HYPERHIDROSIS and other sweat gland disorders, including bromhidrosis and hidradenitis suppurativa (HS), have the potential to be deeply distressing conditions. When severe, they impair an individual’s daily activities, reduce performance and productivity in the workplace, and lead to higher rates of depression and poor personal image.

Despite the high physical and emotional impact of HS, some patients with hyperhidrosis and bromhidrosis do not seek treatment from their GP. Conversely, other patients present repeatedly until the diagnosis is made and treatment is initiated.

Hyperhidrosis is defined as the production of sweat in amounts greater than physiologically required. It is rarely a sign of significant underlying pathology. More often it is a chronic, primary, idiopathic problem. Idiopathic, primary focal hyperhidrosis is localised to certain areas of the body. The most commonly affected areas are the axillae, palms and soles.

Bromhidrosis refers to offensive body odour. It can cause significant embarrassment and social isolation and impair an individual’s quality of life. Sudiferous (sweat) glands are divided into apocrine (underarm, breast, groin) and eccrine (entire body) glands. Bromhidrosis is thought to occur through biotransformation of odourless secretions into volatile odorous molecules. In the axilla, Corynebacterium is the most common bacterium, which is implicated in the production of unpleasant smelling fatty acids. Hidradenitis suppurativa is also known descriptively as acne inversa. It is a chronic, relapsing inflammatory condition affecting the pilosebaceous unit. It most commonly affects the axillary, groin, perianal, perineal and genital skin. The inframammary skin may also be affected in some women.

Patients repeatedly present to emergency departments or their GP with a solitary painful ‘boil’. Delay in diagnosis and failure to initiate prophylactic treatment may result in the formation of sinus tracts, abscesses and scarring.

**Background**

**HYPERHIDROSIS** and other sweat gland disorders, including bromhidrosis and hidradenitis suppurativa (HS), have the potential to be deeply distressing conditions. When severe, they impair an individual’s daily activities, reduce performance and productivity in the workplace, and lead to higher rates of depression and poor personal image.

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Patients repeatedly present to emergency departments or their GP with a solitary painful ‘boil’. Delay in diagnosis and failure to initiate prophylactic treatment may result in the formation of sinus tracts, abscesses and scarring.
Hyperhidrosis

SWEATING is important for thermoregulation, skin hydration, and fluid and electrolyte balance.

Three types of sweat glands have been described: eccrine, apocrine and apoeccrine glands. Eccrine gland overactivity is implicated in the palmer and plantar hyperhidrosis, while overactive apocrine glands cause axillary hyperhidrosis.

Eccrine sweat glands are innervated by the sympathetic nervous system, with different regions of the brain controlling thermal and emotional sweating. Acetylcholine is the primary neurotransmitter responsible for innervating eccrine sweat glands. Sweating on the face, chest and back is caused by thermal stimuli, whereas sweating of the palms and soles is triggered by emotional stimuli.

Gustatory sweating, where both salivation and perspiration occur simultaneously in response to hunger or eating, is confined to the peri-oral region of the face.

In primary hyperhidrosis, sweat glands appear histologically normal, and it is believed that the cause of emotional hyperhidrosis is an inappropriate or exaggerated central response to emotional stress. Emotional sweating is rarely experienced during sleep.

Excessive sweating is a common complaint, with a prevalence of between one and three per cent in the population.

It is important for doctors to determine whether the hyperhidrosis is generalised or focal. The medical history should focus on:
- Location of sweating: generalised versus focal, unilateral or symmetrical
- Age of onset
- Duration of symptoms
- Triggers such as heat, emotion, eating
- Concurrent medical and medication history
- Psychological, physical and social impact
- Modifications to personal and professional behaviour

Generalised hyperhidrosis affects the entire body, and a detailed history and examination can distinguish idiopathic from secondary causes, including systemic diseases and medications. The most common cause of generalised hyperhidrosis is excessive heat. Table 1 lists a number of causes to consider when assessing generalised hyperhidrosis.

Focal hyperhidrosis most commonly affects the axilla, palms and soles. Patients may also describe sweating of the scalp, face, inframammary and groin areas. The most common causes of focal hyperhidrosis are listed in Table 2.

Primary focal hyperhidrosis is commonly reported in healthy adults younger than 25, with two-thirds of patients reporting a positive family history.

A diagnosis of primary focal hyperhidrosis can be made with a history of focal, visible, and excessive sweating of at least six months duration without apparent cause, accompanied by two of:
- Bilateral, symmetrical sweating
- Duration without apparent cause
- Sensitive sweating of at least six months
- History of focal, visible, and excessive sweating

The most common cause of generalised hyperhidrosis is excessive heat. Table 1 lists a number of causes to consider when assessing generalised hyperhidrosis.

Table 1. Causes of generalised hyperhidrosis to consider in general practice

<table>
<thead>
<tr>
<th>Type</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medications</td>
<td>Propranolol, Selective serotonin uptake inhibitors, Tricyclic antidepressants, Cholinesterase inhibitors, Opioids</td>
</tr>
<tr>
<td>Endocrine</td>
<td>Menopause, Hyperhidrosis, Diabetes mellitus, Hypoglycaemia, Pheochromocytoma, Hypopituitarism, Carcinoid syndrome</td>
</tr>
<tr>
<td>Infectious</td>
<td>Tuberculosis, HIV, Endocarditis, Malaria</td>
</tr>
</tbody>
</table>

Excessive sweating is a common complaint, with a prevalence of between one and three per cent in the population.

Table 2. Causes of focal hyperhidrosis

<table>
<thead>
<tr>
<th>Type</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gustatory sweating</td>
<td>Sweating around the mouth, nose and forehead associated with the consumption or sight of food that produces strong salivation. Particularly associated with spicy or hot food</td>
</tr>
<tr>
<td>Neurological (secondary)</td>
<td>Spinal cord injuries and peripheral neuropathy</td>
</tr>
</tbody>
</table>

Figure 1. The finding of comedones in the axilla or groin is pathognomonic for HS.

Figure 2. Abscess formation (single/multiple) without sinus tract development or scarring.

Figure 3. Multiple widespread lesions.

Figure 4. Diffuse involvement, with multiple connected sinus tracts and abscesses across the entire affected area.

Bromhidrosis can be divided into apocrine and eccrine bromhidrosis. Apocrine bromhidrosis is the most prevalent form, occurring exclusively after puberty and producing the distinctive axillary odour reported by many patients. Apocrine bromhidrosis is most common in males, possibly due to larger and more numerous apocrine glands.

Eccrine bromhidrosis occurs when eccrine sweat degrades keratin, with subsequent bacterial degradation. Eccrine bromhidrosis is most common on the soles, and the odour can linger in footwear and gym clothing. Ingestion of certain foods or medications may worsen eccrine bromhidrosis.

Metabolic disorders including trimethylaminuria, with its distinctive fishy odour, is another rare cause of bromhidrosis. Genetic testing is available in Australia, with the condition managed with dietary modification.

The diagnosis of bromhidrosis is made clinically. A thorough history is important. Bromhidrophobia is the abnormal fear of producing body odour and is associated with schizophrenia. Olfactory hallucinations can also be associated with intracranial lesions and a neurological examination is prudent if no odour is clinically apparent.
Although isolation of Corynebacterium, Staphylococcus, Micrococcus and Propionibacteria is common in patients with bromhidrosis, bacterial swabs are rarely beneficial for guiding treatment.

### Hidradenitis suppurativa

The prevalence of hidradenitis suppurativa (HS) is estimated to be around one per cent of the population, and up to four per cent among young adults attending sexual health clinics.2,19 HS can occur any time after the onset of puberty. It most commonly presents in the second and third decades of life, and is more common in women.

A positive family history in a first-degree relative is common. Other risk factors include high body mass index, smoking, diet and hormonal factors. Mechanical stress on the skin, or skin friction, is a factor in localising HS to certain body sites. Classically, apocrine glands have been implicated in the development of HS. However, recent research has demonstrated that follicular occlusion with secondary follicular rupture and localised inflammation are the primary events.63

Hormonally induced keratino-cytic hyperplasia and extrusion of follicular hyperkeratosis and follicular occlusion. Rupture of the sebofilm junction and local inflammation results in destruction of the follicle. Sinus tracts form and are colonised with commensal bacteria. Infection is a late and secondary event. HS begins in intertriginous regions, most commonly the axillae. Table 3 lists other intertriginous and non-intertriginous areas that may become affected progressively. The hallmark of early HS is acute pain, tender nodules in the axilla or groin.4. The nodules may rupture and drain malodorous material. The presence of chronic or relapsing inflammatory nodules, sinus tracts and scarring in intertriginous areas confirm the diagnosis of HS. The finding of comedones in the axilla or groin is pathognomonic for HS (see figure 1).

Any patient with a single ‘boil’ in the axilla or groin should be suspected of having HS.

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### Table 3. Body sites affected by hidradenitis suppurativa

<table>
<thead>
<tr>
<th>Type</th>
<th>Affected body site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intertriginous</td>
<td>Axillae, inguinal area; inner thighs; perianal and perineal area; mammary and inframammary; buttocks; pubic area; scrotum; vulva; chest; scalp and retroauricular area (ear)</td>
</tr>
<tr>
<td>Non-intertriginous</td>
<td>Sites of skin compression or friction; waistbands, bellines, and brassiere straps</td>
</tr>
</tbody>
</table>

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### Table 4. Characteristics of hidradenitis suppurativa and its differential diagnoses

<table>
<thead>
<tr>
<th>Condition</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Follicular poyderomas (folliculitis, furunculosis)</td>
<td>Superficial inflammatory papules (with or without pusules) that surround hair follicles</td>
</tr>
<tr>
<td>Acne vulgaris</td>
<td>Not as deep seated as HS lesions</td>
</tr>
<tr>
<td></td>
<td>Transient lesions that generally respond well to appropriate antibiotic therapy</td>
</tr>
<tr>
<td></td>
<td>Do not progress to form sinuses or keloid scarring</td>
</tr>
<tr>
<td>Intergluteal pilonidal disease</td>
<td>Infection of the skin and tissue of the natal cleft secondary to follicular occlusion</td>
</tr>
<tr>
<td></td>
<td>Formation of a sinus, cavity or pit in the natal cleft</td>
</tr>
<tr>
<td></td>
<td>May drain purulent, bloody and malodorous material</td>
</tr>
<tr>
<td></td>
<td>May coexist with HS</td>
</tr>
<tr>
<td>Crohn’s disease</td>
<td>Like HS, hyperkeratinisation leads to formation of comedones, inflammatory nodules and scarring</td>
</tr>
<tr>
<td></td>
<td>Generally distributed on the face, upper chest and back</td>
</tr>
<tr>
<td>Granuloma inguinale</td>
<td>Sexually transmitted infection caused by Klebsiella granulomatis</td>
</tr>
<tr>
<td></td>
<td>Characterised by enlarging red ulcers with bleeding granulation tissue</td>
</tr>
<tr>
<td></td>
<td>Ulcers confluent to the vulva, penis, scrotum, glans, and inguinal and perianal skin</td>
</tr>
</tbody>
</table>

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### Table 5. Clinical features of the Hurley clinical staging system

<table>
<thead>
<tr>
<th>Stage</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Abscess formation (single/multiple) without sinus tract formation (Figure 2) and development or scarring</td>
</tr>
<tr>
<td>II</td>
<td>Chronic/recurring abscess formation with sinus tract formation and draining (Figure 3) and sinus tract formation and draining or single/multiple widespread lesions</td>
</tr>
<tr>
<td>III</td>
<td>Diffuse involvement, with multiple connected sinus tracts and abscesses across the entire affected area (Figure 4)</td>
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### Management

#### Hyperhidrosis

**CONSERVATIVE management of generalised and focal hyperhidrosis involves identifying and treating any associated underlying cause, frequent use of commercially available antiperspirants and deodorants, and lifestyle modifications, such as more frequent showering, wearing light-weight clothing made from natural fibres, changing socks and underwear, and avoiding regular triggers such as spicy food and hot environments.**

#### Topical therapy

**Antiperspirants**

Most antiperspirant sprays contain a low-dose metal salt (generally aluminium), which physically obstructs the opening of the sweat gland in the skin. This obstruction damages the epithelial cells within the sweat duct leading to the formation of occlusive plugs. Antiperspirants containing aluminium chloride hexahydrate are more effective than agents containing aluminium chloride or aluminium chloride hexahydrate.9,66

A concentration of 10-20% aluminium chloride hexahydrate is appropriate for axillary hyperhidrosis, 25% for palmar and plantar hyperhidrosis and 35% for refractory cases.67

Treatment with stronger antiperspirants is often limited by skin irritation and burning sensation, particularly in the axilla. To minimise this reaction, antiperspirant should be applied to dry skin at night, when hyperhidrosis is reduced, and washed off in the morning.68 Skin irritation can be controlled with 1% hydrocortisones.69

**Botulinum toxin A**

Periodic injection of botulinum toxin A is a safe and effective treatment for focal hyperhidrosis.

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### Figure 5. A 19-year-old man with hidradenitis suppurativa showing left and right axilla nine months post-surgery to excise the axillary sweat glands.

**Periodic injection of botulinum toxin A is a safe and effective treatment for focal hyperhidrosis.**

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**Injections and non-subsidised cost.**

**Iontophoresis**

Iontophoresis utilises a direct electrical current to deliver polar molecules through intact skin to the sweat glands. Patients placed affected hands and/or feet on moistened pads in the iontophoresis unit for 15-20 minutes per session. Tap water is generally utilised in iontophoresis devices available for home use.90 Glycopyrronium bromide solution is the most effective liquid medium, however it is only available in specialist centres. Iontophoresis is a safe, efficacious treatment for palmar and plantar hyperhidrosis, alleviating symptoms in 40-85% of cases, depending on the solution used.91 Iontophoresis is not available in every Australian state.

Reported side effects include dry, cracked hands and feet, erythema and skin irritation, and transient vesiculation.21 Iontophoresis cannot be used for patients with a pacemaker or implantable device. Patients often trial iontophoresis in specialist skin clinics prior to purchasing a home device.

**Microwave thermolysis**

Microwave thermolysis utilises microwave energy to destroy eccrine glands and is an emerging therapy for axillary hyperhidrosis.22,23 Treatment is cont'd next page
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ment is generally administered through two 30-minute sessions separated by three months.

A device is available in some Australian specialised skin clinics, however, cost and limited availability preclude many patients from this therapy.

Systemic Therapy
The efficacy of anticholinergic medications in focal hyperhidrosis is well established. The most commonly prescribed anticholinergic medications in Australia are propantheline bromide and oxybutynin. These are cheap medications that can be used regularly to control hyperhidrosis. Glycopyrrolate is an effective alternative if not tolerated, although this medication is significantly more expensive. Anticholinergic side-effects are invariably reported, most commonly dry mouth, blurred vision, headache and urinary retention. Starting oral oxybutynin at a low dose (0.25mg/day) and increasing the dose slowly up to a maximum of 10mg/day reduces the likelihood of experiencing significant anticholinergic side effects. Drowsiness may occur. These agents may aggravate glaucoma. They are contraindicated in myasthenia gravis. There are numerous drug interactions and these agents all need to be used with caution. Specialist referral may be indicated.

Surgical Therapy
Surgery is reserved for patients who have failed topical and systemic therapy, and are experiencing serious social, emotional and professional consequences due to hyperhidrosis. Significant cost is a barrier for many patients.

Liposuction or local excision of axillary eccrine and apocrine glands may improve symptoms of axillary hyperhidrosis. Surgical excision is often associated with poor cosmetic outcomes, scarring, restriction of arm movements, and compensatory hyperhidrosis where sweating is paradoxically increased elsewhere on the body. Other complications include bruising, infection, haematoma and dysaesthesia. A randomised trial found that botulinum toxin A injection is superior to suction curettage in reducing resting and exercise-induced hyperhidrosis.

Endoscopic thoracic sympathectomy involves cauterising, clipping or cutting the sympathetic chain supplying the upper extremities or cervicofacial region. This surgery is reserved as a last resort for patients with morbidity debilitating disease. While effective for upper limb (including axillary) hyperhidrosis, there is a substantial risk of Horner syndrome, pneumothorax, paraesthesia and bradycardia. Up to 67% of patients will experience compensatory hyperhidrosis following endoscopic thoracic sympathectomy.

Bromhidrosis
It is important to assess the patient’s expectations and treatment goals. Conservative management — including routine washing, removal of axillary hair and removal of sweaty clothing — is sufficient for mild cases. However, improvement

Microwave thermolysis utilises microwave energy to destroy eccrine glands.

Figure 6. Patient with follicular occlusion tetrad demonstrating acne conglobata with severe acne scarring. Acne conglobata has a similar appearance to severe acne vulgaris, with the additional features of double comedones and dissecting interconnecting subcutaneous abscesses that heal to leave scar bridges.

Interventions to reduce the risk of developing further new lesions. Evidence-based European guidelines are currently being developed.

General measures
Lifestyle modifications and general measures to reduce the risk of developing new lesions include: Education and support: given an increased risk of major depression, all patients should be asked about psychological impact and offered resources for support. Hygiene: daily washing of affected areas will improve odour and minimise the risk of secondary infection. Using non-abrasive soap and no abra- sive material is essential. Bleach baths may be helpful. Non-irritating antiperspirants are recommended. For patients unable to tolerate antiperspirants, botulinum toxin injections are helpful. Weight management: excess weight has been associated with HS. Although a causative association has not been established, excess weight is associated with skin occlusion, skin trauma, and hormonal variations.

Smoking cessation: an association between smoking and HS has been identified in numerous patient populations. Continuing smoking appears to be a significant factor in patients who fail to achieve remission. Diet: dairy and high-glycaemic diets have been implicated in exacerbations of HS. Controlling smoking appears to be a significant factor in patients who fail to achieve remission. Diet: dairy and high-glycaemic diets have been implicated in exacerbations of HS. Diet: dairy and high-glycaemic diets have been implicated in exacerbations of HS.

Medical and surgical therapy
Treatment is dependent on disease severity, and includes topical therapy, systemic therapy, and surgery. Antibiotics used to treat HS are thought to act both as anti-inflammatory agents, as well as antibacterial agents. Treatment of mild disease (Hurry stage I) includes topical clindamycin, topical resorcinol, and minor surgery. Patients should be encouraged to bathe using a topical antiseptic or antibacterial soap that is not abrasive to damaged skin.

Clindamycin 1% lotion, applied twice daily to affected areas, is first-line therapy for mild HS. Clindamycin appears to decrease the number of inflammatory nodules and prevent secondary infec-

Figure 7. Patient with follicular occlusion tetrad demonstrating dissecting cellullitis of the scalp. Dissecting cellullitis produces dome-shaped nodules of alopecia. These nodules are filled with pus. If untreated these nodules heal with a permanent cicatricial alopecia. Intralesional triamcinolone can lead to partial or total hair regrowth.

Clindamycin 1% lotion, applied twice daily to affected areas, is first-line therapy for mild HS. Clindamycin appears to decrease the number of inflammatory nodules and prevent secondary infec-

Figure 8. Patient with follicular occlusion tetrad demonstrating hidradenitis suppurativa of left and right axilla and pubic region. A. The left axilla shows thickened scar tissue and sinus tract formation. B. The right axilla show an inflamed nodule and pathognomonic open comedones. C. The pubic region shows multiple inflamed nodules.

may aggravate hidradenitis suppurativa. Laser hair removal is a generally well-tolerated alternative.
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tion.42 Although not confirmed in clinical trials, there is evidence that oral antibiotics, typically doxycycline or minocycline, can alleviate acne flares of mild HS. Although the incidence of resistant acne is low, the presence of resistant acne should be sought after when patients present with acne flares.43,44 Application of resorcinol cream to nodules (not the entire region) appears to reduce pain and promote healing of new lesions.45 Localised desquamation is an expected side effect. However, the availability of resorcinol is limited in Australia.

Given that sinus tract formation is likely due to rupture of the follicular unit, removal of the entire nodule and unit through punch debridement reduces the risk of recurrence and disease progression.46 Other specialist treatment for mild HS includes intraligamental corticosteroid therapy, which may help settle acute flares.

Treatment for moderate disease (Harley stage II) includes systemic antibiotics, hormonal therapy and surgery. The suggested antibiotic regimen for moderate HS is doxycycline or minocycline 50-100mg twice daily for 3-6 months. Patients with moderate disease should be referred early for further treatment if not responding to systemic antibiotics.

Climadynin and rifampicin are suggested for patients who fail to respond to tetracyclines.47 These antibiotics are rarely used as initial therapy given the risk of Clotrimazole diffusion failure.

Given that androgens contribute to the development of hidradenitis suppurativa, antiandrogen medications can be effective for lesion resolution and prevention of new lesions in a sub-population of affected women.48 A combined oral contraceptive pill containing cyproterone acetate, drospirenone, desogestrel or gestodene is generally used. Spironolactone 25-50mg daily, increasing up to 100mg daily, is an alternative for women unable to tolerate oral contraceptive medications. All of these agents are contraindicated in pregnancy, which should be excluded prior to initi treating therapy. Male patients may respond to other dutasteride or finasteride.

Surgery for moderate hidradenitis suppurativa includes punch debride ment of new lesions and debride ment of extensive sinuses. Surgery does not arrest the underlying disease process and should accompany medical maintenance treatment.

Treatment for severe and refractory disease (Harley stage III) requires specialist multidisciplinary care involving dermatologists, plastic surgeons and often psychologists. Medical management includes the addition of TNF-alpha inhibitors, oral retinoids, immunosuppressants and surgery. These agents can be used in addition to the topical and systemic treatments outlined above. Intravenous TNF-alpha inhibitors, notably infliximab, are effective biological agents for severe HS.49,50 Early trials have found infliximab superior to adalimumab and etanercept. Availability, cost and significant adverse effects are limitations to biological agents for some patients.

Oral retinoids, including isotretinoin and acitretin benefit only a minority of patients. Retinoids can also aggravate HS in some patients.51-53 This aggravation may be due to the mechanism of action of isotretinoin, which increases intrafollicular pressure and ruptures the follicular wall. This may trigger an unwarranted inflammatory process and worsen the disease.

Immunosuppressants, including prednolimone and cyclosporine, are used to settle acute inflammation. A 3-4 day course of prednisolone 40-60mg daily is usually sufficient to settle acute flares. Cyclosporine can also be used in early disease to prevent new lesions forming. Cyclosporine is less useful in established disease with scarring and sinus tract formation.

Surgery is used in severe HS to remove acute nodules and sinus tracts, and to remove scarring tissue. Surgical procedures considered in severe hidradenitis suppurativa include incision and drainage of lesions, punch debridement of whole follicular units, unroofing of nodules and sinus tracts, and excision of entire affected regions. Surgery is usually combined with general measures and maintenance medical therapy.

Prognosis

Hyperhidrosis and bromhidrosis

UNTREATED, focal hyperhidrosis generally develops after puberty and rarely improves. With puberty and occurs multiple times per week. Patients experiencing significant social and professional consequences should be referred to a specialist early to initiate first- and second-line treatments. While carefully considering the adverse effects of each treatment, and the severity and location of the disease, many patients are likely to experience clinical improvement.

Bromhidrosis is generally well managed with an approach including lifestyle modifications, managing excess sweating and the application of fragrances.

Hidradenitis suppurativa

The impact of severe HS on a patient’s quality of life can be profound. The average duration of untreated HS is 20 years. The prognosis is improved by early diagnosis, accompanied by lifestyle modifications and intermittent medical treatment. Moderate disease requires specialist intervention and maintenance treatment. Severe HS is very difficult to treat and requires intensive medical and surgical treatment.

Emerging treatments

Hyperhidrosis

THERE have been reports that clonidine, an alpha-2 adrenergic agonist that diminishes the sympathetic nervous system, is effective in reducing hyperhidrosis.54 Some studies have suggested that patients experiencing emotional hyperhidrosis may benefit from beta blocker or benzodiazepine therapy.55,56 However, these should not be considered as part of routine management of hyperhidrosis.

Other treatments with limited data include topical botulinum, laser therapy and ultrasound therapy.57-59

Bromhidrosis

A number of studies have suggested that non-invasive treatment of bromhidrosis with laser therapy is effective in reducing axillary bromhidrosis.60-62 The data available for these therapies is limited and further investigation is required.

Hidradenitis suppurativa

Based on current case reports, numerous emerging therapies may benefit patients with severe HS. A number of patients have experienced improvement following subcutaneous injections of the interleukin inhibitors ustekinumab or anakinra.63-65

Other emerging adjuvant therapies for severe or refractory HS include efflornithine, zinc supplementation, hair removal laser therapy, botulinum toxin, vitamin D3 and external beam radiation. The evidence for these therapies is limited and should not be included in routine management regimens.

Case studies

Case study one

ANDREW, 26, presents to his GP complaining of excessive sweating during the day. He reports that he has a supply of shirts at work for when he invariably saturates the underarms of his clothing. When he invariably saturates the underarms of his clothing.

He returns to the dermatologist after two months of treatment, minimising skin irritation. However, he is unhappy with the degree of improvement. Andrew is referred to a dermatologist, where further treatment options are discussed. He is concerned about the possible side effects of anticholinergic medications. Given the substantial time and effort required to undergo iontophoresis, he elects to trial botulinum toxin A injections. Following a 50 IU dose into each axilla, there is a significant reduction in the rate of sweat production. He returns to the dermatologist six months later for repeat injections. Apart from mild pain at the injection sites during the procedures, Andrew tolerates treatment well and reports a significant improvement in his quality of life.

Case study two

LISA, 34, presents to her GP with recurrent boils in her left axilla and inner thighs. The nodules are exquisitely painful, malodourous and require intensive medical and surgical treatment. Apart from mild pain at the injection sites during the procedures, Andrew tolerates treatment well and reports a significant improvement in his quality of life.

Online resources

International Hyperhidrosis Society

www.sweathelp.org

European S1 guideline for the treatment of hidradenitis suppurativa/acne inversa

See: bit.ly/2IlSh2L

British Association of Dermatology

Hyperhidrosis leaflet

See: bit.ly/25t1vk4

British Association of Dermatology

Hidradenitis Suppurativa leaflet

See: bit.ly/1YW4Nd
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who has treated her for folliculitis and acne.

The flares started with a single, painful lesion in her inner thigh that affected her ability to walk long distances. She was given a course of oral cefalexin, which did not settle the lesion. She noticed a number of other lesions developing in the inner thigh and in her right axilla. The lesions tended to regress spontaneously within approximately two weeks.

She describes her worst flare consisting of eight painful lesions. An abscess on her inner thigh was incised and drained by her GP, with a significant improvement in her pain. Lisa also has polycystic ovarian syndrome, and she smokes one pack of cigarettes each day since adolescence and has a BMI of 31.

On examination during her worst flare, the GP counts 13 painful, deep-seated lesions in the left axilla and inner thigh. The lesions are widely separated and are accompanied by intercommunicating sinuses releasing malodorous bloody discharge. There is extensive scarring in the inner thigh. A diagnosis of hidradenitis suppurativa Hurley Stage II is made. Lisa is encouraged to bathe regularly using a non-soap cleanser, cease smoking, modify her diet and avoid skin trauma. It is imperative that she does not squeeze or manipulate the lesions in any way. Topical 1% clindamycin cream is applied twice daily for three months.

A course of oral doxycycline 100mg daily is prescribed and, as she has recurrent infections and is not currently planning to become pregnant, a combined oral contraceptive pill containing cyproterone acetate is commenced.

Given there have been worsening acute attacks, Lisa is referred to a specialist dermatologist. Punch debridement is performed to remove recurring lesions and the offending follicular units. With aggressive medical management and minor surgical management, she experiences significant clinical improvement within three months.

Lisa follows up routinely with the GP and dermatologist to monitor recurrence and encourage ongoing lifestyle modifications.

Summary

HYPERHIDROSIS, bromhidrosis and hidradenitis suppurativa are conditions that cause major distress and have significant deleterious effects on quality of life. Accurate diagnosis and early referral of patients with debilitating disease may minimise the effects of these conditions on personal and professional functioning.

Key points

- Accurate clinical evaluation of hyperhidrosis will help differentiate primary focal hyperhidrosis from generalised hyperhidrosis, which is likely secondary to medications or a systemic illness. The history should include questions about the consequences of hyperhidrosis on a patient’s life.
- Patients with significant hyperhidrosis unresponsive to aluminium-based antiperspirants should be referred early to a specialist for further treatment, including topical, systemic and surgical therapies. The selection of each treatment follows careful consideration of their specific adverse effects.
- Bromhidrosis can have substantial, negative consequences in social and professional settings. A clinical diagnosis is generally sufficient. Treatment consists of reducing the volume of sweating, optimising hygiene and application of fragrances to mask body odour.
- Hidradenitis suppurativa is a chronic follicular occlusive disorder that is characterised by recurrent nodules, sinus tracts and keloid scarring. It is not a primary disorder of apocrine glands as previously thought. It classically affects the intertriginous axillary, groin, perianal and mammary skin. The severe pain, odour, discharge and permanent scarring greatly impacts quality of life and psychological wellbeing.
- All patients with HS should be encouraged to undertake general measures and lifestyle modifications to prevent developing new lesions, particularly smoking cessation and dietary modification. Treatment thereafter depends on the clinical stage, with topical, systemic and surgical therapies available. Early referral to a dermatologist will help prevent disease progression.
- Patients with moderate to severe HS are at high risk of developing major depression. Resources for psychological support are beneficial for patients whose quality of life is negatively affected.
- Prior to HS to consider prior to dermatology referral include topical antibiotics, oral antibiotics and hormonal therapy. Severe disease may require immunological therapy or extensive surgical treatment.

How to Treat Quiz

Hyperfhidrosis and other sweat gland disorders — 12 August 2016

1. Which TWO statements regarding disorders of sweating are correct?
   a) Sweat gland disorders have the potential to be deeply distressing conditions.
   b) Sweat disorders, even when severe, are not associated with any impaired functionality of quality of life.
   c) Bromhidrosis refers to offensive body odor.
   d) Sudoriferous (sweat) glands are divided into eccrine (underarm, breast, groin) and apocrine (entire body) glands.

2. Which THREE statements regarding hyperhidrosis are correct?
   a) Hyperhidrosis is defined as the production of sweat in amounts greater than physiologically required.
   b) Hyperhidrosis can rarely be a sign of significant underlying pathology, particularly when generalised.
   c) Malignancy in it is a chronic, primary, idiopathic disease.
   d) Idiopathic, primary focal hyperhidrosis occurs most commonly in the groin and buttock cleft.

3. Which TWO statements are correct regarding the clinical features of hyperhidrosis?
   a) Three types of sweat glands have been described, eccrine, apocrine and apocrine glands.
   b) Eccrine sweat glands are innervated by the sympathetic nervous system.
   c) Apocrine gland overactivity is implicated in the palm and plantar hyperhidrosis, while overactive eccrine glands cause axillary hyperhidrosis.
   d) Gustatory sweating may be stimulated by either thermal or emotional stimuli.

4. Which THREE statements are correct regarding the clinical features of hyperhidrosis?
   a) Emotional sweating is commonly experienced during sleep.
   b) In primary hyperhidrosis, sweat glands appear histologically normal, and it is believed that the cause of emotional hyperhidrosis is an inappropriate or exaggerated central response to emotional stress.
   c) Generalised hyperhidrosis affects the entire body, and the most common cause is excessive heat.
   d) Primary focal hyperhidrosis is commonly reported in healthy adults younger than 25, with two-thirds of patients reporting a positive family history.
   e) The finding of nodules in the axilla or groin is pathognomonic for HS.

5. Which TWO statements regarding bromhidrosis are correct?
   a) Eccrine glands are responsible for non-regulated odours.
   b) Apocrine hyperhidrosis is the most prevalent form, occurring exclusively after puberty and producing the distinctive axillary odour reported by many patients.
   c) Eccrine hyperhidrosis is most common on the soles and the odour can linger in footwear and gym clothing.
   d) The diagnosis of bromhidrosis is made by identifying the offending organism on culture, which then guides treatment.

6. Which THREE statements regarding hidradenitis suppurativa are correct?
   a) Risk factors include high BMI, smoking, diet and hormonal factors.
   b) Mechanical stress on the skin, or skin friction is a factor in localising HS to certain body sites.
   c) HS is more common in men.
   d) Follicular occlusion with secondary follicular rupture and localised inflammation are the primary events.

7. Which TWO statements regarding hidradenitis suppurativa are correct?
   a) The hallmark of early HS is acute painful, tender nodules in the axilla or groin.
   b) HS begins in intertriginous regions, most commonly the groin.
   c) The finding of nodules in the axilla or groin is pathognomonic for HS.
   d) The presence of chronic or relapsing inflammatory nodules, sinus tracts and scarring in intertriginous areas confirm the diagnosis of HS.

8. Which THREE are differential diagnoses of hidradenitis suppurativa?
   a) Follicular pyodermas
   b) Granuloma inguinale
   c) Nummular eczema
   d) Crohn’s disease

9. Which TWO statements regarding the management of hyperhidrosis are correct?
   a) Biotulinum toxin A is still in the experimental stages and not recommended for the treatment of hyperhidrosis.
   b) Conservative management of generalised and focal hyperhidrosis involves identifying and avoiding relevant triggers such as spicy food and hot environments.
   c) Anticholinergic medications are cheap, effective and safe, and are regarded as first line treatment for hyperhidrosis.
   d) Surgery is reserved for patients who have failed topical and systemic therapy and are experiencing serious social, emotional and professional consequences due to hyperhidrosis.

10. Which THREE statements regarding the management of hidradenitis suppurativa are correct?

CPD QUIZ UPDATE

The RACGP requires that a brief GP evaluation form be completed with every quiz to obtain category 2 CPD or PDP points for the 2014-16 triennium. You can complete this online along with the quiz at www.australiandoctor.com.au. Because this is a requirement, we are no longer able to accept the quiz by post or fax. However, we have included the quiz questions here for those who like to prepare the answers before completing the quiz online.

GO ONLINE TO COMPLETE THE QUIZ


INSTRUCTIONS

Complete this quiz online and fill in the GP evaluation form to earn 2 CPD or PDP points. We no longer accept quizzes by post or fax. The mark required to obtain points is 80%. Please note that some questions have more than one correct answer.

GO TO NEXT QUESTION

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GOOD TO KNOW

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How to Treat — coeliac disease, one of the most common chronic autoimmune diseases. This condition is commonly overlooked, leading to significant morbidity and mortality, reduced quality of life and increased healthcare use. The author is Dr Jason Yee-Din, consultant gastroenterologist, Royal Melbourne Hospital, and laboratory head, at the Walter and Eliza Hall Institute, Melbourne, Victoria.

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How to Treat — Hyperhidrosis and other sweat gland disorders

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GOOD TO KNOW

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Next week’s How to Treat discusses coeliac disease, one of the most common chronic autoimmune diseases. This condition is commonly overlooked, leading to significant morbidity and mortality, reduced quality of life and increased healthcare use. The author is Dr Jason Yee-Din, consultant gastroenterologist, Royal Melbourne Hospital, and laboratory head, at the Walter and Eliza Hall Institute, Melbourne, Victoria.