



Non Cosmetic Application of Botox in Head and Neck

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Abstract

Botox, or botulinum toxin, has garnered significant attention for its versatile applications in the field of head and neck medicine. This neurotoxin, derived from *Clostridium botulinum*, exerts its effects by inhibiting the release of acetylcholine at the neuromuscular junction, leading to muscle paralysis. In recent years, Botox has been utilized in various therapeutic procedures. Botox injections in the head and neck region have shown promising results in various applications. In this article, we discuss few therapeutic applications of Botox.

Keywords: Botox; Head; Neck; Medicine

Abbreviations: ONA: Onabotulinumtoxin A; HFH: Head and Forehead Hyperhidrosis; AACG: Acute Angle Closure Glaucoma.

Introduction

Botox, or onabotulinumtoxin A (ONA), has multiple uses for both cosmetic and non-cosmetic purposes in the head and face. It is widely studied and approved for various therapeutic treatments, including wrinkle correction, hyperhidrosis, temporomandibular disorders, migraines, and overactive bladder [1,2]. The range of uses for Botox in the head and neck has expanded enormously, including applications in laryngeal, pharyngeal, cervical, oromandibular, and facial muscles, as well as salivary glands [3]. New formulations of Botox have also become available, with different durations and onset of action [4]. It is a safe and effective treatment option with a diverse portfolio of clinically accepted applications [5].

Materials and Methodology

A systematic search of relevant literature was conducted using electronic databases including PubMed, Google Scholar, and Scopus. The search terms used were "botox," "botulinum toxin," "therapeutic," "medical," "noncosmetic," "head and neck," "cervical dystonia," "chronic migraine," "sialorrhea," and "hemifacial spasm". Boolean operators (AND, OR) were employed to refine the search results. These, included, lot many review articles, in vitro studies, in vivo studies and case reports as well. The collection and compilation of the data has been produced here in the best possible manner.

Mechanism of Action

Botulinum toxin (Botox) works by blocking the release of acetylcholine from the cholinergic nerve end plates, leading to inactivity of the muscles or glands innervated in the head and neck [6-9]. It inhibits the neurotransmitter release by cleaving SNARE proteins in the cytosol of peripheral nerve

terminals [10]. This unique mechanism of action allows Botox to specifically target and paralyze the muscles or glands it is injected into, resulting in therapeutic benefits for various head and neck disorders.

Applications of Botox

Migraine: Botox injections can significantly reduce the frequency and intensity of chronic migraines by targeting specific headache-triggering muscles, providing relief to sufferers [11-13]. The use of botulinum toxin type A (BoNT-A) in patients with chronic migraine has been shown to reduce the frequency of pain episodes and alleviate symptoms [14]. Studies have confirmed the effectiveness and safety of BoNT-A in clinical practice, making it the drug of choice for the treatment of chronic migraine [15].

Cervical Dystonia: Individuals grappling with cervical dystonia, a condition marked by involuntary neck muscle contractions, find reprieve through Botox injections. These injections help ease muscle tension, mitigating pain and restoring comfort [16]. Physiotherapy is also mentioned as an adjunctive treatment to improve the symptoms of cervical dystonia, including pain, function, and quality of life [17]. Comprehensive rehabilitation, including exercises, manual therapy, biofeedback, and other modalities, can alleviate disability caused by dystonia and improve the patient's independence and quality of life [18]. Botulinum neurotoxin injection is considered the treatment of choice for cervical dystonia, with different muscles being targeted based on individual patient assessment [19]. Pain in cervical dystonia may have muscle-based and non-muscle-based mechanisms, and botulinum toxin treatment should consider pain as a core symptom in addition to motor problems [20]. Repeated injections of botulinum toxin for cervical dystonia remain beneficial for patients over several years of therapy, with mild side effects that are usually short-lasting.

Hyperhidrosis: Botox injections have been shown to be effective in treating hyperhidrosis in the head and neck area, providing relief from excessive sweating. Studies have demonstrated the benefits of botulinum toxin type A (BTX-A) therapy for head and forehead hyperhidrosis (HFH) [21]. BTX-A therapy has been found to significantly reduce sweating and improve patients' quality of life, with effects lasting for approximately 30-36 weeks [22,23]. The treatment is safe, with minimal side effects such as transient mild ptosis [24].

Radiation Induced Salivary Gland Disorders: Botox administration in the salivary glands before radiation therapy has been shown to be safe and effective in alleviating radiation-induced sialadenitis in head and neck cancer patients. Studies have demonstrated that Botox injections into the salivary glands can reduce saliva secretion [25,26], decrease salivary flow following radiation therapy [27], and potentially minimize complications in patients

undergoing intraoral reconstruction [27]. Additionally, the use of botulinum neurotoxin A (BoNT-A) injections in the parotid glands has been linked to a reduction in salivary production and the closure of pharyngocutaneous fistulas in post-radiation therapy salvage surgery cases [28]. Furthermore, high-dose BTA injections into salivary glands have been explored as a protective measure against sialotoxic radioligand cancer therapies, showcasing safety and tolerability [29].

Laryngeal Disorders: Botulinum toxin injections have shown efficacy in treating various conditions in otolaryngology-head and neck surgery, including vocal fold granuloma, mutational falsetto, bilateral vocal cord paralysis, and spasmodic dysphonia [30-32]. Additionally, in cases of bilateral vocal cord paralysis, botulinum toxin injections into the thyroarytenoid muscle have been effective in improving ventilation without compromising voice or swallowing functions [33].

Glaucoma: The efficacy of botulinum toxin injections in treating iatrogenic entropion in primary open-angle glaucoma patients has been explored, showing significant improvements in most cases [34]. Furthermore, botulinum toxin type A injections have been found to be effective and safe for managing intractable periorbital pain following acute angle closure glaucoma (AACG) attacks, with sustained relief for up to 3 months [35].

Hemifacial Spasm: Hemifacial spasm sufferers find solace in Botox injections, which effectively diminish involuntary muscle contractions on one side although there are complications. The two treatments routinely available are microvascular decompression and Botulinum Toxin type A muscular injections [36].

Conclusion

Botox represents a valuable therapeutic tool in the management of various head and neck conditions. Its ability to selectively target overactive muscles provides relief for patients suffering from migraines, bruxism, cervical dystonia, and other neuromuscular disorders. Continued research into novel indications and optimization of treatment protocols will further enhance the utility of Botox in the field of head and neck medicine, ultimately improving patient outcomes and quality of life.

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