

Cosmetic use of botulinum toxin type A in the elderly

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Abstract: Botulinum toxin type A injections are one of the most popular cosmetic procedures for diminishing the appearance of facial lines caused by habitual facial muscle contractions. Although the manufacturer's labeling recommends botulinum toxin only for the treatment of glabellar lines among adults younger than 65 years of age, there is widespread use of the toxin for other cosmetic purposes and for patients who may be older than 65. Evidence-based safety and efficacy data on botulinum toxin use in elderly patients is limited. However, given the age-related skin changes and multifactorial causes of wrinkles in the elderly, as well as the higher risk for potential side effects due to concomitant diseases and medications, a careful risk-benefit assessment should precede the decision to use botulinum toxin in the elderly patient.

Keywords: Botox Cosmetic, botulinum toxin, facial wrinkles, aging

Introduction

Injections of botulinum toxin type A (BTX-A, Botox Cosmetic, Allergan Inc, CA, USA) have become one of the most popular cosmetic procedures worldwide (Pitman 2005). In the US, more than 2.2 million cosmetic injections were reported in 2003, only a year after it received Food and Drug Administration (FDA) approval for treatment of glabellar lines (Batra et al 2005). Today it is the most common cosmetic procedure performed in the US (Wise and Greco 2006). In contrast to other products used for cosmetic procedures, BTX-A is minimally invasive, relatively easy and quick to administer, has a relatively immediate and noticeable effect and a quick recovery period, and is often more affordable than other cosmetic treatments (Klein 2004). Alternative procedures involve the use of injectable fillers (eg, silicone, collagen), resurfacing techniques (eg, dermabrasion, chemical peels, laser resurfacing), and surgery, which may lead to serious and permanent adverse effects, eg, photosensitivity, scarring, surgical morbidity, and involve a long recovery period (Lemperle et al 2001; Cather et al 2002).

BTX-A is a neuromuscular blocking agent that works by producing transient, dose-dependent, focal weakening of the facial muscles involved in expressions that lead to a tired, disapproving or aged look, such as frowning or wrinkling the forehead (Klein 2004; Carruthers et al 2004). The ideal candidates for BTX-A injections are men and women between 40 and 60 years of age whose facial wrinkles are primarily caused by repeated, habitual muscle contraction over time (Allergan PI 2005). Despite the manufacturer's labeling for the use of BTX-A in adults younger than 65 years of age, there have been anecdotal reports of BTX-A use in older patients. However, there is little published information on the efficacy and safety of BTX-A for cosmetic reasons in this population.

Prior to its use for cosmetic reasons, local injections of BTX-A were successful in treating other disorders characterized by inappropriate and excessive muscle contraction, such as dystonia, blepharospasm, and spasticity (Cote et al 2005).

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Pharmacology

BTX-A is one of eight potent botulinum toxin serotypes produced by the bacteria *Clostridia botulinum*, a Gram-positive spore-forming anaerobe. Commercially available BTX-A is a purified and diluted form of the neurotoxin. Following injection into a muscle, BTX-A binds to the presynaptic nerve terminal and selectively blocks the release of acetylcholine at the neuromuscular junction, thereby preventing muscle contraction. The effect is temporary and reversible following the sprouting of new axons and development of extrajunctional acetylcholine receptors over time. Motor function is typically restored in approximately 3–6 months. Acetylcholine synthesis and storage are not affected (Frampton and Easthope 2003; Klein 2004; Allergan PI 2005).

BTX-A is most effective for wrinkles that form because of muscle contraction, where weakening of the muscle smoothes and flattens the overlying skin. After a BTX-A injection, an improvement in appearance occurs within 1 to 14 days, peaks at approximately 4 weeks, and begins wearing off after 10–12 weeks; therefore, a repeat injection approximately every 3–4 months is necessary to maintain the cosmetic effect of BTX-A (Klein 2004; Allergan PI 2005). BTX-A is not effective for facial wrinkles caused by mechanisms other than muscle contraction, such as sun damage, environmental pollutants, or subcutaneous soft tissue atrophy.

Because BTX preparations vary in potency, commercially available botulinum toxins, including Botox Cosmetic, Dysport (Ipsen LTD, Slough, UK), and Myobloc (Elan Pharmaceuticals, San Francisco, CA, USA), are not interchangeable.

Uses

Cosmetic uses for botulinum toxin include treating the vertical lines between the eyebrows (glabellar lines) and on the bridge of the nose, squint lines or crows feet at the corners of the eyes, forehead horizontal lines, periorbital lines and nasolabial folds around the mouth, and the thick platysmal bands around the neck, also known as “turkey neck” (Blitzer and Binder 2002; Carruthers et al 2004; Klein 2005). The recommended dose for glabellar lines is 20 units distributed among 5 injection sites; however, the dosing is often individualized according to the location and size of the muscle as well as the depth of the wrinkle. The BTX-A doses used for cosmetic purposes are much lower than those used in therapeutic cases (Allergan PI 2005).

Considerations in the elderly

It is difficult to tell for sure whether patients over the age of 65 respond differently to BTX-A than younger patients;

there have been no studies investigating cosmetic uses of BTX-A specifically in the elderly, and there have not been enough elderly patients enrolled in clinical studies to make any meaningful comparisons (Allergan PI 2005). However, since the elderly are more likely to have thinner and less elastic skin, weaker facial muscles, and wrinkles that over time are caused by gravity-induced tissue sagging rather than muscle contraction, the elderly are not expected to respond as well to BTX-A treatment (Norman 2003; Rhodes et al 2003). BTX-A may help soften wrinkles that are noticeable even without muscle contraction, but additional resurfacing procedures are often needed to lead to visible differences in the appearance of the wrinkle (Patel et al 2004).

The site of injection also warrants special considerations in the elderly. Treatment of forehead lines, for example, would require injections to the frontalis muscle, which many older people use to raise their eyebrows and eyelids to see. Older patients may also have extra skin under the brow (pseudoptosis) which could be worsened by BTX-A treatment. Older patients who receive BTX-A for glabellar lines may be more at risk for complications such as eyelid ptosis if they have a reduced or absent orbital septum (Fagien 2003; Klein 2004; Carruthers et al 2004).

Because of their delicate skin, older patients are also more susceptible to bruising from BTX-A injections. The risk for bruising is even greater among patients taking medications that inhibit clotting, such as vitamin E, aspirin, nonsteroidal antiinflammatory drugs, and herbal products such as ginseng, ginko biloba, and garlic. Many physicians advise avoiding these medications and products 10–14 days prior to treatment. A full medication and supplement history should be obtained from all patients prior to receiving BTX-A. This is particularly important for elderly patients, who are more likely to be taking multiple medications or supplements (Rhodes et al 2003; Klein 2004; McLean and Le Couteur 2004).

Conservative dosing, injection of low volumes, and proper placement of the injection can reduce the possibility of spread of the toxin to unintended muscles. Electromyographic guidance may be helpful in selecting the appropriate muscles for injection (Klein 2004; Carruthers et al 2004; Vartanian and Dayan 2005). The manufacturer recommends starting at the lowest possible effective dose for elderly patients (Allergan PI 2005).

Safety

The most common side effects are related to the injection technique and include local redness, bruising, swelling, and mild pain (Allergan PI 2005). These side effects can be

reduced by using proper injection techniques and conservative dosing. Patients who have severe wrinkles (which require a higher dose of BTX-A) or who have altered facial anatomy, and those with pre-existing neuromuscular disease are more at risk for complications. Other side effects include eyelid ptosis, focal facial weakness, and headache. Serious adverse events included dysphagia, flu-like symptoms, and hypersensitivity reactions. Complications that result from weakened muscles adjacent to the injection site are due to the diffusion of toxin to unintended muscles; this may be minimized through proper injection technique (Klein 2004; Naumann and Jankovic 2004; Batra et al 2005; Vartanian and Dayan 2005).

Topical anesthetics applied prior to injection, use of smaller gauge needles, slow injection, small doses, and application of ice immediately after injection can help minimize pain and discomfort following BTX-A injections. Many physicians encourage patients to remain upright for 3–4 hours after the procedure, avoid massaging the treatment area, and actively contract the injected muscle to encourage the uptake of toxin by the intended muscles (Carruthers and Carruthers 1998; Carruthers et al 2004; Klein 2004).

Proper dilution, storage, and handling of BTX-A are also essential for minimizing adverse outcomes (Cote et al 2005).

BTX-A should not be used in patients who are pregnant, nursing, or have neuromuscular disease. Patients taking medications that could potentiate the effects of BTX-A should also not receive BTX-A. Examples of these medications include aminoglycosides, quinidine, and anticholinesterases. BTX-A is also contraindicated in the presence of infection or inflammation at the injection site and in patients with known hypersensitivity to BTX-A or any ingredient in the formulation (Allergan PI 2005).

Reports of serious cardiovascular events, including arrhythmias, have been reported in post-marketing surveillance of adverse events related to the cosmetic uses of BTX-A. The incidence was 2.8% (1/36) for serious arrhythmia and 5.6% (2/36) for any serious cardiovascular event. In many of these cases the patients had preexisting cardiovascular risk factors that may have been related to the adverse event. Nevertheless, BTX-A should be used with caution in patients with cardiovascular comorbidities, which are more common among the elderly (Wenge 2000; Cote et al 2005).

Conclusion

Physicians should consider the suitability of BTX-A for elderly patients, taking into account the etiology of their

wrinkles, skin fragility, facial anatomy, concomitant medications and medical conditions, risk of adverse effects and the likelihood of treatment benefit. Although BTX-A has a low perceived risk of side effects, older patients may be more susceptible to these effects. The benefit from BTX-A treatment is also questionable since wrinkles in older people are more likely to be caused by factors other than repeated muscle contraction. Precautions such as obtaining a full medication and medical history, beginning with low doses, and proper injection technique are especially important for optimal outcomes in elderly patients who are deemed to be good candidates for BTX-A cosmetic injections.

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