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Palmar hyperhidrosis. Needle free anesthesia as an alternative to Bier's block and peripheral nerve blockade for botulinum toxin therapy

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To the editor:

I read with great interest the article on palmar hyperhidrosis (HH) by Ponce-Olivera RM et al [1] where they compare the Safety and efficacy of Bier's block and peripheral nerve blockade for botulinum toxin therapy. As stated by the authors, the Bier's block technique can induce side effects as toxic reactions (passage of the anesthetic into systemic circulation) and pain related to needle prick [2] and on the other hand, repetition of nerve blockage can increase the risk of neural injury caused by mechanical or chemical damage [3].

Needle-free anesthesia prior to palmar HH treatment with BTX-A has emerged as a new technique that may offer new hope for palmar and plantar HH sufferers [4]. The majority of recent research has demonstrated less painful injection with needle-free jet devices compared to traditional needle delivery [5]. Needle-free devices are used to inject all types of liquid (anesthetics, corticosteroids) by painless intradermal projection without the use of a needle or contact with the patient's skin. They penetrate skin with high-pressure fluid.

The MED-JET® MBX (Fig. 1) is a relatively low pressure device that has been recently approved by Health Canada and FDA approval is pending. Lidocaine is directly injected with this device through a small orifice which is four times smaller than a 30 G needle. Each needle free lidocaine injection forms a subepidermal wheal which allows subsequently the introduction of BTX-A with needle in a totally painless way. Reconstitution of BTX-A with lidocaine does not jeopardize toxin potency [6].

Figure 1

The Med-Jet MBX by MIT Canada

Heckmann et al. have suggested that intradermal rather

than subcutaneous injections of Botox may reduce the incidence of significant muscular weakness [7] and Pearson and Cliff found that pain was significantly greater with intradermal injections (mean score 67) than with subcutaneous injections (mean score 42) [8]. This means that in order to avoid pain during BTX-A injection for palmar HH, the needle should be placed deeper in the subcutaneous tissues, but because deeper injection may increase the risk of muscle weakness, subepidermal injection should be the preferred option. According to Saadia et al. up to 77 percent of patients who received 100 U and 45 percent of those who received 50 U of BTX-A for palmar HH reported hand weakness [9].

The device is prepared by adjusting the volume per spurt to 0.02 mL (range 0.01-0.3 mL). The pressure system is set to 130 psi and a first injection is performed at the center of the palm. If a superficial skin wheal fails to appear, pressure is raised by increments of 10 psi, until a lidocaine wheal is formed. Once the wheal is formed, injections are continued evenly at 1.5 to 2 cm intervals over the whole palmar surface including the fingers. The anesthetic wheals, besides providing analgesia, they also map out the BTX-A injection sites. The average dose of 2 percent lidocaine without epinephrine used for one hand is about 1 mL (50 sites x 0.02 mL) much less than the amount needed with conventional wrist nerve blockade.

It is assumed that the spatial three-dimensional reconstruction of the injected liquid has a bulb shaped distribution with the broad side facing the muscle fascia and the narrow side underneath the epidermis (Fig. 2) [10].

Needle-free injection of lidocaine prior to BTX-A injection with needle is a relatively faster technique which takes 15 to 20 minutes per hand compared to the peripheral nerve blockade which necessitates up to 90 minutes to treat a single hand [11], another reason that deters many physicians from using it to treat palmoplantar HH.

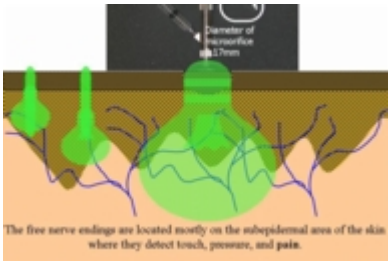

Figure 2

Diagrammatic representation of the anesthetic wheal

Sterilization of the device is achieved by autoclaving the metal component of the device at 134° C for 30 minutes and cold sterilization of the plastic component, similar to the sterilization of a colonoscope. Universal precautions are taken as usual to avoid contamination caused by potential blood splatter.

Although attempts to treat plantar HH by directly injecting BTX-A with Dermojet® have been crowned with success [12] the technique was not recommended for palmar HH because of possible injury to superficial palmar nerves or vessels, particularly in the digits, where the Dermojet® can deposit the toxin deeply. Such deeper injections may cause weakness of the small muscles of the hand and weakening of the grip [13]. Compared to the Dermojet®, the Med-Jet® has an adjustable range of volumes (0.01 to

0.3 mL) where the Dermojet® and other similar devices such as the MadaJet XL® have a fixed volume per spurt which is 0.1 mL. Since increase of penetration depth correlates with increasing injection volumes [10] it is understandable why the Dermojet® was deterred from treating palmar hyperhidrosis.

Another characteristic of the Med-Jet MBX is the possibility to adjust the pressure according to the skin thickness of the site to be injected. In humans the skin thickness varies between body regions, ages and gender. Needle-free devices like the Dermojet® have a fixed pressure setting and do not have the versatility to reach different penetration levels, specially needed for the epidermis of the sole where the thickness of the skin varies considerably from its middle part to the heel.

Needle free anesthesia, prior to botulinum type A injection with needle for the treatment of palmar and plantar HH, has been described as a potential new technique. This technique basically circumvents the use of a nerve block which has many potential drawbacks such as neural injury, vascular puncture, impaired hand dexterity after the first few hours of anesthesia, and reactive hyperemia that increases the tendency to bleed from the injection sites [14]. Also, if a nerve were to be repeatedly injured with the needle it would cause scarring [15]. Many clinicians, who contentedly treat axillary HH, but hesitate to use nerve blockade to treat palmar and plantar HH, may try this technique. Further studies using objective evaluation methods are warranted on a larger number of patients.

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