Leading article

Treatment of axillary hyperhidrosis

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Focal axillary hyperhidrosis is a common condition that often affects many features of daily life. Its aetiology is so far unknown, but it is mostly young adults who are affected. If conservative treatment options, such as the application of aluminium salts or oral anticholinergics, have failed to control excessive sweating, a surgical approach may be considered. This may include local excision or curettage of axillary sweat glands, or endoscopic transthoracic sympathectomy (ETS). Recently, local injections with botulinum toxin type A (BTX-A) have proved a novel and minimally invasive treatment option for focal axillary hyperhidrosis. This article summarizes current knowledge of these treatment alternatives and provides a risk–benefit consideration.

Surgery

Local surgical management of axillary hyperhidrosis aims to eliminate as many eccrine sweat glands as possible within the vault of the axilla, while preserving, as far as possible, its normal appearance and the mobility of the arm. The simplest and most effective method is the *en bloc* excision of the entirety of the sweating area, but this inevitably leads to large and unsightly scars. To overcome this disadvantage a wealth of various surgical techniques has been proposed since the early 1960s. These include partial resection of axillary skin and subcutaneous tissue, removal of subcutaneous tissue without removing skin, shaving procedures, curettage, suction curettage, cryosurgery, and combinations of these methods. Depending on the individual technique used, bleeding, haematoma, seroma, wound infection, skin necrosis, prolonged wound healing, prominent scarring, wound contracture and restriction of arm movement may occur. Curettage and suction curettage techniques are usually performed under local anaesthesia, and appear to be superior to other procedures with regard to cosmetic results and complication profile[1,2]. However, while the operative elements of the many competing approaches are often described in detail, only limited information is available on long-term outcome and patient satisfaction. While it may be concluded that there is a place for local surgical procedures in the treatment of axillary hyperhidrosis, their importance in terms of evidence-based medicine is difficult to assess.

Interruption of the transmission of sympathetic nerve impulses from ganglia to nerve endings was introduced in the treatment of hyperhidrosis as early as 1920. However, the traditional open access to the thorax had considerable potential for severe complications and caused sizeable scars. Open surgery has since been superceded by ETS, which has been shown to be more or less equally effective but much less invasive. With the spread of minimally invasive surgical techniques and video assistance, ETS has gained broad acceptance in the past decade. The usual method is for thoracic sympathetic ganglia T2 and T3 to be destroyed by electrocautery for treatment of palmar hyperhidrosis, with the addition of T4 for axillary hyperhidrosis. While ETS (without removal of ganglia) seems as or almost as effective as more extensive traditional sympathectomy, randomized trials are lacking[3].

In about 98 per cent of patients with palmar hyperhidrosis immediate and complete anhidrosis is achieved, with only low rates of recurrence. Axillary hyperhidrosis does not appear to respond as well to the procedure. A number of significant complications may accompany definitive cure, such as arterial bleeding (possibly requiring conversion to open thoracotomy), intercostal vein bleeding, haemothorax, pneumothorax and chylothorax, pleural adhesion or effusion, peripheral nerve injury, chronic postoperative pain and discomfort, and complete or incomplete Horner's syndrome[4]. While these complications are rare, compensatory sweating (mainly of the back, abdomen and legs) occurs regularly, and gustatory sweating affects up to half of the patients[3]. Both compensatory and gustatory sweating may be severe enough to cause a handicap that is as troublesome as the original hyperhidrosis[3,5]. It is also worth noting that patients who are treated for axillary hyperhidrosis are significantly less satisfied with the ETS procedure than those treated for palmar involvement[3]. In one review[5] of 39 patients with excessive axillary sweating alone only 13 patients were satisfied with ETS; 26 patients were partially satisfied or dissatisfied. In view of the high risk of compensatory sweating, the potential morbidity associated with surgery and the documented low level of patient

satisfaction, ETS provides a less than optimum treatment option, particularly for axillary hyperhidrosis.

Botulinum toxin

BTX-A is a novel and minimally invasive treatment option for focal hyperhidrosis. It is injected intradermally into the hyperhidrotic areas of the axillae, the palms or the forehead at multiple sites, and acts by temporarily blocking the release of acetylcholine from cholinergic sudomotor fibers. Two large placebo-controlled, double-blind trials[6,7] and several open-label studies have clearly documented the beneficial effect of botulinum toxin treatment through reduction of sweat secretion[6,7] and improvement of quality of life[8] in patients suffering from axillary hyperhidrosis. A large double-blind, placebo-controlled study enrolled 320 patients, and evaluated the safety and efficacy of intradermal administration of the agent (50 units BOTOX® (Allergan, Irvine, California, USA) per axilla) *versus* placebo in the treatment of bilateral primary axillary hyperhidrosis[6]. Patients were followed for 16 weeks. At week 4, 93·8 per cent of patients treated with BTX-A were classified as responders (over 50 per cent reduction in sweat production from baseline gravimetric measurement), compared with 35·9 per cent of the placebo group ($P < 0·01$). The mean percentage reduction in sweat production at this time was 83·5 per cent in the BTX-A group compared with only 20·8 per cent in the placebo group ($P < 0·01$).

Some 207 patients were followed for a further 12 months and received up to three more BTX-A treatments. Response rates and satisfaction with treatment remained consistently high, with no diminution of effect with repeated injections[9]. The mean duration of benefit was about 7 months after a single treatment session but about 28 per cent of patients required no more than one treatment, indicating a long-lasting benefit of over 16 months in a substantial proportion of patients. No major side-effects occurred in the whole period of 16 months (controlled and follow-up study). BTX-A treatment markedly improved the quality of life of patients afflicted with hyperhidrosis (Hyperhidrosis Impact Questionnaire© and the Medical Outcomes Trust SF-12 Health Survey™ (SF-12)). At baseline, participants reported a marked negative impact of their hyperhidrosis on various measures, including state of mind, emotional status, comfort in social situations, productivity at work, number of clothing changes needed per day, and ability to engage in sex or participate in athletic activities. After treatment, significantly greater improvements were observed in all of these variables in the BTX-A group than in the placebo group ($P < 0·01$). Patients treated with BTX-A also exhibited significantly greater improvement in the physical component summary score of the SF-12 at 16 weeks than placebo-treated patients ($P < 0·02$). Another study of 145 patients with axillary hyperhidrosis (100/200 units Dysport® (Ipsen, Slough, UK) per axilla) obtained similar results with regard to efficacy and safety, but no quality of life or follow-up data are available[7]. These large controlled studies lent support to the reports of several previous open-label studies indicating that BTX-A is a safe and highly effective treatment for axillary hyperhidrosis. Based on the large controlled trial[6], BTX-A is now licensed for the treatment of this condition in the UK, Canada and other countries.

Conclusion

The long-term benefit of local surgical treatments for axillary hyperhidrosis is uncertain; no data from large or even controlled studies with gravimetric assessment of preoperative and postoperative sweat production are available. ETS has proved a highly effective treatment option for axillary hyperhidrosis, but it is associated with perioperative complications, including a high risk of persisting compensatory sweating. BTX-A is a simple, highly effective and safe treatment for axillary hyperhidrosis that, owing to its temporary effect of about 7 months, must be performed repeatedly. In view of these pros and cons we recommend BTX-A as first-line therapy in axillary hyperhidrosis that has proved refractory to conservative treatments. Surgery is no longer the treatment of choice for this condition[10] but it should be considered if BTX-A fails or if the patient requests it.

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