Injection Therapy for Headache and Facial Pain

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KEYWORDS

• Headache • Migraine • Injection • Local anesthetic • Onabotulinum toxin

KEY POINTS

- Injection therapy for peripheral nerve blockade is an increasingly viable treatment option for selected groups of patients with headache and facial pain that are refractory to medical therapy.
- Treatable headache types with injection therapy include chronic migraine, tension-type headache, chronic daily headache, cluster headache, occipital neuralgia, cervicogenic headache, trigeminal neuralgia, hemicrania continua, and even post–lumbar puncture headache.
- Injection therapies are conveniently administered in office appointments, with initial relief usually apparent before the patient leaves the clinic.
- Injection sites considered for anesthetic blockade include greater occipital nerve, lesser occipital nerve, auriculotemporal nerve, supraorbital supratrochlear nerves, infraorbital nerves, sphenopalatine ganglion, cervical facet and spinal nerve roots, and trigger point injections.
- Multisite onabotulinum toxin injections are increasingly used and effective for chronic migraine, and potentially other headache types pending further investigation.

INTRODUCTION

Despite the variety of acute and prophylactic pain-relieving medications that are often efficacious for headache and facial pain disorders, certain patients experience intolerable side effects to these agents. In others, the remaining pharmaceutical approaches may be too hazardous as a result of comorbid factors including psychiatric conditions, vascular disease (cardiovascular, cerebrovascular, or peripheral vascular disease), hepatic disease, or renal disease. Often these conditions involve the use of long-term medications that could interact negatively with pain-relieving agents. Other complicating contexts include transient contraindications, such as pregnancy, to regimens that are already established and effective for a given patient. In many of these patients, medical therapies simply prove insurmountable. In addition, there is a subgroup of patients who are simply refractory to traditional modes of therapy.[1]

Peripheral nerve procedures, such as nerve blocks, can be dramatically effective for many of these patients and should always be included in the management repertoire. Peripheral nerve blockade for pain suppression is based on the ability of low concentrations of local anesthetics (LAs) to selectively block sensory fibers in mixed nerves. Ideally, motor function is spared or at least minimally affected. The duration of the block depends on the dose and the pharmacokinetic properties of the particular LA, but in practice one commonly observes a longer duration of benefits than expected. Blockade of

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several nerves in the head and neck can also produce beneficial effects in pain syndromes involving regions outside of the territory served by these nerves. This result is often explained by the concept of convergence in the nociceptive system of the head and neck (discussed later), although not all observations are accounted for by this mechanism.

There is unfortunately a shortage of controlled studies on the effectiveness of LA procedures for headache and facial pain, and these procedures often carry a significant placebo effect.[2] Nevertheless, a large number of patients with facial pain and headaches (described by the International Classification of Headache Disorders[3]) obtain significant benefit from nerve block procedures, which are describe here.

CLINICAL CONDITIONS TREATED WITH INJECTION THERAPY

Injection therapy is a versatile tool in clinical practice, efficacious for diverse etiologies of facial pain and headaches. For instance, multiple painful cranial neuropathy conditions, such as trigeminal neuralgia and occipital neuralgia, are alleviated by such techniques as infraorbital nerve blockade, or blocking one or more of the occipital nerves. This tactic could extend to treatment of musculoskeletal syndromes whose painful foci may lie among the distributions of similar nerves. Alternatively, direct trigger point injections of the affected areas are effective, such as in temporomandibular joint dysfunction or myofascial pain syndrome.

We foresee an increasing number of patients using injection therapy in clinical practice in the coming years, particularly for headache disorders. This is in part from the slow build of clinical trials providing sound evidence for anesthetic blocks and even onabotulinum toxin A (Botox) injections in refractory headache conditions. These include chronic migraine, tension-type headache, chronic daily headache, and cervicogenic headache. Other debilitating conditions, such as cluster headache, hemicrania continua, and even post–lumbar puncture headache, can also be alleviated with certain injection therapies. In addition, some patients may suffer from mixed etiologies (eg, chronic migraine exacerbated by occipital neuralgia). The etiologic versatility of nerve block treatments could be particularly useful in treating these otherwise convoluted cases.

The bulk of this article is dedicated to describing the evidence for treating these conditions under the corresponding injection therapies techniques.

OVERVIEW OF PHARMACOLOGY

LAs chemically are weak bases, produced as salts to promote stability and solubility, and have hydrophilic and lipophilic components. They inhibit neural activity (neuropathic pain signaling) by interfering with sodium and potassium currents, preventing depolarization.[4] The ester LAs (including procaine and cocaine) were discovered and used first, although they are slightly more allergenic and shorter acting than amide LAs. The amide LAs are relatively hypoallergenic and well tolerated, hence their current prevalence in clinical practice. These include prilocaine, lidocaine, mepivacaine, and bupivacaine (listed in increasing order of anesthetic effect duration). The first three have similar potency (approximately one-quarter that of bupivacaine) and mid-range duration of action. Lidocaine in 1% solution is the most common choice, with an onset of action at around 4 to 8 minutes after injection and duration of about 1 to 2 hours. Bupivacaine in 0.25% or 0.50% solution offers more prolonged action, with an onset in about 8 to 12 minutes and duration between 4 and 8 hours. Many clinicians choose to combine lidocaine with bupivacaine in a mixture.

Epinephrine-containing LA formulations come with their own potential side effect profile and they are neither necessary nor recommended for nerve blocks. Alternately, some practitioners add a corticosteroid medication to the injected solution, often triamcinolone (Kenalog) or methylprednisolone (Depo-medrol). Some studies suggest efficacy of local steroid injections for cervicogenic headache and potentially migraine or cluster headaches,[5,6] although some results are mixed or are occasionally questioned in methodology. A more recent double-blind randomized controlled trial[7] found no significant difference from steroids on transformed migraine severity in the short- or long-term. Local corticosteroid injections also bring a host of additional potential side effects, such as slow injection site healing, alopecia, or cutaneous atrophy (lipoatrophy) at the injection site (particularly with triamcinolone, which can be mitigated by using methylprednisolone or betamethasone).[8,9] Although rare, even systemic effects embodying Cushing syndrome have been reported after serial injections.[10]

MECHANISMS OF NERVE BLOCK EFFECTS IN PRIMARY HEADACHE AND FACIAL PAIN DISORDERS

LAs seem to attenuate pain-transmitting neural signals, which are often carried by nociceptive C