Clinical trial

Botulinum toxin therapy for palmar hyperhidrosis: experience in an Iranian population

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Introduction

Hyperhidrosis may be defined as excessive sweating beyond that required to return elevated body temperature to normal.[1] There seems to be a genetic predisposition to primary (essential) hyperhidrosis and it often manifests itself in childhood or puberty. Essential or focal hyperhidrosis characteristically does not occur during sleep, but is made worse by heat and emotional situations, as it is considered that the hypothalamic sweat centers are more sensitive to emotional stimuli in non-hyperhidrotic subjects.[2] However, it is estimated that 0.6–1.0% of the population suffers from primary (essential) hyperhidrosis and in many it can become chronic and can lead to significant disruption in both social and professional life, leading to a marked impact on the patient's quality of life (QoL).[2] Patients find the symptoms embarrassing and often complain that the anticipation of sweating leads to avoidance of certain activities.[3] Sweat rates are highly variable between individuals and are thought to be a factor of acclimatization, sex, age, and possibly diet.[4] The aim of the present study was to evaluate the effectiveness, safety, and adverse reactions of botulinum toxin type A, Dysport® (Speywood Pharmaceuticals, Berkshire, UK) on the patients with recalcitrant palmar hyperhidrosis.

Methods

Fourteen patients (18–28 years; ten males, four females) attending the Departments of Dermatology at Shiraz and Jahrom, southwest Iran, with primary palmar hyperhidrosis resistant to any prior topical treatments were included in the study and treated with botulinum toxin A (Dysport®) injections. All the patients had given informed consent. Patients were excluded from the study if they were pregnant or nursing women, had secondary hyperhidrosis or neuromuscular changes, and if they were using systemic medications that could interfere with neuromuscular activity. In all patients the hyperhidrotic area was evaluated by the minor iodine starch test (Fig. 1), which was subdivided into 1 × 1-cm squares. A total of 500 units of lyophilized Dysport® were diluted in 5 mL of sterile 0.9% saline solution. A total of 0.10 mL (10 U) and 0.05 mL (5 U) was injected intracutaneously into each 1-cm^2 area of dominant and nondominant hand, respectively. The injections were made using a single 30-G × 0.30 × 4-mm gauge needle. One unit (U) of Botox® (Allergen, Inc., Irvine, California, USA) equals approximately 2.5–5 U of Dysport®.[5]

The patients were randomly allocated into two groups. Group 1 comprised seven patients who received locoregional block of median and ulnar nerves using the conventional technique (3 mL of lidocaine 2% diluted in 3 mL of saline sterile solution injected at the wrist using a 25-G × 0.50 × 13-mm gauge needle).[6] These patients were asked to bend the wrist, and put the thumb and the

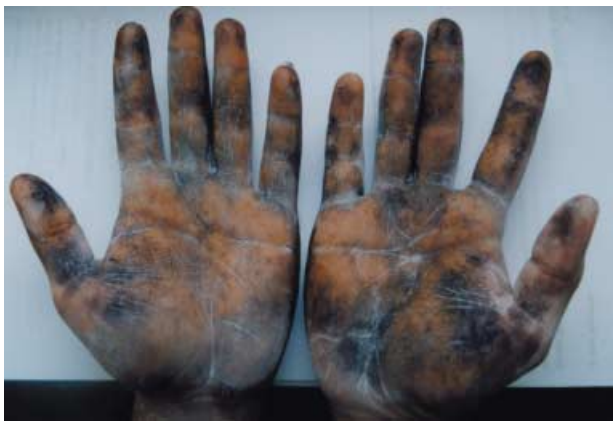

Figure 1 Minor's iodine starch test before treatment

two last fingers together to accentuate the palmaris longus and flexor carpi radialis tendons. The needle was then inserted perpendicularly into the skin between the palmaris longus tendon and flexor carpi radialis tendon at the proximal flexion crease of the wrist. Blockage of this nerve made the radial side of the palmar surface of the hand insensitive. To block the ulnar nerve the patient was asked to actively bend the wrist to make the flexor carpi ulnaris tendon more prominent and the needle was then inserted perpendicularly into the skin between the tendon; the styloid process. This block anesthetizes the cubital portion of the palm of the hand, the little finger, and the median half of the fifth finger.[6,7]

Group 2, comprising seven patients, had their palms cooled with a wrapped ice pack for 10 min immediately before the botulinum injections. The intensity of injection pain was rated by each patient on a 0–10-point scale (0 = no pain, 10 = greatest imaginable pain) immediately after treatment.[8]

Satisfaction was rated as: completely satisfied (> 90% response), good satisfaction (60–90% response), partial satisfied (30–60% response), and not satisfied (< 30% response). Statistical analysis was carried out using the Mann–Whitney *U*-test. Patients were observed for 12 months after treatment.

Results

In all the 14 patients with recalcitrant palmar hyperhidrosis (18–28 years of age; 22.85 ± 3.6; ten males, four females) enrolled in the study, anhidrosis lasted for 4–8 months (5.42 ± 1.34) (Fig. 2), and hypohidrosis lasted for 9–12 months (10.43 ± 1.45) (Fig. 3). Six of the patients (43%) had positive family history of hyperhidrosis. Four patients (29%) had positive family history of thyroid diseases. Also, four patients (29%) had personal history of atopy. Disease duration before treatment ranged from 8–18 years (13.28 ± 4.32). In the patients with personal history of atopy, the hypohidrosis period was shorter ($P = 0.017$), but no correlation with anhidrosis period was observed ($P = 0.057$).

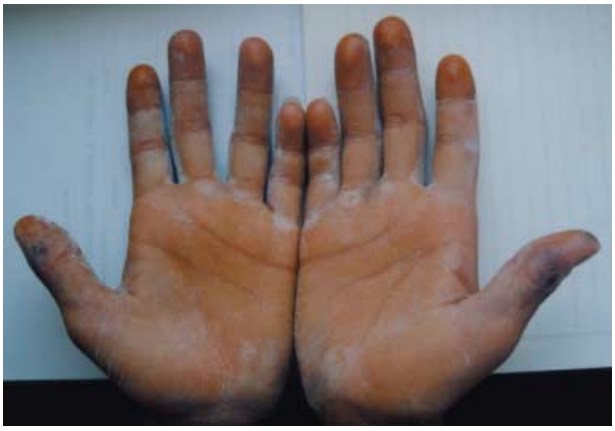

Figure 2 One week after treatment

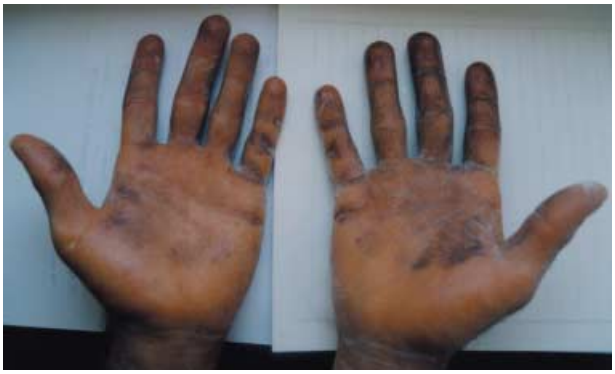

Figure 3 One year after treatment

There were strong statistical associations between the duration of disease and the anhidrosis and hypohidrosis period ($P < 0.001$). The longer the duration of the disease before treatment, then the shorter the anhidrosis and hypohidrosis period after treatment. None of the patients perceived a relevant difference between both hands (dominant versus nondominant). There was no significant correlation between the two groups regarding the anhidrosis or hypohidrosis period after treatment ($P = 0.11$, and $P = 0.09$, respectively). No statistical difference was observed between the sexes and the anhidrosis or hypohidrosis period ($P = 0.55$ and $P = 0.2$, respectively). Satisfaction range was 30–90% (mean 65%).

The mean score of the pain associated with the Dysport®˜ injections after ice-pack cooling and nerve block at wrist level were 7.85 ± 0.7 and 3.28 ± 0.5, respectively. The patients who underwent the cooling anesthesia had a higher pain score versus nerve block anesthesia ($P < 0.001$). Mild muscle weakness of the abductor pollicis brevis muscle was noted in three (21%) of the total patients within 2 weeks of the injection.

Discussion

The present study confirmed the efficacy of botulinum toxin type A in reducing palmar hyperhidrosis.

In a study by Solomon and Hayman, 20 subjects with recalcitrant palmar and digital hyperhidrosis were treated with botulinum toxin type A (Botox®) 165 U per hand. Treatment was shown to reduce sweat production significantly in the treated areas, with anhidrosis lasting 4–9 months, although reduced sweating continued in all patients for the 12-month evaluation period. The greatest reduction in sweating was observed in the nondominant hand.[9]

Another recent study by Bodokh and Branger compared the effectiveness of treatment with Botox® in one hand compared with no treatment in the other control hand. Assessment included subjective and objective measurements using gravimetric scales and Minor's iodine starch test. This study showed a significant improvement in 75% (15/20) of

patients treated for palmar hyperhidrosis, with no serious adverse events observed.[10,11]

Lowe *et al*. investigated the use of Botox® versus placebo for the treatment of palmar hyperhidrosis in 19 patients and concluded that patients experienced a significant improvement in palmar hyperhidrosis without a concomitant decrease in grip-strength, significant finger dexterity, or the occurrence of notable adverse events.[12]

Occasional, transient, and generalized muscle weakness in the hands has been reported following treatment for palmar hyperhidrosis, as has pain during injection, which can be addressed through application of ice packs, use of the Dermojet delivery system, or anesthetic procedures.[13]

In agreement with other observations, no significant difference of the palmar sweat production was detected when comparing palms treated under wrist nerve block and palms pretreated by cooling only.[8] Also, in agreement with the present study, Hayton *et al*. and Naumann *et al*. concluded that patient preference is for local anesthetic blockade rather than topical anesthesia techniques and ice packs.[14,15] Hence, for palmar hyperhidrosis, regional blocking of the ulnar and median nerves at the wrist level with 1% lidocaine is recommended before administering botulinum toxin injections.

This study demonstrates that botulinum toxin can cause anhidrosis for palmar hyperhidrosis as recalcitrant to other therapeutic modalities for as long as 5 months and a reduced sweat production in the patients for greater than 10 months after treatment.

Conclusion

Botulinum toxin provides a safe and efficacious alternative in the treatment of recalcitrant palmar hyperhidrosis.

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