

Liposuction for Treatment of Axillary Hyperhidrosis

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Hyperhidrosis, or excess sweating, of the axillary region is an extremely common malady. Cases of mild to moderate severity are often inadequately controlled by over-the-counter antiperspirant preparations.

Hyperhidrosis is due to eccrine and not apocrine gland secretion. Onset is often at puberty, and, although males usually experience a greater degree of axillary sweating, it is more common for females to present to the physician. What is a normal amount of perspiration in males may be considered unacceptable by many females.

Axillary hyperhidrosis may be familial, may or may not be associated with palmar and/or plantar hyperhidrosis, and is usually not associated with bromhidrosis. The large amount of axillary perspiration may, in fact, make bromhidrosis less likely by "flushing away" the apocrine secretions. The axillary sweat glands are unique in that they respond to both thermal and mental stimuli and exhibit a delayed and diminished response to thermal stimuli when compared with sweat glands in other sites.

The typical patient is female, is in her 20's, and complains of intermittent unpredictable episodes of emotionally induced severe sweating. These episodes often occur in specific stressful social situations. Summertime is not necessarily a problem period for the patient because of clothing styles that allow rapid evaporation of perspiration.

The patient has usually tried all types of over-the-counter treatments without success and may be confused about the distinction between antiperspirants and deodorants. Indeed, in severe cases this condition may play a major role in severely restricting the patient's social activities.

Over the past decades numerous therapies (topical, systemic, and surgical) have been developed to deal with this common problem. All approaches have their drawbacks, with regard to either lack of effectiveness, side effects, or both.

TOPICAL ANTIPERSPIRANTS

Over-the-counter antiperspirants usually contain aluminum salts or zirconium chlorides that probably combine with the keratin in the sweat ducts, resulting in closure of the duct. These are routinely of little or no benefit to the patient who has axillary hyperhidrosis severe enough to seek medical help. A number of topical preparations commonly used on the palms and soles, such as boric acid, resorcinol, formaldehyde, glutaraldehyde, and methenamine, are often too irritating for use on the axillae. Frequent sensitization to these chemicals is also observed. Topical anticholinergics have been tried, with reports of limited to adequate control of hyperhidrosis.

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In the 1970s, 20% aluminum chloride hexahydrate in absolute anhydrous ethyl alcohol (Drysol) was introduced and is generally considered to be the most effective topical treatment. Nevertheless, there are many patients who do not respond adequately to this modality. In addition, there are many patients who experience an unacceptable degree of irritation when using Drysol under occlusion, as it must be used to achieve maximum effect.

SYSTEMIC AGENTS

Sedatives and tranquilizers can be helpful, but long-term use is inadvisable. Most commonly, anticholinergic drugs such as glycopyrrolate (Robinul) are tried alone or in combination with phenobarbital. Usually, however, for oral anticholinergic medication to be effective, high doses are required, resulting in unacceptable side effects. Dry mouth, dilated pupils, constipation, and difficulty with micturition often result. Generally speaking, it is the unusual patient who will find oral medication an acceptable approach to treating axillary hyperhidrosis.

IONTOPHORESIS

An iontophoresis machine is basically a direct current power supply that is able to pass a current of 15–20 milliamperes through the patient's extremities. The areas to be treated (hands, feet, axillae) are subjected to the current for 10–15 minutes on a daily basis until the desired results are achieved. Inhibition or absence of sweating may persist for a variable period of time.

In general, this approach works better on the palms and soles than on the axillae. A battery-powered home unit (Drionic) has been developed with special formfit electrodes for the hands, feet, and axillae. This has made iontophoresis a much more practical approach to the treatment of hyperhidrosis. Theoretically, the Drionic device should be a practical solution for many patients afflicted with hyperhidrosis. Although impressive statistics have been published concerning the effectiveness of this modality, clinical responses in these authors' experience have been less predictable.

SURGERY

Numerous surgical approaches have been developed to treat axillary hyperhidrosis. Sympathectomy, which is occasionally used in severe recalcitrant palmar hyperhidrosis, carries unacceptable risks for localized axillary hyperhidrosis.

In 42 patients with hyperhidrosis of the upper extremity treated by periaxillary sympathectomy, Hartfall and Jochimsen showed a significant complication rate.¹¹ They concluded that a localized surgical approach rather than sympathectomy is indicated in axillary hyperhidrosis.

The exact location of the axillary sweat glands may be determined by the starch-iodine test. In this test the entire axilla is painted with iodine and then sprinkled lightly with starch. The combination of the eccrine sweat with the mixture will turn purple, outlining the location of the eccrine sweat glands. Although the dome of the axilla is usually the location where most of the glands are found, variations to a significant degree may occur.

Many localized approaches have been developed to eliminate the offending sweat glands. The severity of the problem may dictate which approach is utilized.

Simple elliptical excision was recommended by Hurley and Shelley in 1963.¹² The authors had noted that the chance removal of no more than a generous biopsy of hyperhidrotic axillary skin led to such an unexpected reduction of sweating that they did very limited excisions of axillary skin in three other patients, with dramatic reduction of sweating.

In a subsequent study of 12 patients, Hurley and Shelley showed similar results.¹³ One hematoma and two suture abscesses were noted. Gillespie and Kane treated 11 patients with similar results, but nearly all experienced minor but occasionally troublesome wound infections or delays in healing.⁹ This has been a common problem in these authors' experience.

In 1975, Jemec reported a technique in which the eccrine glands are scraped away from the undersurface of the axillary skin using a curette introduced through a small incision.¹⁴ Jemec treated 20 patients, with 17 achieving satisfactory improvement. Curettage must be vigorous, but postoperative morbidity is significantly less than with axillary excision.

Radical elliptical excision of the axilla with subsequent Z-plasty closure was reported in 1973 by Bretteville-Jensen.² In 1971 Guerrero-Santos reported elliptical excision and subcutaneous clearance with preservation of vascularized flaps.¹⁰ In 1962 Skoog reported radical gland clearance with vascular flaps.²² In 1977 Rigg reported simple elliptical excision, plus radical gland clearance, with conversion of edges from flaps to skin graft.¹⁹ In 1988 Kobayashi reported using insulated electrosurgery needles for destruction of both apocrine and eccrine sweat glands.¹⁵

AXILLARY LIPOSUCTION

There have been several recent reports on the effectiveness of liposuction for obliterating eccrine sweat glands in the axillae.^{3, 4, 21} Liposuction provides a means of removing sweat glands without sacrificing the overlying skin. This also results in only minimal scars. Liposuction is superior to curettage because it is a blunt technique with decreased potential for bleeding. Since the eccrine sweat glands are located in the deep dermis and upper subcutaneous layers, they can be removed by a liposuction cannula without endangering deeper axillary structures such as the brachial plexus.

Liposuction is preferable over excisional surgical techniques for hyperhidrosis in that scars are quite small. This is particularly important in female patients. Excisional techniques result in total loss of axillary hair, which can become a cosmetic abnormality for male patients. Liposuction of the axillae does result in some hair loss, however, which some men may find objectionable.⁵

Technique

The liposuction is performed on one axilla at a time, with a suitable interval (usually one week) between surgeries. This allows an easier recovery with only one arm immobilized. The procedure can be carried out easily using local anesthesia in an outpatient surgical setting.

The axilla to be treated is liberally scrubbed with Hibiclens solution. A dilute solution of lidocaine with epinephrine is prepared by mixing the stock solutions with normal saline until

a 0.1% concentration is achieved. Sodium bicarbonate can be added to decrease the sting of injection. The anesthetic solution is injected through the two planned incision sites in both the lower and superior vaults of the axilla. Enough solution is injected to create a firm bloated look to the axillary skin. This additionally separates the intended operative plane from the deeper underlying structures.

After a small incision a 4-mm blunt cannula is introduced, and suctioning is performed from both the superior and the inferior incisions. Thus a criss-cross pattern is achieved. Rather than tunneling as in traditional liposuction, a sweeping "windshield wiper" pattern is used. This eliminates most deeper eccrine glands, which are often found in the subcutaneous tissue. A firm grasping technique is employed to stabilize the overlying skin and to control the depth of the cannula penetration.

After much of the fat is removed, the aperture of the cannula is turned up toward the skin surface and is used to scrape the overlying dermis. This is necessary to remove the more superficial eccrine glands. The nondominant hand can be used to hold firmly the overlying skin to allow effective scraping of the dermis.

After the entire bulk of the axilla has been treated in this fashion, the small incision sites are closed with single nylon sutures. The operative site is dressed with numerous fluffs secured by 4 × 4 gauze squares. The patient is instructed to keep the arm down and to apply ice packs to the axillae for the remainder of the day. Patients are advised not to lift the arm for one week after surgery. It is not unusual during the early healing stages to observe a dusky appearance to the treated skin. This is likely due to the trauma of the dermal scraping. Theoretically a small area of full-thickness skin loss is possible after such a procedure, although we are not familiar with any reports of this complication. All results to date have been universally favorable. There is typically normalization of sweating. Obviously some eccrine sweat glands survive, but enough are injured in this procedure so that excessive sweating is eliminated. Secondary procedures can be easily performed if the decrease in sweating is not satisfactory, but the need for this is rare.

Discussion

Liposuction surgery provides a new modality for difficult cases of axillary hyperhidrosis. As

of this writing the logical sequence for treating this condition probably should be first a trial of topical Drysol. If the patient cannot tolerate this or the sweating is not controlled, an iontophoresis machine is the next logical step. If this is not successful, the patient should be advised to have liposuction of the axillae. Liposuction has emerged as the surgical treatment of choice for hyperhidrosis.

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