

Case Report

Acupuncture in the Management of Medication Overuse and Drug-induced Aseptic Meningitis Headache: A Case Report

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ABSTRACT

Headache disorders are burdensome, both in terms of the number of people they affect, and in terms of associated healthcare spending. This report presents a 36-year-old female admitted to a tertiary university hospital with a primary complaint of intractable headache, caused by a combination of medication overuse headache, and headache secondary to aseptic meningitis. During her hospital stay, opioid analgesic doses were initially increased without success in an attempt to control her headache. Despite multiple medication trials the patient's headache failed to improve. On day ten of her hospitalization, she underwent a thirty-minute acupuncture session which resulted in immediate relief of her headache. She received one more acupuncture treatment the following day and was discharged to an acute inpatient rehabilitation facility on a vastly reduced dose of opioids. Instructions on how to taper the remaining opioids were provided, and the patient was scheduled for outpatient acupuncture therapy sessions for further headache management. This report demonstrates the importance of recognizing acupuncture as a viable treatment option for medication overuse headache and for headache secondary to systemic diseases such as aseptic meningitis. Furthermore, acupuncture should also be considered as a non-pharmacological modality to be used when tapering a patient off of high doses of opioids.

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1. Introduction

Acupuncture has been used in the management of headaches with variable success. The best evidence of its effectiveness is for migraine headache [1–3]. Although the *International Classification of Headache Disorders 3rd Edition* includes multiple types of headaches, this case report presents a patient suffering from both medication overuse headache (MOH) and headache attributed to aseptic meningitis [4]. MOH is characterized by chronic headache owing to overuse of various analgesics and abortive headache medications. Overuse of abortive headache medications can

worsen headache symptoms and transform episodic headaches into chronic daily headaches [5].

Meningitis is the inflammation of the meninges of the brain and spinal cord. Aseptic meningitis presents with characteristic meningeal symptoms (fever, headache, neck stiffness, nausea, vomiting, and photophobia amongst others), however cerebral spinal fluid testing is negative for an identifiable bacterial pathogen and usually accompanied by a lymphocytic pleocytosis [6]. The most common causes of aseptic meningitis include viral infections, mycobacteria, spirochetes, fungi, malignancy, or can be drug induced. Drug-induced meningitis occurs either via direct meningeal irritation caused by intrathecal administration of drugs, or via hypersensitivity reaction after systemic administration [7].

Patients suffering from headaches are often treated with a multidrug regimen, both prophylactic and abortive. When standard pharmacologic agents fail to provide relief, physicians may resort to opioids. As in other chronic pain conditions, a multimodal approach has been recommended for therapy, which includes a number of

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nonpharmacological modalities such as cognitive behavioral therapy, massage, biofeedback, meditation, physical therapy, and acupuncture [8].

In light of the opioid epidemic, it is especially important to determine the role of nonpharmacologic modalities such as acupuncture in treating patients who have been using high doses of opioid analgesics for pain secondary to noncancerous conditions, and in patients who are being tapered to lower doses or completely off of opioid analgesics.

2. Case Presentation

A 36-year-old Caucasian female with past medical history of migraines, anxiety, and bipolar disorder, presented to a tertiary medical center with a primary complaint of headaches and low back pain that had been present intermittently for about a year but were worsening in intensity and frequency over the month preceding her admission. These headaches were associated with nausea, vomiting, photophobia, phonophobia, neck stiffness, low grade fevers, and low back pain. The headache intensity did not change with position nor were there any features of increased intracranial pressure such as changes in visual acuity, issues with balance, or increased intensity of headache with Valsalva. She had no history of receiving spinal injections for her low back pain. There was no history of traumatic brain injury, concussion, meningitis, encephalitis, or immunosuppression in this patient. Her family history was relevant for migraines in her mother. The patient, who previously worked as an aerobics instructor, began declining in functional ability over the 18 months preceding admission. In the three months preceding admission she had lost 30 pounds and was mostly bedridden requiring assistance from her husband who took family medical leave to help care for the family. The patient's home medications included lamotrigine 200 mg Per os (PO) daily for bipolar disorder and opioid analgesics for headache management. Approximately a month before admission, the patient's primary care provider was prescribing her oxycodone 20 mg at bedtime Pro re nata (PRN). However, over the course of a month, her opioid

regimen escalated to oxycodone immediate release 20 mg PO at bedtime PRN, oxycodone 10 mg q4h PRN, and oxycodone extended release 30 mg q12 h. The patient had trialed and failed a combination of acetaminophen, butalbital and caffeine (Fioricet) and sumatriptan in the past.

On initial physical examination, the patient was awake, alert and oriented times three. Her speech was fluent and cognition intact. She was applying ice packs to her head, neck and back, and mild neck stiffness was evident, with no other meningeal signs present. She had no focal neurological deficits.

On admission, the infectious disease team who was already seeing this patient in the outpatient setting, was consulted. Initial evaluation was notable for documented low-grade fevers up to 37.8°C, and leukopenia of 3.3×10^9 cells/L (normal = $4.0 - 10.4 \times 10^9$). A lumbar puncture was performed which was significant only for a lymphocytic pleocytosis, believed to be secondary to drug induced aseptic meningitis caused by lamotrigine. The patient reported having been on lamotrigine at the same dose for “years”. The infectious disease team noted that while this made implication of lamotrigine as the causal agent for aseptic meningitis more difficult, it was still a plausible explanation. Magnetic Resonance Imaging (MRI) and Magnetic Resonance Angiography (MRA) of the head and neck, and MRI of the lumbar spine, were all carried out and within normal limits.

On day five of admission, a consult was placed to the chronic pain medicine team as the patient was on high doses of extended release and short acting opioid analgesics without adequate pain relief. With the addition of breakthrough doses of oxycodone for additional pain relief, her total daily dose was 140 mg of oxycodone. The pain medicine team proposed that the patient's headache worsened from chronic opioid overuse, in addition to aseptic meningitis. It was the recommendation of the pain medicine team that the patient be tapered off of opioids, starting with discontinuation of oxycodone extended release 30 mg q12 h, and use of oxycodone immediate release 30 mg four times daily as needed. The primary team did make this change, however was unable to taper dosing owing to poor pain control, and continued to give the

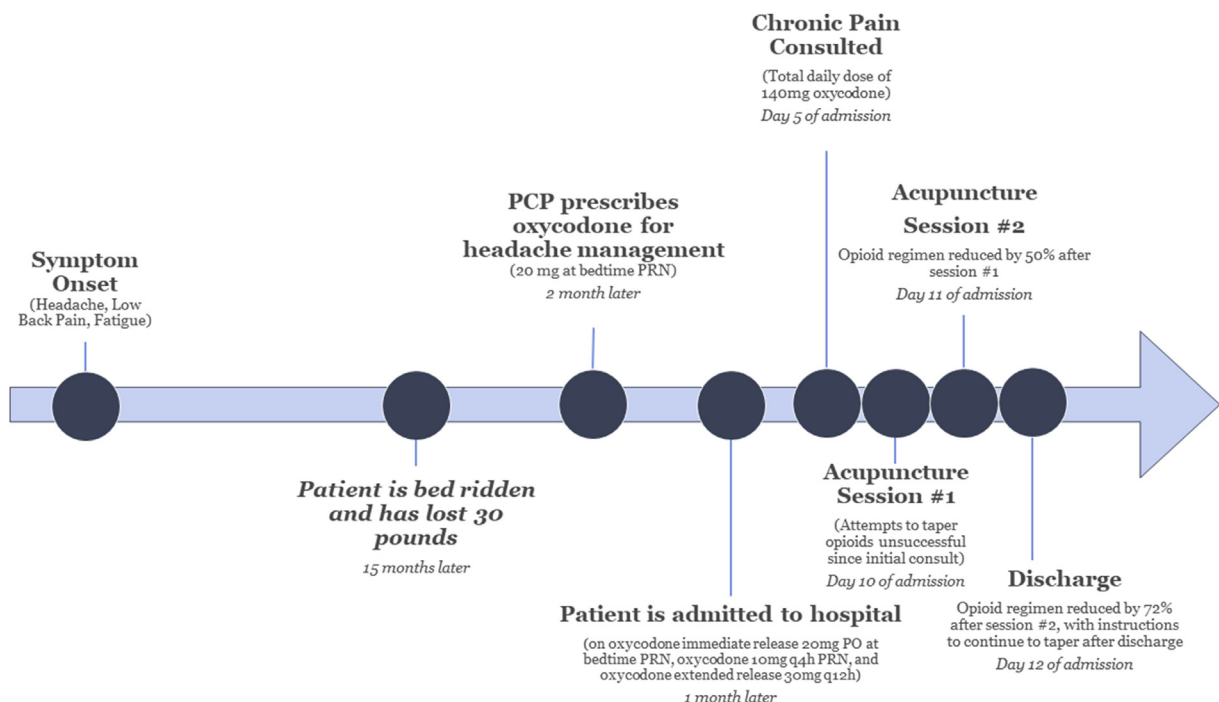


Figure 1. Timeline of management course.

patient additional breakthrough doses of narcotics. Finally, on day ten of admission a multidisciplinary team meeting was held in which the pain medicine team offered the services of a physician trained in acupuncture to the patient. The patient was agreeable to trialing acupuncture as she was unable to achieve any pain relief in spite of multiple medication trials.

At the beginning of the acupuncture session, the patient rated headache intensity at 10/10 with associated photophobia, phonophobia and nausea. The patient underwent a thirty-minute session with the following points stimulated with needles: First group: EX-HN1 point in four sites and EX-HN3 point at the glabella. Second group: BL10, LI4, GB20, GB44, GB2, and EX-HN5 on both sides. During this session, the patient's pain improved drastically from 10/10 to 1/10 and her photophobia resolved. She reported feeling tired after the procedure, however was more interactive with the staff and her family members. The following morning, the patient reported the best night's sleep she had had during the hospitalization and reported no headache. She underwent another 30-minute acupuncture session with the points aforementioned restimulated. Her opioid regimen was reduced by 50% after the first acupuncture session, and she was discharged home the following day, still headache free. At the time of discharge, her opioid requirement decreased by 72% from her prior baseline. Her discharge plan included instructions on how to taper the remaining dose of opioids, the discontinuation of lamotrigine, and follow-up for repeat acupuncture treatments in the outpatient setting (Fig. 1).

3. Discussion

According to the World Health Organization global burden of disease, headache disorders rank as the leading cause of years lived with disability worldwide [9]. In the United States, about one in six Americans are affected by at least one migraine and/or a severe headache of a different etiology over a three-month period. These disorders are a public health concern owing to prevalence, associated disability, and financial cost [10]. Treatment for headaches often involves the use of analgesics and abortive antimigraine drugs. The frequent use of analgesics or antimigraine drugs for primary headache syndromes may then lead to a MOH, which is a secondary headache syndrome [11]. In light of the opioid epidemic, the U.S. Food and Drug Administration (FDA) now recommends consideration of nonpharmacologic options for pain control in patients on high doses of opioid analgesics, and for those whose pain and ability to function are adversely affected by opioid use [12].

Acupuncture has been used in China for two thousand years as a nonpharmacologic treatment of headaches. Our patient underwent manual acupuncture, in which acupuncture needles are inserted into acupoints followed by manipulation of the needles up and down by hand [13]. Although mechanisms of analgesia from acupuncture are still being studied, multiple mechanisms have been proposed: poststimulatory sympathetic inhibition, stimulation induced release of endogenous opioids, and deformation of localized tissue eliciting a systemic response [14–16].

In the presented case, the patient had tried and failed antimigraine medications, and was requiring opioids for migraine headaches. Her headache symptoms became more frequent as time progressed, and she was subsequently diagnosed with MOH. This case supports the existing data in showing that the use of non-opioid and opioid analgesics and antimigraine agents, intended to provide relief, can contribute toward the global burden of headache disorders. Therefore, it is imperative that we consider alternative nonpharmacologic methods of treatment, such as acupuncture. Studies have shown acupuncture in particular to be safe, cost-effective, and successful in cases of opioid abuse and overuse [17]. In this case, acupuncture resulted in the dramatic improvement of

the patient's condition and decreased her opioid requirement by 50% within 24 hours of the first acupuncture session. The use of nonpharmacologic therapies in place of opioids can help lessen the health-care burden that the opioid crisis has caused. A second etiology potentially contributing toward this patient's headaches was aseptic meningitis secondary to lamotrigine use. Given that the patients symptoms completely resolved following manual acupuncture, it may be worthwhile to not only further investigate the use of acupuncture in MOH, but also in headache symptoms secondary to systemic diseases, such as aseptic meningitis.

Declaration of competing interest

No financial or personal conflicts of interest exist for the authors of this case report. All authors contributing to this paper have never submitted this manuscript, in whole or in part, to other journals.

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