose a treatment strategy compatible with flying status.

CASE REPORT

A 24-yr-old door gunner presented to a flight clinic in theater with new onset headache. Symptoms started 6 wk prior to presentation after he was issued a new helmet (Aircrew Integrated Helmet, HGU-56P). He described the pain as a stabbing sensation originating in the suboccipital region and radiating to the top of the cranium. The pain occurred in waves, often lasting several minutes at maximum intensity and persisting at lower intensity for several hours. He experienced some nausea with the pain and some numbness along the occiput. He noticed that the frequency and intensity of the pain was aggravated by wearing his helmet for a prolonged period of time and relieved when he was off duty (albeit still present). Attempts to fit the helmet better did not provide relief. He had tried acetaminophen without any relief. His past medical history was unremarkable. On examination his mentation, fundoscopy, cranial nerves, motor exam, sensory exam, cerebellar exam, and reflexes were all normal. There was mild tenderness upon palpation of the greater occipital nerve area.

The working diagnosis upon evaluating him in the clinic was occipital neuralgia. Treatment strategies were discussed with

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the patient, who requested therapies that would enable him to continue on flight status due to tactical mission requirements. A greater occipital nerve block was performed both for diagnostic and treatment purposes. An ultrasound-guided local injection with 2% lidocaine and 10 mg of triamcinolone was performed along the superior nuchal line medial to the occipital artery (identified by palpation and ultrasound). The patient was observed in the flight clinic for 15 min and discharged to his quarters in do-not-fly status for 12 h. Upon examination the next morning he indicated that his symptoms had completely resolved. He was returned to flying duties and remained symptom free for 3 mo, when he required a second injection.

DISCUSSION

Occipital neuralgia is described as paroxysmal pain in the distribution of the greater or lesser occipital nerves.^{1–3} Diagnostic criteria include pain in the occipital region, stabbing pain occurring in paroxysms, nerve tenderness upon palpation, and symptom relief with infiltration of a local anesthetic.^{1,2,6} Traditionally occipital neuralgia is classified as primary when it occurs in an isolated form, and secondary when it occurs associated with tumors, trauma, Chiari malformations, etc.¹ Occipital neuralgia is one of the many types of cranial neuralgias.

The greater occipital nerve emerges from the dorsal ramus of the second cervical nerve and provides innervation to most of the posterior scalp region. After originating in the neck, lateral to the lateral atlantoaxial joint and deep under the oblique inferior muscle, it travels in rostral direction over the surface of the rectus capitis posterior, turning dorsally to pierce the semispinalis capitis and ending laying deep in the trapezius. Slightly inferior to the superior nuchal line, the greater occipital nerve becomes subcutaneous, lying above an aponeurotic sling and medial to the occipital artery.^{1,3,6} In this area the nerve is susceptible to pressure injuries.

Compression headaches related to the wear of military helmets are well recognized in the literature. It is estimated that up to 30% of military personnel may suffer from headaches related to helmet use.⁴ Furthermore, headgear wear is one of the top 10 most common triggers of headaches among military personnel.⁵ Although typically the headache occurs following the wear of the helmet, in many individuals the headache persists after removing the helmet, suggesting a primary headache disorder aggravated/triggered by the use of the helmet. Compression headache is believed to originate from mechanical irritation of trigeminal or occipital nerve branches.² The most common type of headache seen in military personnel is migraine with aura, while occipital neuralgia constitutes approximately 6% of headaches encountered in the outpatient setting.⁵ External compression headache is a distinct type of headache triggered by wearing goggles, hats, or helmets and typically ceasing within 1 h of removing the external compression.² Our patient experienced classical symptoms of occipital neuralgia and obtained relief from an occipital nerve block, supporting the diagnosis of primary occipital neuralgia and not external compression headache.

There are multiple treatment options for patients with helmet-induced occipital neuralgia. Discontinuing helmet use is a reasonable option, but not feasible in the military setting. Pharmacological treatment for occipital neuralgia relies on the use of anticonvulsants, tricyclic antidepressants, and serotonin reuptake inhibitors.^{1,6} Unfortunately, those agents have serious side effects that are not compatible with flying status and with performing as a gunner. Local infiltration offers the advantages of confirming the diagnosis, offering prompt relief, and allowing the soldier to remain in flight status.^{1,3,6} The procedure is simple, safe, well tolerated, and can be performed either using anatomic landmarks or under ultrasound guidance.³ Theoretically the blind approach carries the risk of anesthetizing adjacent structures or injecting the occipital artery.^{3,6} A complication rate of 5-10% has been described when using anatomic landmarks, but most complications are minor and transient.³ In the deployed setting ultrasound may not be available and the procedure can safely be performed using anatomic landmarks. The patient is placed in the seated position with the head slightly flexed forward. The nerve is identified 2.5 to 3 cm lateral to the external occipital protuberance and medial to the occipital artery (easily palpated). The nerve is infiltrated with a 5-cc syringe and a 25-gauge needle using a mixture of an anesthetic agent (lidocaine or bupivacaine) with a steroid such as triamcinolone or betamethasone.⁶ After removing the needle, local pressure is applied to achieve hemostasis and bathe the nerve with the anesthetic.

Helmet-induced occipital neuralgia can be an incapacitating symptom for an aviator and can distract him from performing his regular duties. Traditional conservative treatments do not provide complete and immediate relief and pose the risk of grounding the aviator. Greater occipital nerve block can provide prompt symptomatic relief with a reasonable safety profile. The lack of systemic side effects makes it ideal for military personnel in flying status. Secondary causes of occipital neuralgia and external compression headache can be ruled out with a careful history and exam.

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