

Acne vulgaris

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Abstract

Acne vulgaris is a chronic skin condition caused by blockage or inflammation of the hair follicles and their associated sebaceous glands – together known as the pilosebaceous units. It typically affects areas with the highest density of sebaceous follicles; this includes the face, upper chest and back. Although all age groups can be affected, it is primarily a disorder of adolescence. It can present as non-inflammatory comedones (blackheads, whiteheads), inflammatory papules, pustules, nodules and cysts, or a mixture of lesions. This can result in symptoms of local tenderness and erythema. Acne is extremely common and thought to affect most people at some point in their lives. Twenty per cent progress to severe acne, which can lead to permanent scarring. The condition can be associated with significant psychosocial complications including low self-esteem, altered body image, social isolation and depression. The aims of treatment are to prevent long-term complications.¹

Keywords Acne; antibiotics; contraceptive pill; diet; isotretinoin; light and laser therapies; spironolactone

Epidemiology

Acne accounts for more than 3.5 million general practitioner appointments per year.² It affects 80% of people at some point between 11 and 30 years of age. During adolescence, acne is more common in male than female patients. Acne can also occur in adults and is more prevalent in women. It can develop for the first time over the age of 25 years and is thought to affect up to 20% of women and 8% of men. Of those suffering with the disease, 20% have severe disease that is likely to lead to scarring.

Pathogenesis

Acne develops from a complex interplay between multiple factors. Genetics are thought to play an important role, as the number and size of sebaceous glands and their activity is inherited. Twin studies show that the concordance rate for the prevalence and severity of acne is extremely high. The heritability of acne is almost 80% in first-degree relatives.

Sebaceous gland activity is under the influence of hormones, in particular the androgen dihydrotestosterone. During adolescence, the body produces androgen hormones from the gonads and adrenal glands. These hormones act directly on the sebaceous gland to increase sebum production and excretion. Increased sebum combined with abnormal follicular hyperkeratinization results in 'sticky' keratinocytes blocking the pilosebaceous duct, and comedo formation. Bacterial colonization with the anaerobic *Propionibacterium acnes* can follow. *P. acnes*

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Key points

- Acne is a disorder of the pilosebaceous unit and typically affects areas with a high density of sebaceous follicles
- Acne presents as comedones, papules, pustules, nodules and cysts
- Severe acne can lead to permanent scarring of the skin
- Diagnostic investigations may be required in an adult woman with signs of hyperandrogenism
- There are multiple methods of treatment to achieve acne control, including topical and oral agents in addition to light and laser therapies

stimulates inflammation via a number of proinflammatory mediators, including interleukins-12 and -8 and tumour necrosis factor.³

Other causes

A small number of other causes that have been implicated in the pathogenesis of acne. These include cosmetic agents and hair pomades, medications (corticosteroids, lithium, iodides), hyperandrogenism and mechanical occlusion with headbands, shoulder pads and backpacks.

Diagnosis

History

A patient with acne usually presents with a history of 'spots,' most commonly affecting the face, back, chest and shoulders. Systemic symptoms are often absent, but the patient may describe local symptoms of pain, erythema or tenderness. Additionally, acne can have a psychological impact, regardless of the severity of disease.

When taking a history, it is important to enquire about the duration of symptoms, aggravating factors, any over-the-counter preparations that have been tried, and the psychosocial impact of the disease, particularly at work or school. In female patients, consider whether acne could be secondary to hyperandrogenism, and enquire about irregular menstrual cycles, hirsutism, androgenic alopecia, premenstrual flaring of acne lesions or sudden-onset severe acne.

Psychosocial factors are often overlooked but must not be taken lightly. Acne can have a severe negative impact on a person's life and is often underestimated by healthcare professionals. Validated quality-of-life scoring systems such as the Cardiff Acne Disability Index can be used to monitor psychological state. Individuals in whom acne is having a marked psychosocial impact may need more aggressive treatment or early referral to a specialist.

Examination

Acne is characterized by comedones, papules, pustules, nodules and cysts, as follows.

- **Comedones** are the most basic acne lesion and can be open or closed. Closed comedones (whiteheads) are small plugged follicles whose contents are not exposed to the skin surface. Open comedones (blackheads) are small follicles with dilated openings onto the skin. The black colour results from oxidation of the debris within the follicle.
- **Papules** are small, usually red, raised elevations of the skin.
- **Pustules** resemble papules but have a central pocket of pus.
- **Nodules and cysts** are larger painful swellings usually more than 5 mm in size.

Examination can reveal other skin lesions that have developed as a consequence of the acne. These include atrophic or pitted scars, post-inflammatory erythema or hyperpigmentation, and keloids. The latter two are more common with darker skin.

When making a clinical assessment, an attempt should be made to categorize disease severity. There are multiple acne severity grading systems, largely developed for use in clinical trials, that may not be entirely suitable for daily clinical practice. However, expert opinion is that separating disease status into mild, moderate and severe categories can help guide management (Table 1).

Differential diagnoses

The diagnosis of acne is usually straightforward. Table 2 offers a list of conditions that can mimic it.

Investigations

Diagnostic investigations are not typically required in acne as the diagnosis is clinical. However, in female patients with signs of hyperandrogenism, hormonal investigations can be required to exclude conditions such as polycystic ovarian syndrome (PCOS) and congenital adrenal hyperplasia.¹

Usual screening blood tests include total and free testosterone, luteinizing hormone, follicle-stimulating hormone, dehydroepiandrosterone, 17-hydroxyprogesterone, prolactin, 21 β -hydroxylase. These should be checked in the luteal phase of the menstrual cycle, that is, just before the onset of menses. To improve accuracy, patients should be asked to stop oral contraceptives 1 month before testing. It is also worth bearing in mind

Assessing acne severity

Severity	Description
Mild	Open and closed comedones and few inflammatory lesions
Mild/moderate	Comedones with occasional inflammatory papules and pustules that are confined to the face
Moderate	Many comedones with small and large inflammatory papules and pustules; more extensive
Severe	Many comedones and inflammatory lesions with nodules and cysts tending to coalesce; face and truncal involvement, evidence of scarring

Table 1

Differential diagnosis

- Rosacea
- Folliculitis
- Perioral dermatitis
- *Pityrosporum* folliculitis
- Demodex folliculitis
- Milia

Table 2

that many adult women with an androgen drive to their acne do not have elevated circulating hormone concentrations.

Management

Topical treatments⁴

Retinoids: these agents are derived from vitamin A. They correct abnormal follicular hyperkeratinization and inhibit new comedone formation. The most commonly used topical retinoids include tretinoin, adapalene and isotretinoin. Skin irritation and redness can occur in the early phase of treatment. These agents thin the stratum corneum and can increase photosensitivity; patients should therefore be given advice regarding sun protection.

Benzoyl peroxide: benzoyl peroxide is a bactericidal agent with the ability to reduce *P. acnes* populations in the sebaceous follicles. It is useful for both inflammatory and non-inflammatory acne lesions, and is not associated with bacterial resistance. Products containing benzoyl peroxide are available over the counter or by prescription, and are used once or twice daily.

Antibiotics: topical antibiotics, commonly clindamycin, are often used for their activity against *P. acnes*. There is a risk of bacterial resistance with these agents so they are not used as monotherapy. Topical antibiotics are usually combined with either retinoids or benzoyl peroxide. Topical antibiotic usage should if possible be limited to no more than 12 weeks.

Azelaic acid: this can be used as a second-line option for acne if other treatments are unsuitable or not tolerated. There are fewer scientific data on this agent, and results are mixed.

Oral treatments

Antibiotics: these have anti-inflammatory properties and activity against *P. acnes*. Oral antibiotics can be successfully combined with topical retinoids or benzoyl peroxide in moderate acne. First-line agents include tetracycline, oxytetracycline, doxycycline and lymecycline. There is good evidence that these agents can reduce inflammatory lesion counts and severity. Other antibiotics used include erythromycin, azithromycin and trimethoprim. Tetracycline antibiotics should not be used during pregnancy, but erythromycin is a safe alternative in this situation. Average treatment time is about 12 weeks.

Hormonal therapies: the combined oral contraceptive pill can be used to control acne in women requiring contraception. Oestrogen in the contraceptive pill reduces sebum production. It also reduces ovarian production of androgens by suppressing

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