Hyperhydrosis

Number: 0504

Policy

*Please see amendment for Pennsylvania Medicaid at the end of this CPB.

I. Botulinum Toxin and Iontophoresis

Aetna considers treatment of intractable, disabling primary hyperhidrosis (axillae, palms, and soles) with botulinum toxin type A (Botox), botulinum toxin type B (Myobloc) (see CPB 0113 - Botulinum Toxin (../100_199/0113.html)) or iontophoresis (see CPB 0229 - Iontophoresis (../200_299/0229.html)) (electrophoresis, Drionic device) medically necessary when all of the following criteria are met:

A. Member is unresponsive or unable to tolerate at least 1 of the following pharmacotherapies prescribed for excessive sweating if sweating is episodic: Anti-cholinergics, beta-blockers, or benzodiazapines; and

B. Significant disruption of professional and/or social life has occurred because of excessive sweating; and

C. Topical aluminum chloride or other extra-strength anti-perspirants are ineffective or result in a severe rash.

Policy History

Last Review
07/12/2019

Effective: 05/04/2001

Next Review: 05/08/2020

Definitions

Additional Information

Clinical Policy Bulletin Notes
II. Surgical Treatments for Primary Hyperhidrosis

Aetna considers the following surgical treatments for primary hyperhidrosis (axillae, palms, and soles) medically necessary for members who meet the above-listed criteria (A through C) and have failed to adequately respond to treatment with iontophoresis (Note: A trial of botulinum toxin can be substituted for iontophoresis in persons with predominantly axillary hyperhidrosis):

- Chemical thoracic sympathectomy
- Clipping of the thoracic sympathetic chain
- Endoscopic sympathetic ablation by electrocautery
- Endoscopic thoracic sympathectomy
- Excision of axillary sweat glands
- Lumbar sympathectomy
- Open thoracic sympathectomy
- Thoracoscopic sympathectomy

[CPB 0310 - Thoracoscopic Sympathectomy](../300_399/0310.html)

- Tumescent or ultrasonic liposuction for axillary hyperhidrosis
- Video-assisted endoscopic thoracic ganglionectomy
- Video-assisted thoracic sympathectomy (VATS).

III. Experimental treatments

Aetna considers any of the following treatments for hyperhidrosis experimental and investigational because they have not been proven to be effective for this indication (not an all-inclusive List):

- Alternative therapy methods including acupuncture, homeopathy, massage, and phytotherapeutic drugs
- Biofeedback
- Hypnosis
Laser treatment (including subdermal Nd-YAG laser)
Liposuction-curettage
Microwave therapy
Osteopathic manipulation
Oxybutynin gel
Percutaneous thoracic phenol sympathicolysis
Photodynamic therapy
Psychotherapy
Pulsed radiofrequency
Radiofrequency ablation
Radiotherapy
Topical umeclidinium
Ultrasound.

For topical Glycopyrronium Tosylate (Qbrexza), see Pharmacy CPB on Qbrexza.

Background
Sweating is a natural phenomenon necessary for the regulation of an individual's body temperature. Hyperhidrosis (hyperhydrosis), or excessive sweating, is a medical condition that is defined as sweating beyond what is necessary to maintain thermal regulation.

Hyperhidrosis is classified as primary or secondary, depending on its cause or origin. Primary hyperhidrosis, also known as essential or idiopathic hyperhidrosis, is caused by an overactive sympathetic nervous system. It can lead to intractable and profuse sweating in several locations of the body, including palms (hands), axillae (armpits), and planta (feet). Primary hyperhidrosis may be treated with nonsurgical or surgical treatments.
Secondary hyperhidrosis is the result of a medication or an underlying condition, such as Parkinson’s disease, hyperthyroidism, diabetes mellitus, hyperpituitarism, pyrexia, hypoglycemia, or menopause. Secondary hyperhidrosis usually affects the whole body. Alleviating symptoms of secondary hyperhidrosis involves treating the underlying condition.

Regardless of the type or cause of hyperhidrosis, severe palmar and plantar hyperhidrosis can disrupt professional and social life and may lead to emotional problems. In the case of secondary hyperhidrosis, treatment of the underlying condition should first be attempted. In patients with disabling primary hyperhidrosis, a variety of treatment methods have been used.

The simplest method to control or reduce profuse sweating is the application of topical agents, such as aluminum chloride or other extra-strength chemical anti-perspirants. Usually recommended as the first therapeutic measure, topical antiperspirants are effective in cases with light to moderate hyperhidrosis but have to be repeated regularly. Drysol (aluminum chloride hexahydrate) is a prescription topical anti-perspirant commonly prescribed for excessive sweating. Drysol is reported to work in 80% of persons who use it for excessive sweating. Treatment is repeated nightly until sweating is under control. Thereafter, Drysol is applied once- or twice-weekly or as needed.

Persons with with hyperhidrosis should be instructed on the difference between an anti-perspirant and a deodorant (deodorants mask odors caused by sweat, but do not reduce sweating), and that they are using an anti-perspirant correctly (CKS, 2009; Hornberger et al, 2004). An absorbent dusting powder (talc) may also be helpful (CKS, 2009; Lowe et al, 2003).
A number of other conservative measures can be employed to manage hyperhidrosis (Lowe et al, 2003; CKS, 2009). Trigger factors, such as specific foods or hot environments, should be identified and avoided (CKS, 2009; Lowe et al, 2003). Soap substitutes (e.g., emollient washes) can be used in place of soap-based cleaners to reduce the chance of skin irritation.

Persons with hyperhidrosis should be advised to wear loose-fitting clothing. They should avoid clothes made of synthetic materials such as Lycra and nylon that trap moisture, and to avoid clothes that show up sweat marks readily. Persons with plantar hyperhidrosis should be advised to wear cotton or other moisture wicking socks, and change socks and use absorbent foot powder at least twice-daily. They may also use absorbent insoles. They should be advised to wear a different pair of shoes on alternate days, to allow them to dry fully. They should be advised to wear non-occlusive footwear (leather shoes), and avoid athletic shoes or boots, as these are likely to have an occlusive effect (CKS, 2009; Hornberger et al, 2004; IHS, 2008).

Generalized hyperhidrosis is usually secondary to an underlying illness or a side effect of a medication, and the first approach to providing relief from the excessive sweating is to investigate the cause (IHS, 2008). Underlying conditions should then be treated appropriately and relevant medications should be adjusted, if possible, to relieve the sweating symptoms. In the rare instance in which there is no underlying cause found for generalized hyperhidrosis, consideration must be given to treating the most involved areas as one would in focal hyperhidrosis.

Oral prescription medications may be prescribed for situational or episodic hyperhidrosis, including anti-cholinergics (e.g., Robinul, Ditropan), beta-blockers (e.g., atenolol, propanolol), and benzodiazapines (e.g., Valium, Ativan). Anti-cholinergic medications may be effective for alleviating hyperhidrosis (ATTRACT, 2002: Altman and Kihiczak, 2002; GP Notebook,
2003). Anti-cholinergics such as propantheline bromide, glycopyrrolate, oxybutynin, and benztrapine are effective because the pre-glandular neurotransmitter for sweat secretion is acetylcholine (although the sympathetic nervous system innervates the eccrine sweat glands). Some anti-cholinergics are better tolerated than others. Nyamekye (2004) stated: "The most effective anticholinergic drug, glycopyrrolate (Robinul and Robinul Forte, Mikart, Inc., Pharmaceutical Manufacturers, Atlanta, GA) has mild side-effects and is generally well tolerated...... Topical glycopyrrolate has also been used in the treatment of localised secondary gustatory sweating." Guidance from the NHS Institute for Innovation and Improvement (CKS, 2009) state that systemic anticholinergics may have a role before surgery is considered (particularly if the symptoms of severe). In such circumstances, propantheline bromide is typically used (CKS, 2009; Hornberger et al, 2004). Guidelines from the International Hyperhidrosis Society (IHS, 2008) state that systemic medications are also indicated in the treatment of generalized hyperhidrosis if treatment of the underlying condition and medication adjustments fail to reduce sweating.

Adverse effects of anti-cholinergics include mydriasis, blurry vision, dry mouth and eyes, difficulty with micturition, and constipation (CKS, 2009). Topical anti-cholinergic drugs, such as glycopyrronium bromide, may have markedly less adverse effects than systemic anti-cholinergic drugs (CKS, 2009). Anxiolytics, sedatives, or beta-blockers (e.g., propranolol) may be helpful when history indicates that symptoms are precipitated or exacerbated by stress (see Tyrer, 1998; Noyes, 1985; Fonte and Stevenson, 1985; GP Notebook, 2003; CKS, 2009; IHS, 2008). In addition, there is some evidence that other systemic medications, such as indomethacin and calcium channel blockers, may be beneficial in the treatment of palmoplantar hyperhidrosis (see Feder, 1995 Eedy and Corbett, 1978; Tkach, 1982; IHS, 2008).
Iontophoresis or electrophoresis can be tried if anti-perspirants are not effective. Iontophoresis involves placing the affected area into a water bath that contains two electrodes which then pass a small electrical current. The electrical current interacts with the sweat glands and ducts stopping or decreasing sweat secretion. Treatments are repeated over several days until sweating is reduced to a comfortable level. Individuals may require a maintenance schedule and iontophoresis sessions often require repeating if excessive sweating returns. Prescription medications may be added to the water bath if iontophoresis using water alone has proven unsuccessful. Iontophoresis devices used for treatment of hyperhidrosis include, but may not be limited to, the Drionic, which uses electrode pads instead of the water bath. Another device, the MD-1a iontophoresis unit, offers either option.

Iontophoresis appears to alleviate symptoms in approximately 85% of patients with palmar or plantar hyperhidrosis and is safe and simple to perform (Smith, 2008). Iontophoresis causes blockage of sweat ducts by directing a mild electrical current through the skin (CKS, 2009). Iontophoresis has been used mainly to treat palmar and plantar hyperhidrosis, but can also be used to treat axillary hyperhidrosis with a special axillary electrode (Smith, 2008; CKS, 2009; Hornberger et al, 2004). Evidence for effectiveness is from small controlled trials and observational studies (CKS, 2009). However, some people seem to gain considerable symptom relief. The procedure has to be repeated regularly, initially in 20-min sessions several times a week, gradually stretching out the interval between treatments to 1 to 4 weeks (CKS, 2009; Hornberger et al, 2004). Most people report an improvement after 6 to 10 sessions (CKS, 2009; Hornberger et al, 2004).

Treatments must be maintained indefinitely to control the symptoms. The results, however, vary: some many find the electric current uncomfortable and the treatments time consuming and not lasting long enough. The Drionic device (General Medical Co., Los Angeles, CA) is an iontophoretic device that can be purchased for home use.
Botulinum toxin type A (Botox) has been found to inhibit the release of acetylcholine not only at the neuromuscular junction, but also in post-ganglionic sympathetic fibers to sweat gland. It is indicated for the treatment of hyperhidrosis of the palms and axillae; intra-cutaneous injections of Botox have been shown to induce a temporary anhidrosis. Responses have been as long as 1 year, but in most cases the effect begins to weaken in 4 months. Naumann et al (2003) reported on a trial of botulinum toxin for persons (n = 320) with axillary hyperhidrosis; the mean duration between botulinum toxin treatments was 7 months, and 28% of people required only 1 treatment over the 16-month duration of the trial. Although effective, the clinical usefulness of this treatment is limited by the need for multiple and repetitive relatively painful injections into sensitive palms and soles for palmoplantar hyperhidrosis. Application of a topical anesthetic prior to the injection of botulinum toxin may help alleviate some of the discomfort (Smith, 2008). The reports in clinical trials of increased palmar sweating in patients with axillary hyperhidrosis should also be noted; in the study by Naumann and colleagues, 5% of patients treated with botulinum toxin reported an increase in non-axillary sweating (Naumann and Lowe, 2001). It has not been reported in clinical trials whether this subsided as the effects of treatment wore off. In patients with palmar hyperhidrosis, another consideration might be the long-term effects on muscle tone, as weakness has been reported in the small muscles of the hands with botulinum toxin treatment (Bandolier, 2002). In one study of botulinum toxin for palmar hyperhidrosis, 21% of subjects reported weakness that lasted an average of 3 weeks (Solomon and Hayman, 2000).

Patients with severe, intractable palmar hyperhidrosis who fail topical therapies and iontophoresis, and who do not tolerate or get relief from botulinum toxin, can be treated effectively with endoscopic thoracic sympathectomy (ETS). Sympathectomy is a surgical procedure that involves cauterizing (cutting and sealing) a portion of the sympathetic nerve chain that runs
down the inside of the chest cavity. This operation permanently interrupts the nerve signal that is causing the body to sweat excessively and can be performed in either of the two sympathetic trunks. Each trunk is divided into three regions: cervical (neck), thoracic (chest) and lumbar (lower back). Sympathectomy is commonly targeted to the upper thoracic region. Endoscopic thoracic sympathectomy (ETS) is performed by inserting a scope with a camera into the chest via a small incision under the axilla. The lung is temporarily collapsed so the surgeon can cut or otherwise destroy the nerve paths associated with the overactive sweat glands. The same procedure is repeated on the other side of the body. The principle of sympathectomy is to interrupt the nerve tracks and nodes that transmit the signals to the sweat glands. This can basically be achieved for all locations in the body, but only the nerve nodes responsible for the sweat glands of the palms and the face are accessible without the need for a major surgical procedure. With the advent of minimally invasive endoscopic sympathectomy, open surgical sympathectomy or upper thoracic ganglionectomy at T2 to T4 has come into disfavor because of the magnitude of the procedure, the long periods of hospitalization and recovery, and the complication rate. Side effects, especially compensatory hyperhidrosis in other parts of the body, may reduce long term satisfaction with this procedure. Sweating returns in approximately 50% of individuals.

Whether performed open or endoscopically, the most common side effect of sympathectomy surgery is compensatory hyperhidrosis characterized by an increase in sweating in other parts of the body. In a study of 158 patients who underwent endoscopic thoracic sympathectomy for palmar, axillary or facial hyperhidrosis, compensatory sweating occurred in 89% of patients and was so severe in 35% that they often had to change their clothes during the day (Licht and Pilegaard, 2004). A rare side effect is "gustatory sweating", a condition that leads to the sensation of sweating when eating. Another possible complication is Horner's
syndrome resulting in a slightly smaller pupil and a slightly drooping eyelid on the affected side. This complication is estimated to occur in less than 1% of patients, is usually temporary, but is sometimes permanent (CKS, 2009). Other complications include pneumothorax (1 to 5%), brachial plexus injuries, post-operative neuralgia, and recurrent laryngeal nerve palsy (CKS, 2009). Side effects, especially compensatory hyperhidrosis in other parts of the body, may reduce long-term patient satisfaction with this procedure. The new technique of clipping the sympathetic nerve is generally viewed as the best option currently available because it is potentially reversible by removing the nerve clip in patients with severe and unmanageable compensatory sweating. Endoscopic thoracic sympathectomy can also be used for axillary hyperhidrosis, but the relapse rate is high. In a study of 382 patients with upper limb hyperhidrosis treated with endoscopic thoracic sympathectomy, patients with palmar hyperhidrosis had a relapse rate of 6.6% and patients with axillary hyperhidrosis had a relapse rate of 65% (Gossot et al, 2003). While endoscopic thoracic sympathectomy has also been used for facial hyperhidrosis, rates of compensatory and gustatory hyperhidrosis after the procedure appear to be very high (Licht et al, 2006). Lumbar sympathectomy, an open abdominal procedure, can cure isolated plantar hyperhidrosis; however, it is not usually employed because of the risk of sexual dysfunction.

Consensus guidelines from the Society of Thoracic Surgeons (Cerfolio, et al., 2012) on surgical treatment of hyperhidrosis state that primary hyperhidrosis of the extremities, axillae or face is best treated by endoscopic thoracic sympathectomy (ETS). Interruption of the sympathetic chain can be achieved either by electrocautery or clipping. The highest success rates occur when interruption is performed at the top of rib level (R) 3 or the top of R4 for palmar-only hyperhidrosis. R4 may offer a lower incidence of compensatory hyperhidrosis but moister hands. For palmar
and axillary, palmar, axillary and pedal and for axillary-only hyperhidrosis interruptions at R4 and R5 are recommended. The top of R3 is best for craniofacial hyperhidrosis.

Guidelines from the Canadian Hyperhidrosis Advisory Committee (Solish et al, 2007) state that local surgery (axillary) and endoscopic thoracic sympathectomy (palms and soles) should only be considered after failure of all other treatment options. For patients with severe axillary hyperhidrosis, the guidelines recommend as first-line therapy the use of topical aluminum chloride and botulinum toxin. If a patient fails to respond to topical or botulinum toxin therapy, the guidelines recommend use of both in combination. For patients who fail to respond to topical or botulinum toxin therapy, oral medications may be used alone or as an adjuvant therapy. Glycopyrrolate (1 to 2 mg) can be taken up to 3 times per day; other anticholinergics are also sometimes used. The guidelines state that endoscopic thoracic sympathectomy (ETS) should be the last resort in patients not responding to therapy: "Local surgery and ETS should only be considered in severe cases of hyperhidrosis in which the patient fails to respond to all other treatment options." The guidelines state that patients must be well informed and willing to accept both the surgical risks and the significant risk of compensatory sweating.

For patients with severe palmar hyperhidrosis, these guidelines indicate that topical aluminum chloride, botulinum toxin, and iontophoresis are all considered to be first-line therapy (Solish et al, 2007). Oral medications may be considered for patients who fail first-line therapy. The guidelines also note that iontophoresis with glycopyrrolate solution has been shown to increase efficacy of iontophoresis but can increase side effects. The guidelines indicate that endoscopic thoracic sympathectomy should be the last resort in patients not responding to therapy, and that patients must be well-informed and willing to accept both the surgical risks and the significant risk of compensatory hyperhidrosis."
The guidelines provide a similar algorithm for management of severe plantar hyperhidrosis. The guidelines state that endoscopic thoracic sympathectomy "should only be considered in severe cases of hyperhidrosis in which the patient fails to respond to all other treatment options."

For patients with severe craniofacial hyperhidrosis, the guidelines indicate that topical aluminum chloride, botulinum toxin, and oral medications (glycopyrrholate) are considered first-line therapy (Solish et al, 2007). The guidelines state that the safety and effectiveness of endoscopic thoracic sympathectomy for craniofacial hyperhidrosis has not been extensively studied, and should be the last resort in patients with severe hyperhidrosis not responding to therapy. The guidelines note that patients must be well-informed and willing to accept the risks of endoscopic thoracic sympathectomy, including the success rate of surgery and the high risk of compensatory hyperhidrosis.

Regarding use of endoscopic thoracic sympathectomy in axillary hyperhidrosis, the guidelines (Solish et al, 2007) state that endoscopic thoracic sympathectomy is generally not recommended and should be considered the last treatment option only in patients with severe axillary hyperhidrosis. The guidelines identified 2 studies (Herbst et al, 1994; Zacherl et al, 1998) that examined the long-term outcomes after endoscopic thoracic sympathectomy and found that permanent side effects impaired patient satisfaction; compensatory sweating was seen in 67% of patients, and individuals treated for axillary hyperhidrosis without palmar involvement were significantly less satisfied with endoscopic thoracic sympathectomy (33% versus 67%).

The guidelines (Solish et al, 2007) reviewed the evidence for endoscopic thoracic sympathectomy in palmar hyperhidrosis. They found that published reports of endoscopic thoracic sympathectomy in palmar hyperhidrosis lack consistency in patient selection, surgical technique, and quantitative and
qualitative measurement of hyperhidrosis and quality of life. The guidelines noted that, although success rates range from 92% to 100%, there are significant complications associated with sympathectomy, including pneumothorax, gustatory sweating, rhinitis, and Horner’s syndrome. The guidelines note that patients are often satisfied with sympathectomy in palmar hyperhidrosis, yet compensatory sweating may at times be worse than the original condition being treated.

Other groups have made similar recommendations regarding the management of hyperhidrosis (see Lowe, 2003; Hornberger et al, 2004; CKS, 2009; IHS, 2008; BAD, 2009). The Multi-Specialty Working Group on the Recognition, Diagnosis, and Treatment of Primary Focal Hyperhidrosis (Hornberger et al, 2004) states that failure to respond or intolerance to other treatments may be an indication for referral to surgery for severe axillary or palmar hyperhidrosis. The guidelines state that data on the efficacy and safety of endoscopic thoracic sympathectomy for craniofacial hyperhidrosis are extremely limited, and that this option should be restricted to selected patients who are unable to tolerate other therapies and for whom the burden of hyperhidrosis is severe. The guidelines state that potential candidates for surgery should be evaluated by a surgeon and a dermatologist. The guidelines state that sympathectomy is not recommended as a treatment for plantar hyperhidrosis because of the risk of sexual dysfunction.

Guidelines from the International Hyperhidrosis Society (IHS, 2008) make similar recommendations about the management of focal hyperhidrosis. For primary palmar hyperhidrosis, the guidelines indicate endoscopic thoracic sympathectomy for persons who have failed conservative measures, including topical antiperspirants, iontophoresis, and botulinum toxin. The guidelines indicate that the clinician should educate the patient on the proper timing and technique for application of topical antiperspirants, and about methods of avoiding side effects. Similarly, for iontophoresis, the clinician should pay
attention to proper technique and patient education and training. Treatment with systemic medications should be considered, including anti-cholinergics (propantheline, oxybutynin, glycopyrronium, benztpine), benzodiazepines (short course, as needed), clonidine, diltiazem, and others. A trial of botulinum toxin should include repeated attempts and appropriate adjustments in technique and area covered. Endoscopic thoracic sympathectomy should be considered for persons with no response. Surgical candidates should be carefully selected and educated who fully understand the risks and complications of surgery including compensatory sweating.

Guidelines from the International Hyperhidrosis Society (IHS, 2008) indicate local sweat gland excision, but not endoscopic thoracic sympathectomy, for axillary hyperhidrosis. These guidelines include no recommendation for the use of surgery for primary plantar hyperhidrosis. Endoscopic thoracic sympathectomy is indicated as a last-resort treatment for facial sweating, after a trial of conservative management, including avoidance of triggers, expectant use of systemic medications, botulinum toxin, and topical anti-perspirants. The guidelines note that the evidence that endoscopic thoracic sympathectomy is effective for this indication comes from a small series of patients and the surgery is not as effective for facial/cranial sweating as for palmar sweating.

Guidelines from the International Hyperhidrosis Society (IHS, 2008) recommend investigation of the cause as the first approach to treatment of generalized hyperhidrosis, since generalized hyperhidrosis is usually secondary to an underlying illness or a side effect of a medication. Underlying conditions should then be treated appropriately and relevant medications should be adjusted, if possible, to relieve the sweating symptoms. If symptoms persist during or after treatment of the primary condition and/or medication adjustments, systemic medications can be used to reduce sweating. In addition, the guidelines state that systemic
medications may be useful if symptoms seem to be worse in anxiety-provoking situations (such as during public speaking). The guidelines state that, in the rare instance in which there is no underlying cause found for generalized hyperhidrosis, the most involved areas may be treated as one would in focal hyperhidrosis.

Available evidence suggests that botulinum toxin A and botulinum toxin B are comparably effective for treatment of hyperhidrosis. Dressler and colleagues (2002) reported on a self-controlled study comparing the effectiveness of Botox and botulinum toxin type B in persons with bilateral axillary hyperhidrosis. A total of 19 subjects with axillary hyperhidrosis received botulinum toxin type B in one axilla and Botox in the other axilla. These investigators reported that all subjects except 1 reported excellent improvement in hyperhidrosis in both axillae, and that none of the subjects had residual hyperhidrosis on clinical examination. The duration of effect was not statistically significantly different between Botox and botulinum toxin type B.

In a randomized controlled clinical trial, Baumann and Halem (2004) reported on the use of botulinum toxin B in the treatment of patients with palmar hyperhidrosis. A total of 20 subjects with hyperhidrosis were randomly assigned to injection with botulinum toxin type B (n = 15) or placebo (n = 5). These researchers reported a significant difference in treatment response (as determined by participant assessment) between the subjects injected with botulinum toxin B and placebo. The duration of cessation of palmar sweating ranged from 2.3 months to 4.9 months, with a mean duration of 3.8 months. The authors stated, however, that 18 of 20 participants reported dry mouth/throat, 60 % reported indigestion/heartburn, 60 % reported muscle weakness, and 50 % reported decreased grip strength. These investigators concluded that botulinum toxin B was safe and effective in treating bilateral palmar hyperhidrosis. However, the side effect profile was substantial.
In a review on the use of botulinum toxins for the treatment of patients with hyperhidrosis and gustatory sweating syndrome, Glaser (2006) stated that both diseases respond very well to botulinum toxin therapy.

Surgical removal of sweat glands has been shown to be only effective in the treatment of axillary hyperhidrosis, and may leave significant scarring. Excision of the axillary sweat glands involves the surgical removal of limited areas of skin and selected sweat glands. Procedures can be grouped into three different categories: 1) excision of both skin and underlying sweat glands (the most radical/extensive approach); 2) removal of subcutaneous glands through a small incision by liposuction or by scraping the glands from the undersurface of the dermis with a curette; and 3) a combination of the two approaches described above in which a limited central excision is combined with curettage and/or liposuction of the surrounding axillary subcutaneous glands.

For a person suffering from primary hyperhidrosis, surgical sweat gland removal is usually only a partial solution to the problem, especially since the most annoying areas usually are the hands. Guidelines from the Canadian Hyperhidrosis Advisory Committee (Solish et al, 2007) state that reduction of sweat glands, done on an outpatient basis with local anesthesia, is indicated in patients with axillary hyperhidrosis who do not respond to treatment with topical aluminum chloride, botulinum toxin, and oral medications (glycopyrrolate). The guidelines indicate that local surgery should only be considered in severe cases of hyperhidrosis in which the patient fails to respond to all other treatment options.

Poor results have been reported with the use of psychotherapy and hypnosis. Psychological problems are in most cases a consequence of hyperhidrosis, not the cause. Hence,
psychiatric or psychopharmacologic therapy can not cure this disorder; at most it may help the patient to accept living with the problem.

Alternative medicine interventions, including homeopathy, massage, acupuncture and phytotherapeutic drugs, have not been proven effective.

In a pilot study, Goldman and Wollina (2008) examined the effectiveness of subdermal Nd-YAG laser for the treatment of axillary hyperhidrosis. A total of 17 patients (2 men and 15 women) with axillary hyperhidrosis were treated using a subdermal 1,064-nm Nd-YAG laser. Results were assessed by the patients as well as by the physician. The objective evaluation was realized by Minor's iodine starch test combined with planimetry. Histology was performed in axillary skin after the laser treatment. The subdermal laser-assisted axillary hyperhidrosis treatment using a 1,064-nm Nd-YAG laser resulted in significant clinical improvement. The authors concluded that the treatment of axillary hyperhidrosis using the 1,064-nm Nd-YAG laser has the advantage of a minor invasive procedure without leaving large scars and causing temporary impairment. The laser proved to be effective and safe. Moreover, they stated that although the laser treatment has shown promising results, further studies are needed for final conclusions.

Ultrasonic liposuction has been used as an alternative to tumescent liposuction for treatment of axillary hyperhidrosis. Commons and Lim (2009) reported their findings on treatment of axillary hyperhidrosis/bromidrosis by means of ultrasonography. A total of 13 patients (3 males, 10 females) with significant axillary hyperhidrosis and/or bromidrosis were recruited, treated with the VASER ultrasound, and followed for 6 months. Pre-operative assessment of the impact of hyperhidrosis and/or bromidrosis on lifestyle and the degree of sweat/odor were completed. Post-operative assessment of changes relative to lifestyle and degree of sweat/odor
reduction and patient and surgeon satisfaction were completed. Eleven of 13 patients had significant reduction in sweat/odor and had no recurrence of significant symptoms at 6 months. Two patients had a reduction in sweat/odor but not to the degree desired by the patients. No significant complications were noted. A simple amplitude and time protocol was established that provides consistent and predictable therapy. The complete procedure takes less than 1 hour to treat 2 axillae using local anesthetic. The authors concluded that the VASER is safe and effective for treatment of axillary hyperhidrosis/bromidrosis. The method is minimally invasive with immediate return to basic activities and only temporary minor restriction of arm movement. At 6 months the treatment appears to be long-lasting, but further follow-up is needed for verification of permanence. This was a small study; its findings need to be validated by well-designed studies with more patients and long-term follow-up.

Letada et al (2012) noted that axillary hyperhidrosis (AH) is a rather common idiopathic disorder of the eccrine sweat glands, which can interfere with daily activities and cause significant social distress. In a pilot study, these researchers examined the effects of 1,064-nm laser hair reduction on sweat production in patients with focal AH. In this prospective, case-controlled, randomized, pilot study, 1 axilla from 6 different subjects with AH was treated with monthly laser hair reduction sessions using the 1,064 nm neodymium:yttrium-aluminum-garnet (Nd:YAG) laser at typical settings. The contralateral axilla acted as a control. Subjects were asked to subjectively classify improvement of axillary sweating using a Global Assessment Questionnaire (GAQ) weekly after each treatment. Qualitative evaluation of sweating was also performed using a modified starch iodine test monthly after each treatment. In addition, prior to the first treatment and at 1 month following the final treatment, a punch biopsy was performed on the treatment axilla to assess for histologic changes to the eccrine gland and surrounding structures. Statistically significant improvements in subjective ratings of
sweating using the GAQ compared to baseline were observed. Objective improvements in sweating with modified starch iodine testing comparing treated versus non-treated axillae were also seen for at least 9 months in selected subjects. No significant differences in pre- and post-treatment biopsies were noted on routine histology. The authors concluded that laser hair reduction using the 1,064-nm Nd:YAG at laser hair removal settings provided subjective and objective improvements in patients with focal AH. The findings of this small pilot study need to be validated by well-designed studies.

Bechara et al (2012) evaluated the effect of diode laser epilation on the sweat rate of patients with AH. These investigators performed a randomized half-side controlled trial. A total of 21 patients were treated with 5 cycles of an 800-nm diode laser. Sweat rates were documented using gravimetry and a visual analog scale. Histologic examination was performed in all patients before and after treatment. A significant reduction in sweat rate was observed on the laser-treated (median of 89 mg/min, range of 42 to 208 mg/min versus 48 mg/min, range of 17 to 119 mg/min; p < 0.001) and the untreated contralateral (median of 78 mg/min, range of 25 to 220 mg/min versus median 65 mg/min, range of 24 to 399 mg/min; p = 0.04) sides, although no significant difference was found between the treated and untreated sides (p = 0.10). The authors concluded that although they observed a significant decrease in sweat rate on laser-treated sites, laser epilation was not able to reduce the sweat rate significantly more than on the untreated contralateral side. They stated that these results probably indicated a placebo effect rather than a direct therapeutic effect of laser epilation.

Percutaneous thoracic phenol sympathicolysis (PTPS) entails the introduction of small volumes of phenol into multiple sites on each side of the T2 to T4 sympathetic trunks and ganglia. This procedure is performed under local or general anesthesia guided by C-arm fluoroscopy. Percutaneous thoracic phenol
sympathicolysis is not widely used in clinical practice nor frequently referenced in the literature. There is currently insufficient evidence to support the use of PTPS for the treatment of hyperhidrosis.

Wang et al (2001) noted that their previous study demonstrated that a high concentration of phenol (75 to 90%) with minimal volume (0.02 ml) can elicit serious degeneration of ganglion cells of the stellate ganglia in cats. Another previous study demonstrated that approximately 84 to 90% of the upper thoracic (T2 to T3) sympathetic trunks can be found under an endoscope on the ventral side of the T2 to T3 rib heads. In this report, these investigators presented a new mode of dorsal PTPS for the treatment of palmar hyperhidrosis or axillary bromidrosis (AB). A total of 50 patients with palmar hyperhidrosis or AB were injected with 75% phenol into a total of 98 sides of the T2 to T3 or T3 to T4 sympathetic trunks and ganglia. The injected volume was 0.6 to 1.2 ml (average of 0.8 ml) for each side. The technique of dorsal percutaneous injection was performed under local anesthesia or local with intravenous general anesthesia and under the guidance of a C-arm fluoroscope. Forty patients (80%) showed satisfactory results, including cessation of sweating. The success rates of PTPS were 83.7% (41 of 49 patients) on the left side and 91.8% (45 of 49 patients) on the right side. The skin temperature of the thumb increased by 5.3 to 5.4 degrees C approximately 1 hour after the phenol injection in patients with satisfactory results, whereas it increased by only 1.3 to 2.7 degrees C in patients who had unsatisfactory results. The authors concluded that PTPS may be a good alternative to endoscopic sympathectomy to treat palmar hyperhidrosis and AB.

Kao and colleagues (2004) stated that the difference between axillary osmidrosis (AO) and AB is the degree of odor and quantity of sweat, which is associated with selection of therapeutic modality theoretically. Upper thoracic sympathectomy has been used for both diseases but its effect needs to be further evaluated with more clinical data. These
Researchers collected 108 patients with AO or AB treated by upper thoracic sympathectomy from July 1995 to July 2002. Of these patients, 42 suffered AO alone, 17 had AB (AO with AH), and 49 had AO with palmar hyperhidrosis (PH). Ninety-two patients (183 sides) received anterior subaxillary transthoracic endoscopic sympathectomy and 17 patients (33 sides) PTPS. The levels of sympathectomy or sympathicolysis were T3 to T4 for AO and AB, and T2 to T4 for AO with PH. Mean follow-up period was 45.2 months (13 to 97 months). The satisfaction rates of patients were 52.4 %, 70.6 % and 61.2 % for AO, AB and AO with PH, respectively. The rates of patients with improvement and satisfaction were 78.6 %, 88.2 % and 85.7 % for AO, AB, and AO with PH, respectively. The authors concluded that these findings suggested that upper thoracic sympathectomy may be an acceptable treatment for AB or AO with PH rather than AO only.

An UpToDate review on “Primary focal hyperhidrosis” (Smith and Pariser, 2013) does not mention the use of percutaneous thoracic phenol sympathicolysis as a therapeutic option.

Duller and Gentry (1980) stated that preliminary findings attesting to the successful therapeutic use of biofeedback training in reducing symptoms of chronic hyperhidrosis have been reported; 11 of the 14 adult patients trained with biofeedback were able to demonstrate clinical improvement in their excessive sweating 6 weeks after termination of treatment. Relaxation was suggested as the active ingredient in the biofeedback treatment effect. These preliminary findings need to be validated by well-designed studies.

Lin et al (2000) noted that patients undergoing an unsuccessful sympathectomy experience dryness on one hand and excessive sweating on the other. This is embarrassing for the patients, and resolution of both a previous failed sympathectomy and recurrent hyperhidrosis is important. These investigators examined the effectiveness of repeat ETS for palmar and axillary hyperhidrosis. From
September 1995 to January 1998, a total of 24 patients (11 men and 13 women; mean age of 28.2 years) underwent repeat ETS. The repeat ETS was performed with patients under general anesthesia using either a standard single-lumen endotracheal tube (12 patients) or a double-lumen endotracheal tube (12 patients). Ablation of T2 and T3 ganglia and any Kuntz fiber was performed in treating patients with palmar hyperhidrosis, and a similar procedure was performed on T3 and T4 ganglia for patients with axillary hyperhidrosis. The reasons for failure of the previous ETS were pleural adhesion (14/24), intact T2 ganglion (5/24), aberrant venous arch drainage to the superior vena cava (2/24), incomplete interruption of sympathetic nerve (2/24), and possible re-innervation (1/24). The mean operation time was 28 mins (range of 18 to 72 mins). In all, 23 patients had a satisfactory result, without recurrence of palmar or axillary hyperhidrosis. The mean follow-up time was 22 months (range of 5 to 30 months). The average hospital stay was 1.8 days. There was no surgical mortality. The authors concluded that repeat ETS is a safe and effective method for treating both an unsuccessful sympathectomy and recurrent palmar or axillary hyperhidrosis. Well-designed studies are needed to validate these preliminary findings.

Sugimura et al (2009) evaluated (i) post-operative satisfaction and the occurrence of compensatory sweating after ETS clipping in a consecutive series of patients, and (ii) the reversibility of adverse effects by removing the surgical clips. Between June 1998 and March 2006, a total of 727 patients undergoing bilateral endoscopic thoracic sympathetic clipping for hyperhidrosis or facial blushing were prospectively followed for post-operative satisfaction and subjective compensatory sweating. The effect of removing the surgical clips was assessed in 34 patients who underwent a subsequent reversal procedure after ETS clipping. Satisfaction and compensatory sweating were assessed using a visual analog scale (VAS) ranging from 0 to 10, with 10
indicating the highest degree. Follow-up was complete in 666 patients (92%). The median age was 26.9 years, and 383 (53%) were men. The level of sympathetic clipping was T2 in 399 patients (55%), T2 + T3 in 55 patients (8%), and T3 + T4 in 273 patients (38%). Median follow-up was 10.4 months (range of 0 to 83 months). Excellent satisfaction (8 to 10 on VAS) was seen at last follow-up in 288 (74%) of the T2 group, 33 (62%) of the T2 + T3 group, and 184 (85%) of the T3 + T4 group. Post-operative satisfaction was significantly higher in the T3 + T4 group when compared with the T2 or T2 + T3 groups (p < 0.01). Severe compensatory sweating (8 to 10 on the VAS) was reported in 42 (13%) of the T2 group, 11 (28%) of the T2 + T3 group, and 17 (8%) of the T3 + T4 group. Post-operative compensatory sweating was significantly lower in the T3 + T4 group when compared with the T2 or T2 + T3 groups (p < 0.05). Thirty-four patients have subsequently undergone removal of the surgical clips after ETS clipping. Follow-up was complete in 31 patients. The reasons for removal included severe compensatory sweating in 32 patients, anhydrosis of the upper limb in 4 patients, lack of improvement or recurrence of hyperhidrosis in 5 patients, and other adverse symptoms in 5 patients. The reversal procedure was done after a median time of 11.0 months (range of 1 to 57 months) after ETS clipping. The initial level of clipping was T2 in 21 patients, T2 + T3 in 7 patients, and T3 + T4 in 6 patients. There was a trend toward fewer subsequent reversal procedures in the T3 + T4 group when compared with the T2 or T2 + T3 groups (p = 0.06). Fifteen patients (48%) reported a substantial decrease in their compensatory sweating (5 to 10 on the VAS) after reversal. Thirteen patients (42%) reported that their initial hyperhidrosis or facial blushing has remained well controlled (8 to 10 on the VAS) after reversal. There was no significant relationship between the original level of clipping and the interval between ETS clipping and the subsequent reversal and reversibility of symptoms. The authors concluded that when compared with ETS clipping at the T2 or T2 + T3 levels, ETS clipping at the T3 + T4 level was associated with a higher satisfaction rate, a lower rate of severe compensatory
sweating, and a trend toward fewer subsequent reversal procedures. Subjective reversibility of adverse effects after ETS clipping was seen in approximately 50% of the patients who underwent endoscopic removal of surgical clips. Moreover, they stated that although yet to be supported by electrophysiologic studies, reversal of sympathetic clipping appeared to provide acceptable results and should be considered in selected patients.

Furthermore, an UpToDate review on “Primary focal hyperhidrosis” (Smith and Pariser, 2014) does not mention the use of biofeedback, radiofrequency (RF) ablation, and radiotherapy as therapeutic options.

In summary, there is currently insufficient evidence in the peer-reviewed literature to support the use of biofeedback, RF ablation, and radiotherapy as management tools.

Photodynamic Therapy

Mordon et al (2014) stated that hyperhidrosis is a medical problem defined as perspiration in excess of what is normally needed to cool the body. The excessive production of sweat by the sudoriferous glands is independent of the process of thermoregulation. Techniques have recently appeared that make use of energy sources, in particular microwave devices and light (pulsed flash-lamp or laser). The aim is to obtain very long-lasting efficacy without notable side effects. Thermal Nd:YAG lasers used with an interstitial fiber, microwave devices, and photodynamic therapy appear to offer new treatment options for axillary hyperhidrosis. However, insertion of a laser fiber into tissue by means of a cannula may lead to complications if the procedure is not well mastered, as has been shown by numerous studies on laser lipolysis. The only microwave device available on the market is certainly interesting. Photodynamic therapy using eosin gel is an attractive technique. The energy source is a pulsed flash-lamp, which many physicians have Eosin gel is relatively easy
to produce and these gels are already marketed in several countries. The authors concluded that further clinical studies of larger series of patients and with longer follow-up are still needed to reach a definitive conclusion as to the value of this approach.

Ultrasound Therapy

Stashak and Brewer (2014) noted that primary hyperhidrosis (HH), a condition of sweating in excess of thermoregulatory requirements, affects nearly 3% of the U.S. population and carries significant emotional and psychosocial implications. Unlike secondary HH, primary HH is not associated with an identifiable underlying pathology. The limited understanding of the precise pathophysiologic mechanism for HH makes its treatment particularly frustrating. However, various interventions for the treatment of HH have been implemented throughout the world. These researchers discussed the most extensively studied therapeutic options for primary HH, including systemic oxybutynin, botulinum toxin injections, skin excision, liposuction-curettage, and sympathectomy. The authors concluded with a discussion of possible future therapies for HH, including the applications of laser, microwave, and ultrasound technologies.

An UpToDate review on “Primary focal hyperhidrosis” (Smith and Pariser, 2015) states that “Limited data suggest that topical botulinum toxin, ultrasound, and laser therapy can be useful for the treatment of axillary hyperhidrosis. Further study is necessary to determine the role of these therapies”.

Topical Glycopyrronium Tosylate (Qbrexza)

In an uncontrolled study, Mackenzie and associates (2013) reported the findings of 35 patients with axillary hyperhidrosis who previously failed treatment with topical aluminum chloride, and who applied a topical formulation of 1% glycopyrrolate in Cetomacrogol cream BP once-daily for 1 month. Only 9
Hyperhidrosis

patients (25.7%) had a greater than 50% reduction in the Dermatology Life Quality Index score, and only 2 patients (5.7%) desired to continue treatment at the end of the study.

Hyun and colleagues (2015) evaluated the safety and effectiveness of the topical glycopyrrolate on facial hyperhidrosis at specified post-treatment intervals. A total of 39 patients with facial hyperhidrosis were enrolled and treated with 2% topical glycopyrrolate on 50% of the forehead, whereas the other 50% of the forehead was treated with a placebo. All patients applied topical glycopyrrolate or placebo once-daily for 9 successive days. Each evaluation included weighing sweat and assessing the Hyperhidrosis Disease Severity Score (HDSS) score and any adverse effects.

Compared with the placebo-treated sides, topical glycopyrrolate-treated sides showed a reduction in the rate of sweat production at the forehead of 25.16 ± 10.30% (mean ± SD) at 90 mins after the first application (day 1), 29.63 ± 7.74% at 24 hrs after the first application (day 2) and 36.68 ± 11.41% at 24 hrs after 8 additional successive daily applications (day 10) (all p < 0.025). There was a little more decrease in HDSS score with the topical glycopyrrolate-treated 50% of the forehead, but the difference was not statistically significant (p > 0.025). No serious adverse events were reported during the course of this study. Only 1 patient developed a transient headache after treatment. The authors concluded that topical glycopyrrolate application appeared to be significantly effective and safe in reducing excessive facial perspiration. This was a small study with short-term follow-up. Well-designed studies with larger sample size and longer follow-up are needed to validate the effectiveness of topical glycopyrrolate for facial hyperhidrosis.

An UpToDate review on “Primary focal hyperhidrosis” (Smith and Pariser, 2015) states that “Topical glycopyrrolate -- Glycopyrrolate is an anticholinergic agent that is used as an oral drug for the treatment of hyperhidrosis. Limited data suggest that topical administration of glycopyrrolate can be
effective for craniofacial hyperhidrosis. Topical glycopyrrolate is not commercially available worldwide, but can be compounded. A commercial product is not available in the United States …. Adverse effects such as mydriasis, xerostomia, and other anticholinergic effects related to systemic absorption of topical glycopyrrolate are potential side effects of therapy. Additional studies are necessary to explore the safety and efficacy of topical glycopyrrolate therapy”.

Negaard and colleagues (2017) noted that hyperhidrosis can cause dehydration and exercise intolerance. There are several case reports of extremely high sweat rates in athletes. These investigators presented a case report of a 17-year old male with the highest sweat rate recorded in the literature (5.8 L/h). They examined if glycopyrrolate, an anti-cholinergic medication with primarily anti-muscarinic effects that is known to decrease sweat production, would reduce the sweat rate of this subject in a controlled exercise setting. The patient and a control subject were subjected to an exercise protocol consisting of running on a treadmill (5.4 to 6.7 mile/h at 1 degree of incline) in a warm climate-controlled chamber after receiving 0, 2, or 4 mg of glycopyrrolate. Core temperature, heart rate, rate of perceived exertion, and sweat rate were monitored in both subjects. Glycopyrrolate dose was not significantly correlated with decreased sweat rate and maximal core temperature. However, the clinical effect of reducing the sweat rate was very strong. The improvement of the subject's sweat rate allowed him to successfully return to sport. The authors concluded that these findings suggested that low-dose glycopyrrolate may be a safe and effective method of controlling exertional hyperhidrosis. Moreover, they stated that further study is needed to establish optimal dosing to maximize sweat reduction while minimizing the side effects associated with glycopyrrolate.

Baker (2016) noted that oral anti-cholinergic medications reduce generalized hyperhidrosis, but the effectiveness of topical anticholinergic solutions on axillary hyperhidrosis is
unclear. In a non-randomized, consecutive patient, prospective questionnaire, treatment comparison study, these researchers examined the initial effectiveness of 1% and 2% topical glycopyrrolate (TG) spray and compared this with BTX-A injections for the management of axillary hyperhidrosis. A total of 40 patients with axillary hyperhidrosis were allocated to 1 of 4 study groups (10 patients to each group): (a) 1% glycopyrrolate spray, (b) 2% glycopyrrolate spray, (c) subcutaneous BTX-A injections, and (d) no treatment. Clinical outcomes were measured by comparing a prospectively administered questionnaire, completed both pre-treatment and 6 weeks after starting treatment; 40 healthy volunteers without axillary hyperhidrosis completed the same questionnaire. The 3 treatment groups showed a significant (p < 0.05) improvement in their hyperhidrosis scores following treatment. The degree of improvement was less for the 1% glycopyrrolate group when compared with the BTX-A group (p < 0.05), but there was no difference in treatment outcomes between the 2% glycopyrrolate and BTX-A groups. No treatment group experienced reduced hyperhidrosis to a level similar to those without hyperhidrosis. Patients in both, the 2% glycopyrrolate and BTX-A groups reported a significant improvement in axillary hyperhidrosis symptoms. These included reduction in psychologically precipitating factors (e.g., public speaking) and axillary hyperhidrosis-specific physical effects (e.g., limitation of clothing choice). The authors concluded that TG spray could provide a further treatment modality to manage axillary hyperhidrosis.

Glaser and associates (2019) noted that GT is a topical anticholinergic developed for once-daily treatment of primary axillary hyperhidrosis. In 2 phase-III RCTs, these researchers examined the safety and efficacy of GT for primary axillary hyperhidrosis. ATMOS-1 and ATMOS-2 were replicate randomized, double-blind, vehicle-controlled, 4-week, phase-III clinical trials. Patients were randomized 2:1 to GT 3.75% or vehicle applied once-daily to each axilla for 4 weeks. Co-primary end-points were responder rate (greater than or equal
to 4-point improvement from baseline) on item 2 (severity of sweating) of the Axillary Sweating Daily Diary (ASDD), which is a newly developed patient-reported outcome measure, and absolute change from baseline in axillary gravimetric sweat production at week 4. Safety evaluation included treatment-emergent AEs. Pooled data, which were consistent with the individual trial results, showed that significantly more GT-treated patients achieved an ASDD-Item 2 response than did those treated with vehicle (59.5% versus 27.6%), and they had reduced sweat production from baseline (-107.6 mg/5 min versus -92.1 mg/5 min) at week 4 (p < 0.001 for both co-primary end-points). Most treatment-emergent AEs were mild or moderate and infrequently led to discontinuation. The authors concluded that GT applied topically on a daily basis over 4 weeks reduced the severity of sweating as measured by ASDD-Item 2, reduced sweat production as measured gravimetrically, and was generally well-tolerated in patients with primary axillary hyperhidrosis.

Hebert and co-workers (2019) stated that hyperhidrosis in pediatric patients has been under-studied. These investigators carried out post-hoc analyses of 2 phase-III randomized, vehicle-controlled, 4-week trials (ATMOS-1 and ATMOS-2) to evaluate safety and efficacy of topical GT in pediatric patients. Subjects had primary axillary hyperhidrosis for greater than or equal to 6 months, average ASDD-Children (ASDD-C) Item 2 (sweating severity) score of greater than or equal to 4, sweat production of greater than or equal to 50 mg/5 min (each axilla), and HDSS of greater than or equal to 3. Co-primary end-points were greater than or equal to 4-point improvement on ASDD/ASDD-C Item 2 (a validated patient-reported outcome) and change in gravimetrically measured sweat production at Week 4. Safety and efficacy data were shown through Week 4 for the pediatric (greater than or equal to 9 to less than or equal to 16 years) versus older (greater than 16 years) subgroups. A total of 697 patients were randomized in ATMOS-1/ATMOS-2 (GT, n = 463; vehicle, n = 234); 44 were greater than or equal to 9 to less than or equal
to 16 years (GT, n = 25; vehicle, n = 19). Baseline disease characteristics were generally similar across subgroups. GT-treated pediatric versus older patients had comparable improvements in ASDD/ASDD-C Item 2 (sweating severity) responder rate, HDSS responder rate (greater than or equal to 2-grade improvement), sweat production, and QOL (mean change from baseline in DLQI/children’s DLQI), with greater improvement versus vehicle. Treatment-emergent AEs were similar between subgroups, and most were mild, transient, and infrequently led to discontinuation. The authors concluded that topical, once-daily GT improved disease severity (ASDD/ASDD-C, HDSS), sweat production, and DLQI, with similar findings in children, adults, and the pooled population; GT was well-tolerated, and treatment-emergent AEs were qualitatively similar between subgroups and consistent with other anticholinergics.

Pariser and colleagues (2019) noted that GT is a topical anticholinergic approved in the U.S. for primary axillary hyperhidrosis in patients aged greater than or equal to 9 years. GT was evaluated for primary axillary hyperhidrosis in replicate, randomized, double-blind, vehicle-controlled, phase-III clinical trials. GT reduced sweating severity and production versus vehicle and was generally well-tolerated. These investigators examined patient-reported outcomes (PROs) from these trials. Patients aged greater than or equal to 9 years with primary axillary hyperhidrosis of greater than or equal to 6 months, gravimetrically measured sweat production of greater than or equal to 50 mg/5 mins in each axilla, ASDD Item 2 severity score of greater than or equal to 4, and HDSS score of greater than or equal to 3 were randomized 2:1 to GT 3.75 % or vehicle applied once-daily to each axilla for 4 weeks. The 4-item ASDD, 6 Weekly Impact (WI) items, Patient Global Impression of Change (PGIC), HDSS, and DLQI were utilized. In the pooled population, 463 patients were randomized to GT and 234 to vehicle; 426 (92.0 %) and 225 (96.2 %) completed the trials. At baseline, most patients considered their axillary sweating to be at least moderate in severity, impact, and
bothersomeness (ASDD items 2, 3, and 4, respectively).

Improvement was substantially greater for GT than for vehicle at every study week, and, at week 4, ASDD scores improved from baseline by 62.6 versus 34.0 % (severity), 65.5 versus 40.3 % (impact), and 65.4 versus 39.0 % (bothersomeness). Improvements favoring GT versus vehicle also occurred for WI items, PGIC, HDSS, and DLQI. The authors concluded that PRO results demonstrated that GT reduced the disease burden of primary axillary hyperhidrosis.

Nwannunu and co-workers (2019) noted that GT reduces sweat production by blocking the activation of acetylcholine receptors in peripheral sweat glands. In clinical trials, topical GT, a pre-moistened cloth containing 2.4 % glycopyrronium solution, was shown to be a safe, effective, and non-invasive treatment for patients suffering from primary hyperhidrosis. The authors examined the clinical trials of topical GT and its role in primary hyperhidrosis. The authors stated that GT was approved by the Food and Drug Administration (FDA) in June 2018 for the management of patients with primary axillary hyperhidrosis.

Treatments for Plantar Hyperhidrosis

Xiao and colleagues (2016) evaluated the effect of video-assisted thoracoscopic sympathectomy at the T4 level on plantar hyperhidrosis in the treatment of palmar hyperhidrosis. The clinical data of 28 patients with primary palmar hyperhidrosis, who were admitted to the authors’ hospital from June 2009 to May 2014, were analyzed. All patients were qualified to receive bilateral thoracoscopic transaction of the sympathetic chain at the thoracic level T4. Patients completed a self-administered hyperhidrosis questionnaire and scoring before and after procedure. Follow-up data were obtained at 1 and 6 months after the surgery. Endoscopic thoracic sympathectomy at the thoracic level T4 was performed successfully for all cases. Palmar hyperhidrosis was completely alleviated after the operation.
and no recurrence was observed during follow-up. The ratio for initial improvement of plantar hyperhidrosis was 28.6% (8/28) at 1 month after the surgery followed by a recurrence of plantar hyperhidrosis. No case continued to show the improvement of palmoplantar hyperhidrosis at 6 months after the sympathectomy; 27 patients (96.4%) were very satisfied with the outcome of the operation, 1 patient (3.6%) was satisfied and no patient regretted the surgical procedure. The authors concluded that T4 thoracoscopic sympathectomy could initially alleviate plantar hyperhidrosis in some patients with palmoplantar hyperhidrosis, but the improvement was not sustained over a long period. They stated that T4 thoracoscopic sympathectomy could not be used to treat plantar hyperhidrosis.

Singh et al (2016) examined the current literature regarding the management of plantar hyperhidrosis in the form of a structured review. A literature search was conducted using various databases and search criteria. The literature reported the use of conservative, medical and surgical treatment modalities for the management of plantar hyperhidrosis. However, long-term follow-up data are rare and some treatment modalities currently available are not fully understood. The authors concluded that there is a considerable dearth in the literature on the management of plantar hyperhidrosis. They stated that further study in larger populations with longer follow-up times is needed to evaluate the long-term effects of treatment. Moreover, they stated that iontophoresis, botulinum toxin injection and lumbar sympathectomy are promising treatment modalities for this disorder.

An UpToDate review on “Primary focal hyperhidrosis” (Smith and Pariser, 2016) states that “Although there are only limited data from randomized trials, iontophoresis appears to alleviate symptoms in approximately 85% of patients with palmar or plantar hyperhidrosis and is safe and simple to perform ….” The efficacy of botulinum toxin for palmar hyperhidrosis is
supported by multiple studies, including a few small randomized trials. Data on plantar hyperhidrosis are more limited.

Microwave Therapy

Electromagnetic microwave energy is purported to deliver microwave energy to axillary skin at specified frequency and power levels. One example of such system is the noninvasive miraDry which is indicated for use in the treatment of primary axillary hyperhidrosis and is not indicated for use in the treatment of hyperhidrosis related to other body areas or generalized hyperhidrosis.

Glaser et al (2012) noted that duration of effect and effectiveness limit current options for treating AH. These investigators examined the effectiveness of a new microwave procedure for treatment of AH. Adults with primary AH were enrolled in a randomized, sham-controlled, blinded study. Subjects were required to have a HDSS score of 3 or 4 and baseline sweat production greater than 50 mg/5 min. Procedures were administered using a proprietary microwave energy device that isolates and heats target tissue. Responders were defined as subjects reporting a HDSS score of 1 or 2. Subjects were followed for 6 months (sham group) or 12 months (active group). Thirty days after treatment, the active group had a responder rate of 89% (72/81), and the sham group had a responder rate of 54% (21/39) (p < 0.001). Treatment effectiveness was stable from 3 months (74%) to 12 months (69%), when follow-up ended. Adverse events were generally mild, and all but 1 resolved over time. The authors concluded that the procedure demonstrated statistically significant, long-term effectiveness in sweat reduction. Moreover, they stated that as with any new procedure, findings from this first investigational device study identified optimization strategies for the future.
Hong et al (2012) stated that a third-generation microwave-based device has been developed to treat AH by selectively heating the interface between the skin and underlying fat where the sweat glands reside. A total of 31 adults with primary AH were enrolled. All subjects had 1 to 3 procedure sessions over a 6-month period to treat both axillae fully. Effectiveness was assessed using the HDSS, gravimetric weight of sweat, and the Dermatologic Life Quality Index (DLQI), a dermatology-specific quality-of-life scale. Subject safety was assessed at each visit. Subjects were followed for 12 months after all procedure sessions were complete. At the 12-month follow-up visit, 90.3 % had HDSS scores of 1 or 2, 90.3 % had at least a 50 % reduction in axillary sweat from baseline, and 85.2 % had a reduction of at least 5 points on the DLQI. All subjects experienced transient effects in the treatment area such as swelling, discomfort, and numbness. The most common adverse event (12 subjects) was the presence of altered sensation in the skin of the arm that resolved in all subjects. The authors concluded that the microwave-based device provided effective and durable treatment for AH. The findings of this small study need to be validated by well-designed studies.

An UpToDate review on “Primary focal hyperhidrosis” (Smith and Pariser, 2013) states that “Early studies suggest that microwave energy can be utilized to destroy eccrine glands and relieve hyperhidrosis in the axilla. In a randomized trial of 120 adults with primary axillary hyperhidrosis who were given 1 to 3 treatments with a microwave energy device (n = 81) or a sham device (n = 39), patients treated with the microwave device were more likely to notice a subjective reduction in the severity of axillary hyperhidrosis 30 days after treatment than patients in the sham treatment group (89 versus 54 %). The difference in favor of active treatment remained statistically significant for up to 6 months. In addition, more patients in the active group achieved at least a 50 or 75 % reduction in a gravimetric measurement of sweat production through 6 months after treatment. However, this difference was only
statistically significant for patients who achieved greater than or equal to 75% improvement at the 30 day time point (62 versus 39%). The most common side effects of treatment were altered skin sensation (median duration 25 days, range of 4 to 225 days), discomfort, and other local reactions. Additional studies are necessary to determine the role of microwave energy devices in the treatment of hyperhidrosis.

In a systematic review, Hsu and colleagues (2017) evaluated the literature on the use of the microwave-based device for subdermal thermolysis of the axilla and its effectiveness for the treatment of axillary hyperhidrosis. They performed the review using PubMed, Embase, SCOPUS, and Cochrane databases on June 2, 2016. The inclusion criteria included: (i) studies with human subjects, (ii) full-text articles published in English, (iii) a microwave-based device used to treat axillary hyperhidrosis, and (iv) trials that precisely evaluated axillary hyperhidrosis. Exclusion criteria included: (i) studies that did not fit the inclusion criteria mentioned above, and (ii) case reports and reviews. These investigators reviewed 5 clinical trials and 189 patients, all of which were published between 2012 and 2016. There was 1 randomized controlled trial (RCT), 1 retrospective study, and the remainder were prospective studies. Although all of the studies were conducted with a small sample size, the results indicated that microwave-based device treatment of axillary hyperhidrosis had long-term effectiveness with mild adverse events (AEs). In addition, most patients were satisfied with the outcomes in these studies. The authors concluded that microwave-based device treatment may be an effective alternative treatment for axillary hyperhidrosis; however, further investigation is needed to ascertain its long-term safety and effectiveness.

Radiofrequency Ablation/Thermotherapy

In a case-study, Asik et al (2008) reported their experience with sympathetic RF neurolysis in a 35-year old male with right unilateral lumbar hyperhidrosis. Under scopy-guided
localization of the lumbar spine sympathetic blockade with local anesthetics to L2 to L5 vertebral levels were performed as a diagnostic block. Lesion effectiveness was monitored by bilateral feet skin temperature measurement. Clinical effects produced by the first sympathetic ganglion block were sustained for 1 week and then RF neurolysis of lumbar sympathetic ganglion was performed to the same levels for a longer effect. The procedure was accomplished within 30 mins and the patient was discharged within 2 hrs after the procedure. Hyperhidrosis was relieved after the procedure and there were no post-sympathectomy neuralgia and sexual dysfunction. The patient obtained improvement of lumbar hyperhidrosis at his first month of follow-up and was satisfied with the outcome. The authors concluded that RF neurolysis of lumbar sympathetic ganglia is a safe and effective palliative procedure with minimal invasiveness for relieving excessive sweat secretion in patients with localized hyperhidrosis. The findings of this case-report need to be validated by well-designed studies.

Purtuloglu et al (2013) tested the primary hypothesis that RF therapy is independently associated with decreased palmar hyperhidrosis and compared results for patients receiving this treatment with patients who underwent surgical sympathectomy. These researchers included all the patients undergoing treatment for hyperhidrosis between March 2010 and April 2012. Patients who underwent either surgical sympathectomy or RF ablation for palmar hyperhidrosis were included and analyzed. The outcomes studied included complications, success of the procedure, patient satisfaction with their procedure and compensatory hyperhidrosis. There were 94 patients who met inclusion criteria, of whom 46 (49 %) had surgical sympathectomy and 48 (51 %) had RF ablation performed. Radiofrequency had a success rate of 75 % in treating hyperhidrosis, but this was found to be statistically lower than for surgical sympathectomy (95 %; p < 0.01). The groups were similar regarding patient satisfaction (p = 0.26) and compensatory hyperhidrosis (p = 0.78). The authors
concluded that this was the first clinical study to evaluate the role of RF ablation and compare it with the surgical treatment option for palmar hyperhidrosis. They stated that RF ablation significantly decreased hyperhidrosis, but it had a lower success rate than surgical sympathectomy.

Schick and colleagues (2016) presented RF thermotherapy (RFTT) as a new treatment method for AH. A total of 30 adult patients with pronounced AH were treated with RFTT with non-insulated micro-needles 3 times at intervals of 6 weeks. Subjective improvement was rated using the HDSS and DLQI. Satisfaction and estimated reduction of sweating were monitored. Objective measurements were made using gravimetry; AEs were recorded in follow-up. At the 6-month follow-up, improvement in sweating was seen in 27 patients. The HDSS dropped from 3.4 to 2.1, the DLQI improved significantly from 16 to 7. The gravimetric measurements of sweat were reduced from 221 to 33 mg/min. The average reduction of sweating was reported to be 72%; AEs were generally mild and improved rapidly. The authors concluded that RFTT was shown to be an effective and minimally invasive treatment option for AH; patients described their sweating as normal. They stated that the method clearly has the potential to normalize axillary sweating.

Osteopathic Manipulation

Shanahan and colleagues (2017) noted that Isaacs syndrome is a rare neuromuscular disorder characterized by chronic muscle stiffness, cramping, fasciculations, myokymia, and hyperhidrosis. Pathogenesis includes autoimmunity, paraneoplastic disorders, genetic predisposition, or toxin exposure. There is no known cure for Isaacs syndrome. These investigators described a patient who had been given the diagnosis of Isaacs syndrome and received osteopathic manipulative treatment to manage fascial and cranial
dysfunctions and reduce nervous system hyper-excitability; and noted long-term decrease of myokymia and reduction of severity and frequency of exacerbations.

Laser

Cervantes and colleagues (2018) stated that hyperhidrosis occurs when the body produces sweat beyond what is essential to maintain thermal homeostasis. The condition tends to occur in areas marked by high-ecr ine density (e.g., axillae, palms, and soles) and less commonly in the craniofacial area. The current standard of care is topical aluminum chloride hexahydrate antiperspirant (10 to 20%), but other treatments such as anti-cholinergics, clonidine, propranolol, anti-adrenergics, injections with attenuated botulinum toxin (BTX), microwave technology, and surgery have been therapeutically implicated as well. Yet, many of these treatments have limited efficacy, systemic side effects, and may be linked with significant surgical morbidity, creating need for the development of new and effective therapies for controlling excessive sweating. These investigators examined the use of lasers, particularly the Nd:YAG and diode lasers, in treating hyperhidrosis. The authors concluded that due to its demonstrated effectiveness and limited side effect profile, this review suggested that Nd:YAG laser may be a promising treatment modality for hyperhidrosis. Moreover, they stated that additional large RCTs are needed to confirm the safety and efficacy of this therapeutic option.

Liposuction-Curettage

Nasr and associates (2017) compared microwave ablation (MA), BTX injection, and liposuction-curettage (LC) in the treatment of primary axillary hyperhidrosis based on subjective and objective criteria. These investigators performed a systematic review of the literature published in French or English between January 1, 1991 and February 1, 2015 using PubMed and Embase databases; 16 of 775 articles were
selected based on relevance and criteria of inclusion and exclusion. The 3 methods proved to be efficient and safe; however, MA and BTX injection had better results when compared to LC in the short-term. Both MA and LC showed longer lasting results when compared to BTX injection. However, in the long-term, MA was superior to LC. The authors concluded that MA, LC, and BT injections are safe and efficient minimally invasive alternatives for the treatment of axillary hyperhidrosis. Moreover, they stated that well-designed RCTs are needed to further compare the efficacy of these techniques.

Furthermore, an UpToDate review on “Primary focal hyperhidrosis” (Smith and Pariser, 2018) states that “Suction curettage -- For many years axillary hyperhidrosis was surgically treated with subcutaneous curettage or excision of the skin containing eccrine glands. However, this procedure has a significant failure rate and is associated with permanent scarring and the risk of restricted arm movement. Minimally invasive suction curettage, a newer local surgical technique for removing axillary eccrine and apocrine sweat glands, may have improved outcomes and decreased morbidity … Ideally, the permanent removal of axillary sweat glands via suction curettage would result in permanent improvement of hyperhidrosis, unlike non-surgical local interventions. However, the limited amount of outcomes data on suction curettage and variation in surgical technique among studies preclude definitive conclusions about the long-term efficacy of the procedure. The potential for long-term benefit is supported by a prospective study of 28 patients that found reductions in resting and exercise-induced sweat rates of 70 and 86 % 1 month after treatment, and 58 and 87 %, respectively, after 1 year. Treatment results at 1 year were graded as excellent, good, or satisfactory by 25, 14, and 24 % of patients, respectively. Continued hyperhidrosis after suction curettage may occur as a result of skipped areas or compensatory sweating. The skill of the surgeon performing the procedure
also may influence treatment efficacy. Recurrences of hyperhidrosis may be related to reinnervation of remaining sweat glands.

Oxybutynin Gel

In a randomized, double-blind, placebo-controlled, split area study, Artzi and associates (2017) evaluated the efficacy of topical oxybutynin 10% gel in treating 61 patients with primary focal hyperhidrosis. The gel was applied to the right or left axilla, palms or soles versus a placebo compound to the contralateral side for 30 days. A blinded visual grading of the change in starch-iodine tests was performed by 2 non-involved physicians. The HDSS and DLQI questionnaires were administered before and after treatment. Patients rated their satisfaction with treatment; 53 patients completed the 4-week treatment. Sweat reduction in the drug-treated sweating areas was higher than in the control-treated areas. There was a significant mean improvement in pre- and post-treatment HDSS and DQLI (p = 0.001 for both); 39 subjects (74%) reported moderate-to-high satisfaction. The authors concluded that the findings of this study demonstrated that topical oxybutynin appeared to be a safe and efficient therapeutic option for focal primary hyperhidrosis. Moreover, they stated that follow-up studies are needed to measure the extent of drug absorption as well as to optimize dosage and improve drug formulation.

Delort and co-workers (2017) stated that oxybutynin presents as an efficient drug with a low level of AEs for the treatment of primary hyperhidrosis. Main indications for this drug are generalized sweat, multi-focal or resistant to other forms of treatment, and as a 2nd- or 3rd-line treatment for axillary and palmoplantar hyperhidrosis. The doses required for treatment varies among authors, and different dosages may be adapted to the weight of patients and compromised areas, always taking into account the principle of the lowest possible dose to minimize undesirable adverse events. The authors concluded
that studies with longer follow-ups are needed to establish the drug's safety and long-term results, although recent studies are encouraging.

Nguyen and colleagues (2018) noted that there are no reliably effective, well-tolerated topical agents for the treatment of hyperhidrosis. In a pilot study, these researchers evaluated the efficacy and tolerability of oxybutynin 3 % gel in adolescents and young adults with primary focal hyperhidrosis. Patients with severe axillary hyperhidrosis were treated with topical oxybutynin 3 % gel for 4 weeks. Response to treatment was assessed by calculating change in HDSS from baseline to weeks 1 and 4. Change in health-related quality of life (QOL) was assessed using the Children's Dermatology Life Quality Index (CDLQI) or the DLQI; AEs were evaluated using patient diaries, investigator global review, and physical examination. Of 10 enrolled patients (aged 13 to 24 years), 7 completed the study. Of those who completed the study, 4 (57.1 %) reported reduction in axillary HDSS at week 1 and all 7 (100 %) at week 4; 6 patients (85.7 %) reported reduction in CDLQI or DLQI score. Anti-cholinergic AEs were infrequent. The majority of treatment-related AEs were mild-to-moderate in severity; 1 patient experienced a severe AE. The authors concluded that oxybutynin 3 % gel reduced hyperhidrosis severity and improved health-related QOL in this small pilot study. Moreover, they stated that the safety and efficacy of oxybutynin 3 % gel should be further evaluated in a large, prospective, placebo-controlled study.

Pulsed Radiofrequency

Lin and colleagues (2017) noted that PH exhibits excessive and unpredictable sweating. The most effective treatment for permanent cure is the ablation of thoracic sympathetic ganglia innervating hands. However, sympathectomy of T2 sympathetic ganglion by clipping or cauterization causes irreversible nerve damage, and results in a compensatory
hyperhidrosis (CH). In an animal study, these researchers used pulsed RF (PRF) stimulation to reversibly block sympathetic ganglion to treat PH and avoid CH. A bipolar electrode was implanted into the right T2 sympathetic trunk by endoscopic surgery and PRF was delivered via the electrode. The humidity (%) of right palm was measured to indicate sweating level; 6 out of 13 rats (46.2 %) that received a 5-min PRF stimulation on the T2 sympathetic trunk showed a decrease in the right palm humidity during the surgery. PRF stimulation significantly reduced humidity from 69.17 % ± 0.72 % obtained from baseline condition to 66.93 % ± 0.69 %. The humidity reduction was also observed at 10 mins after the PRF stimulation. These investigators further evaluated the effect of PRF stimulation 1 week after surgery and found that the PRF stimuli reduced right hand humidity in 5 out of 8 rats (62.5 %); PRF stimulation significantly reduced humidity from 66.11 % ± 0.81 % obtained from sham operation control to 63.62 % ± 0.82 %. The percentage of right hand humidity obtained 10 mins after PRF stimulation was also reduced to 63.38 % ± 0.80 %. Anesthetics had no effect on humidity. The authors concluded that these findings indicated that PRF stimulation of T2 sympathetic trunk reduced palm sweating in rats. These preliminary findings need to be further investigated in human studies.

Topical Umeclidinium

In a phase-2a, 2-week, double-blind, randomized, vehicle-controlled study, Nasir and colleagues (2018) evaluated systemic exposure, safety and tolerability of topically administered umeclidinium (UMEC; a long-acting muscarinic antagonist) in subjects with primary axillary hyperhidrosis. Clinical effect was a secondary objective, measured by gravimetry and the HDSS. Vehicle was included to evaluate safety. A total of 23 subjects were randomized to either 1.85 % UMEC (n = 18) or vehicle (n = 5) once-daily. Measurable plasma concentrations were seen in 78 % of subjects after the treatment; 9 subjects (50 %) on UMEC and 2 subjects (40 %)
on vehicle reported AEs, most commonly application site reactions. At day 15, 7 subjects (41 %) in UMEC and 2 subjects (40 %) in vehicle had at least a 50 % reduction in sweat production; 8 subjects (47 %) in UMEC and 1 subject (20 %) in vehicle had at least a 2-point reduction in HDSS. No comparisons of treatment arms were planned prospectively.

The authors concluded that measurable exposure, acceptable safety and preliminary clinical activity observed in this proof-of-concept study suggested the potential clinical utility of topical UMEC in subjects with axillary hyperhidrosis.

Clipping of the Thoracic Sympathetic Chain

Fibla Alfara and colleagues (2019) stated that division of the thoracic sympathetic chain is the standard treatment for severe palmar and/or axillary hyperhidrosis and facial flushing.

Clipping is an alternative option that allows the block to be reverted in cases of intolerable compensatory sweating. In a prospective study, these researchers evaluated results of clipping of the thoracic sympathetic chain in patients with palmar and/or axillary hyperhidrosis and facial flushing; and examined the improvement obtained after removal of the clip in patients with unbearable compensatory sweating. This trial included 299 patients (598 procedures) diagnosed with palmar hyperhidrosis (n = 110), palmar and/or axillary hyperhidrosis (n = 78), axillary hyperhidrosis (n = 35), and facial flushing (n = 76), who underwent video-thoracoscopic clipping between 2007 and 2015. A total of 128 men and 171 women were treated, with mean age of 28 years; 290 patients (97.0 %) were discharged within 24 hours. The procedure was effective in 92.3 % (99.1 % in palmar hyperhidrosis, 96.1 % in palmar and/or axillary hyperhidrosis, 74.3 % in axillary hyperhidrosis, and 86.8 % in facial flushing); 9 patients (3 %) presented minor complications. Compensatory sweating developed in 137 patients (45.8 %): moderate in 113 (37.8 %), severe in 16 (5.3 %) and unbearable in 8 (2.7 %). The clip was removed in these 8 patients; symptoms improved in 5 (62.8 %), with sustained effect on hyperhidrosis in 4 of them. The authors
concluded that clipping of the thoracic sympathetic chain was a safe and effective procedure. If incapacitating compensatory sweating developed, this technique allowed the clips to be removed with reversion of symptoms in a considerable number of patients.

CPT Codes / HCPCS Codes / ICD-10 Codes

*Information in the [brackets] below has been added for clarification purposes. Codes requiring a 7th character are represented by “+”.*

<table>
<thead>
<tr>
<th>Code</th>
<th>Code Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPT codes covered if selection criteria are met:</td>
<td></td>
</tr>
<tr>
<td>11450</td>
<td>Excision of skin and subcutaneous tissue for hidradenitis, axillary; with simple or intermediate repair</td>
</tr>
<tr>
<td>11451</td>
<td>with complex repair</td>
</tr>
<tr>
<td>15877</td>
<td>Suction assisted lipectomy; trunk [not covered for liposuction-curettage]</td>
</tr>
<tr>
<td>15878</td>
<td>upper extremity</td>
</tr>
<tr>
<td>32664</td>
<td>Thoracoscopy, surgical; with thoracic sympathectomy</td>
</tr>
<tr>
<td>64650</td>
<td>Chemodenervation of eccrine glands; both axillae</td>
</tr>
<tr>
<td>64653</td>
<td>other area(s) (e.g., scalp, face, neck), per day</td>
</tr>
<tr>
<td>64802 - 64823</td>
<td>Excision sympathetic nerves</td>
</tr>
<tr>
<td>97033</td>
<td>Application of a modality to one or more areas; iontophoresis, each 15 minutes</td>
</tr>
</tbody>
</table>

CPT codes not covered for indication listed in the CPB:
<table>
<thead>
<tr>
<th>Code</th>
<th>Code Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>17110 - 17111</td>
<td>Destruction, (eg, laser surgery, electrosurgery, cryosurgery, chemosurgery, surgical curettage), of benign lesions other than skin tags or cutaneous vascular lesions [laser treatment including subdermal Nd-YAG laser]</td>
</tr>
<tr>
<td>+90785</td>
<td>Interactive complexity (List separately in addition to the code for primary procedure)</td>
</tr>
<tr>
<td>90832 - 90853</td>
<td>Psychotherapy</td>
</tr>
<tr>
<td>90875 - 90876</td>
<td>Individual psychophysiological therapy incorporating biofeedback training by any modality (face-to-face with the patient), with psychotherapy (eg, insight oriented, behavior modifying or supportive psychotherapy)</td>
</tr>
<tr>
<td>90880</td>
<td>Hypnotherapy</td>
</tr>
<tr>
<td>97124</td>
<td>Therapeutic procedure, one or more areas, each 15 minutes; massage, including effleurage, petrissage and/or tapotement (stroking, compression, percussion)</td>
</tr>
<tr>
<td>97810 - 97814</td>
<td>Acupuncture</td>
</tr>
<tr>
<td>98925 - 98929</td>
<td>Osteopathic manipulative treatment (OMT)</td>
</tr>
</tbody>
</table>

**HCPCS codes covered if selection criteria are met:**

J0585  Botulinum toxin type A, per unit
J0587  Botulinum toxin type B, per 100 units

**ICD-10 codes covered if selection criteria are met:**

L74.510, L74.512, L74.513

Primary focal hyperhidrosis
## Code Description

<table>
<thead>
<tr>
<th>Code</th>
<th>Code Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>L74.52</td>
<td>Secondary focal hyperhidrosis</td>
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</table>

**ICD-10 codes not covered for indications listed in the CPB:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Code Description</th>
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</thead>
<tbody>
<tr>
<td>L74.511</td>
<td>Primary focal hyperhidrosis, face</td>
</tr>
<tr>
<td>L74.519</td>
<td>Primary focal hyperhidrosis, unspecified</td>
</tr>
</tbody>
</table>

The above policy is based on the following references:


31. Swinehart JM. Treatment of axillary hyperhidrosis:
   Combination of the starch-iodine test with the
32. Payne CM, Doe PT. Liposuction for axillary
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   sympathicolysis for essential hyperhidrosis: Immediate
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   Randomised, parallel group, double blind, placebo
   controlled trial. BMJ. 2001;323(7313):596-599.
37. Atkins JL, Butler PE. Hyperhidrosis: A review of current
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   thoracoscopic sympathectomy for palmar
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   2002;16(6):708-713.
40. Connolly M, de Berker D. Management of primary
   hyperhidrosis: A summary of the different treatment


65. NHS Institute for Innovation and Improvement, Clinical Knowledge Summaries Service (CKS). Hyperhidrosis - management. CKS Clinical Knowledge Summaries. Newcastle upon Tyne, UK; Sowerby Centre for Health Informatics at Newcastle (SCHIN); revised March 2009.


69. Smith CC. Idiopathic hyperhidrosis. UpToDate [online serial]. Waltham, MA: UpToDate; October 2008.


95. Smith CC, Pariser D. Primary focal hyperhidrosis. UpToDate Inc. Waltham, MA. Last reviewed March 2013.


101. Smith CC, Pariser D. Primary focal hyperhidrosis. UpToDate Inc., Waltham, MA. Last reviewed March 2014. (Updated March 2015)


120. Smith CC, Pariser D. Primary focal hyperhidrosis. UpToDate Inc., Waltham, MA. Last reviewed February 2018.


Glycopyrronium tosylate (Qbrexza) for hyperhidrosis.  

AETNA BETTER HEALTH® OF PENNSYLVANIA

Amendment to
Aetna Clinical Policy Bulletin Number: 0504 Hyperhydrosis

For the Pennsylvania Medical Assistance Plan:

1.) Botulinum toxins are subject to the Statewide preferred drug list (PDL) effective January 1, 2020 and determination of medical necessity is determined using the following criteria statewide PDL criteria: Botulinum Toxins.

2.) Photodynamic therapy is not considered experimental for treatment of hyperhidrosis.

3.) Microwave therapy is not considered experimental for treatment of hyperhidrosis.