alcohol abuse, or any form of liver injury, the amount of acetaminophen is limited to 2 grams.

The MMS POP control regimen, as described above, is effective in our practice, allowing for protocol-driven pain control regimens and optimizing pain relief for our patients. Each medication we use has a specific role. The use of this regimen has helped us avoid potential unwanted side effects and increased analgesia throughout the postoperative period. As we look ahead, we hope to continue to refine our pain regimen with the goal of optimizing pain control while prioritizing patient safety and patient satisfaction.

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The authors have indicated no significant interest with commercial supporters.

First Reported Case of Neuromodulator Use in a Patient Who Received the Botulinum Vaccine

In 1965, the CDC created an investigational pentavalent botulinum (A-E) toxoid that was used to vaccinate workers who were in contact with the *Clostridium* species. The pentavalent botulinum vaccine was discontinued in November 2011 because there was a concern for declining potency.[1] In this report, we describe the first case in the literature of a patient receiving treatment with a neuromodulator after being immunized with the pentavalent (A-E) botulinum vaccine.

There are 7 serotypes of botulinum neurotoxins (A-G),[2] with the common neuromodulators such as onabotulinum toxin (Botox) and incobotulinum toxin (Xeomin) being a formulation of botulinum toxin Type A (BoNT-A). The botulinum toxin is synthesized from the anaerobic gram-positive bacteria, *Clostridium botulinum*. Unlike onabotulinum toxin or any other commercially available BoNT-A, incobotulinum toxin is free of complexing proteins and should not promote the development of neutralizing antibodies.[3] In fact, the complexing proteins offer no therapeutic effect; however, it can result in the generation of antibodies and therapy failure.[4] These hemagglutinins could result in the generation of antibodies and therapy failure according to some immunization studies.[5] Therefore, the lack of proteins in incobotulinum toxin may prevent the formation of antibodies to incobotulinum toxin. Herein, we report the first case of cosmetic neuromodulator use in a patient who previously received the botulinum vaccine.

A 39-year-old female patient presented to the clinic desiring cosmetic treatment of glabellar rhytides. She never received treatment with a neuromodulator before this office visit. She reported receiving 3 rounds of the botulinum vaccine in 2005 and a subsequent booster in 2006, as was required due to her biodefense work. Although she was informed that she might not respond to cosmetic treatment with a neuromodulator given her past vaccination, she decided to move forward with the treatment. A 100-unit vial of onabotulinum toxin (Botox Cosmetic) was diluted with 5 mL of 0.9% sodium chloride resulting in a dilution of 2 units of neuromodulator for every 0.1 mL. During the initial visit, the patient received 14 units of onabotulinum toxin to her glabella. On physical examination at a follow-up visit 2 weeks later, the patient exhibited full movement of her corrugators and procerus muscles (Figure 1). She only noted slight resistance to movement that lasted a few days after the onabotulinum toxin injection; however, regular movement returned shortly. At her request, repeat treatment was performed but with incobotulinum toxin (Xeomin) instead of onabotulinum toxin. The same dilution and protocol were applied to the same anatomic location. Two weeks after the treatment, the patient reported the full movement of the glabella again.

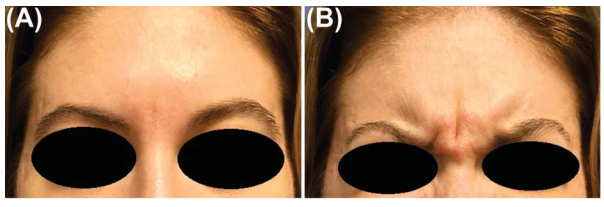

Figure 1. (A) Photograph showing the patient's corrugators at rest and (B) while active 2 weeks after treatment with onabotulinum toxin.

Discussion

This is the first report of neuromodulator use to treat glabellar rhytides on a patient who was previously immunized with a botulinum vaccine. We found that neither onabotulinum toxin nor incobotulinum toxin was effective in this patient with previous botulinum vaccination. This suggests that in patients with a history of botulinum vaccination, alternative methods to treat facial rhytides should be used. After neuromodulator treatment, paresis should occur within 3 to 7 days, with effects lasting 2 to 3 months. In this case, the patient had minimal paresis of her corrugator and procerus muscles. It can be hypothesized that neutralizing antibodies to BoNT-A were developed after immunization with the pentavalent botulinum vaccine. An annual booster was recommended by the CDC in 2004; however, this person resisted therapy even without a booster in over 10 years. Given that the patient had been vaccinated over 10 years ago, it was our hope that her antibody titers were low enough that the neuromodulator would still be effective. Although it may be helpful to test the serology of patients with a similar history for the presence of neutralizing antibodies before the treatment with BoNT-A, no commercially available test exists.

Conclusion

Our case illustrates 2 novel points. The first is that neither onabotulinum toxin nor incobotulinum toxin is effective for treating rhytides in patients who previously received the botulinum vaccine. Second, antibodies from the botulinum vaccine remain more than 10 years after vaccination.

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E. Graber is a consultant for Allergan and Medscape. The remaining author has no conflicts of interest to disclose.

Accidental Subcutaneous Injection of Mercury

Mercury is a heavy metal that is in liquid form at room temperature. Mercury is used in some medical equipment such as thermometers and sphygmomanometers, and in some pesticides.[1] Exposure to the mercury can be by inhalation, ingestion, or injection. Self subcutaneous injection of elemental mercury is so rare. It is typically used for suicide or to increase athletic or sexual performance.[2] Exposure by subcutaneous injection of mercury mostly does not cause systemic poisoning. In this article, we reported a case of subcutaneous injection of mercury without the clinical signs of systemic poisoning.

A previously healthy 43-year-old man presented 5 days after a mistaken subcutaneous injection of elemental mercury into his right second finger (Figure 1). The range of motion of the distal and proximal joints was minimal distinct on examination. The capillary refill was intact. X-ray of the right hand showed diffuse punctate lesions on the second finger middle phalanx soft tissue area (Figure 2). Computerized tomography confirmed metallic foreign body spreading from the injection point (Figure 3). There was no clinical evidence of the mercury poisoning. A blood sample was obtained from the patient for detecting mercury levels. The mercury level was found to be 4 μgr/dL (A normal maximum 10 μgr/dL). The patient consulted with our national poison center. He was taken to the operating room immediately, and the subcutaneous tissue of the injection area was excised by a plastic surgeon. The Pathologic study showed necrosis and the driblets of mercury. After 1 week, the amount of mercury on the x-ray decreased (Figure 4).

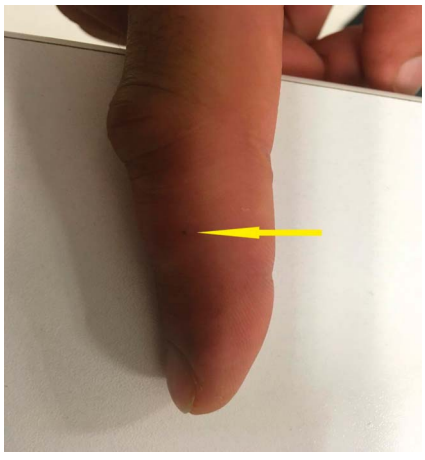

Figure 1. The injection site with minimal edema.