Acne

Sheba Medical Center

Dermatology Department 5/1/14-16/1/14

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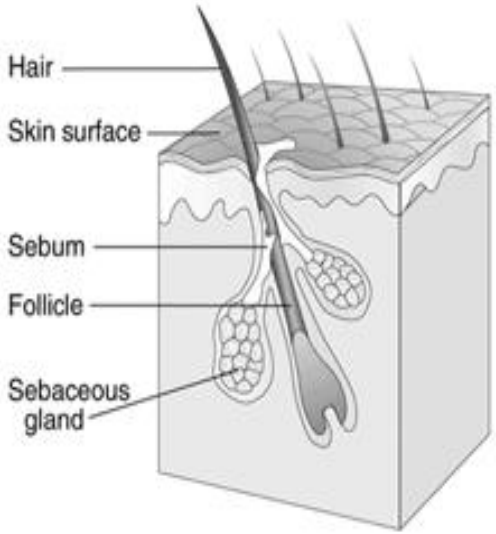
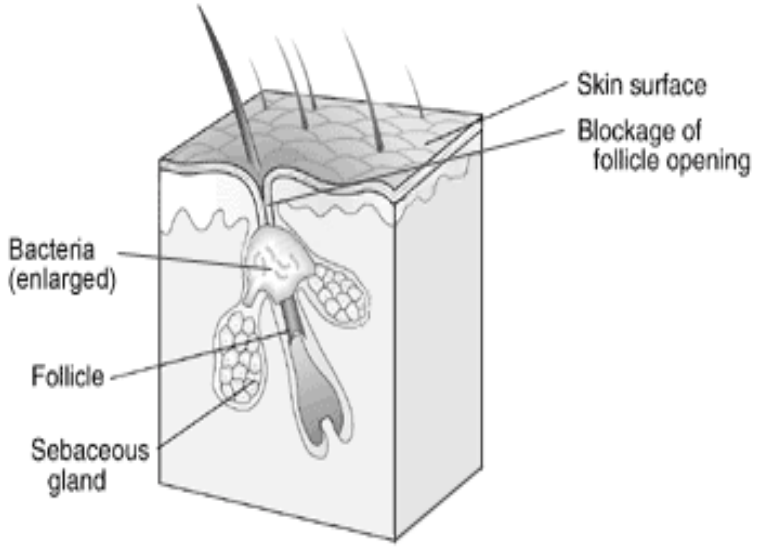
Introduction

- Acne, or acne vulgaris, is a skin condition of multifactorial pathogenesis, of which the key factor is genetics. Acne develops as a result of an interplay of the following 4 factors
  - Follicular epidermal hyperproliferation with subsequent plugging of the follicle
  - Excess sebum production
  - The presence and activity of the commensal bacteria Propionibacterium acnes
  - Inflammation

- It is characterized by noninflammatory, open or closed comedones and by inflammatory papules, pustules and nodules. Typically affects the areas of skin with densest population of sebaceous follicles – face, upper chest and back
  - Comedo (plural: comedone) – clogged hair follicle
  - Papule – a solid, raised lesion <1cm in diameter. May have a variety of shapes in profile (domed, flat-topped, umbilicated) and may be associated with secondary features such as crusts or scales
  - Pustule – circumscribed elevated lesions that contain pus. They are most commonly infected (as in folliculitis) but may be sterile (as in pustular psoriasis)
  - Nodule – a raised lesions >1cm and may be in the epidermis, dermis or subcutaneous tissue


Hair
Skin surface
Sebum
Follicle
Sebaceous gland

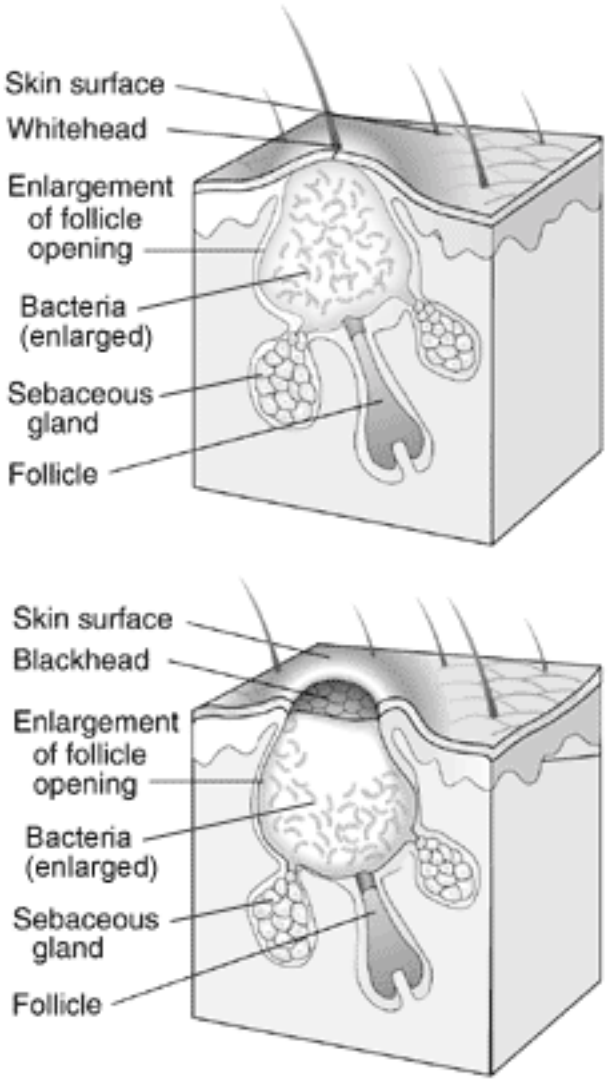

Skin surface
Blockage of follicle opening
Bacteria (enlarged)
Follicle
Sebaceous gland

Clinical Variants

- Two main types
  - Non-inflammatory acne
  - Inflammatory acne

Non-Inflammatory acne

- Microcomedone can spontaneously become unplugged and heal or they become non-inflamed skin blemished called comedone – either a whitehead or a blackhead
- Whitehead
  - When the trapped sebum and bacteria stay below the skin surface, a whitehead is formed. Whiteheads may show up as tiny white spots or they may be so small that they are invisible to the naked eye
- Blackhead
  - When the pore opens to the surface and the sebum, which contains the skin pigment melanin, oxidizes and turns a brown/black colour. It is not dirt and can not be washed away. Blackheads can last for a long time because the contents very slowly drain to the surface

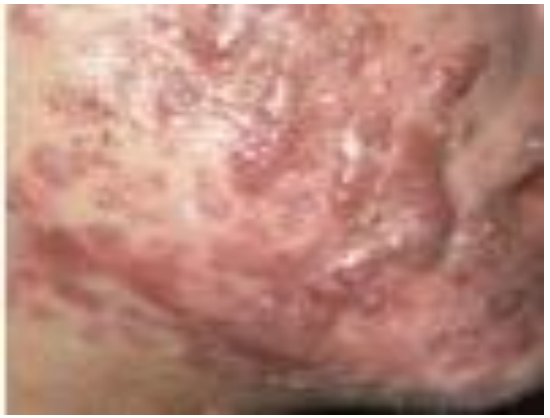


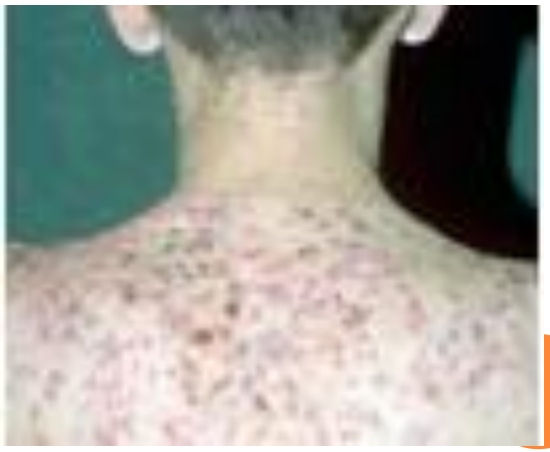
Inflammatory Acne

- A blackhead or whitehead can release its contents to the surface and heal or the follicle wall can rupture and inflammatory acne can ensue. This rupture can be caused by random occurrence or by picking or touching the skin. This is why it is important to leave acne prone skin relatively untouched
- Papule
  - Occurs when there is a break in the follicular wall. White blood cells rush in and the pore becomes inflamed
- Pustule
  - Forms several days later when white blood cells make their way to the surface of the skin. This is what people usually refer to as a 'zit' or a 'pimple'.
- A papule or pustule can completely collapse or explode, severely inflaming the surrounding skin and may engulf neighbouring follicles. These lesions are called cysts or nodules
- Cyst
  - Severe inflammatory reaction causing a large pus filled lesions
- Nodule
  - When a follicle breaks along the bottom, total collapse can occur, causing a large, inflamed bump that can be sore to the touch

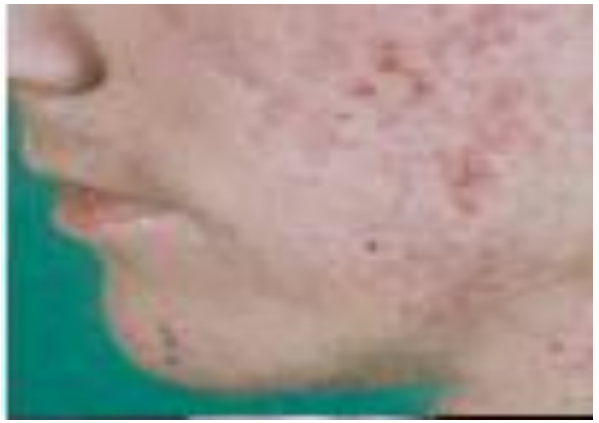
Severe Forms of Acne

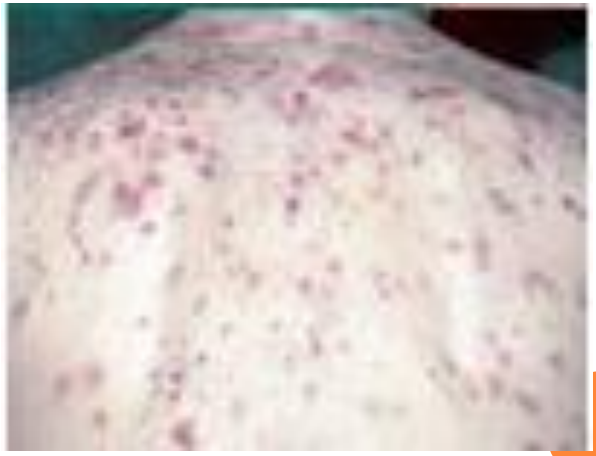
- Acne Conglobata
  - This is the most severe form of acne vulgaris and is more common in males. It is characterized by numerous large lesions, which are sometimes interconnected, along with widespread blackheads, it can cause severe, irrevocable damage to the skin, and disfiguring scarring. It is found on the face, chest, back, buttocks, upper arms and thighs. The age of onset for acne conglobata is usually between 18 to 30 years and the condition can stay active for many years. As with all forms of acne, the cause of acne conglobata is unknown. Treatment usually includes isotretinoin (Accutane), and although it is sometimes resistant to treatment, it can often be controlled through aggressive treatment over time.



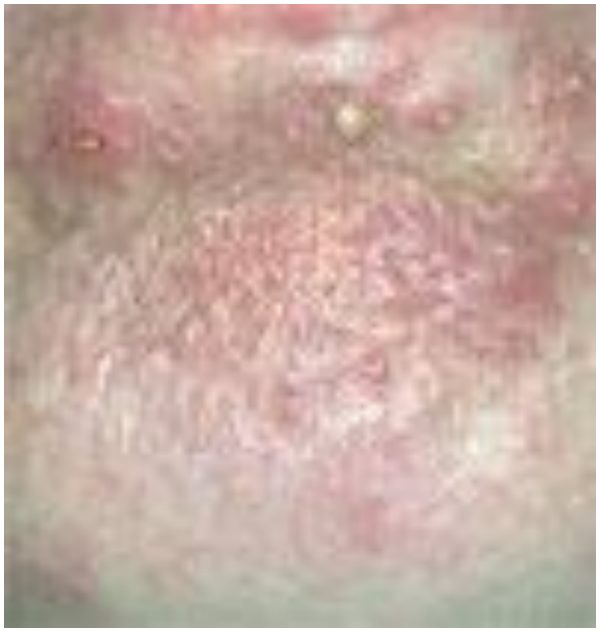


- Acne Fulminans
  - This is an abrupt onset of acne conglobata-like symptoms which normally afflicts young Caucasian men. Symptoms of severe nodulocystic, often ulcerating acne are apparent. As with acne conglobata, extreme, disfiguring scarring is common. Acne fulminans is unique in that it also includes a fever and aching of the joints. Hospitalization of 3-5 weeks is typical for treatment. Acne fulminans does not respond well to antibiotics. Isotretinoin (Accutane) and oral steroids are normally prescribed.

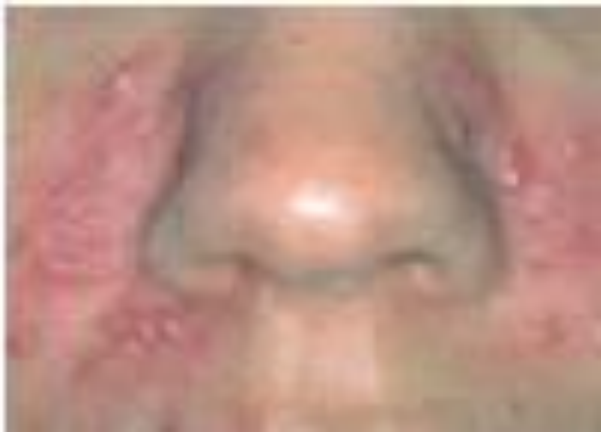


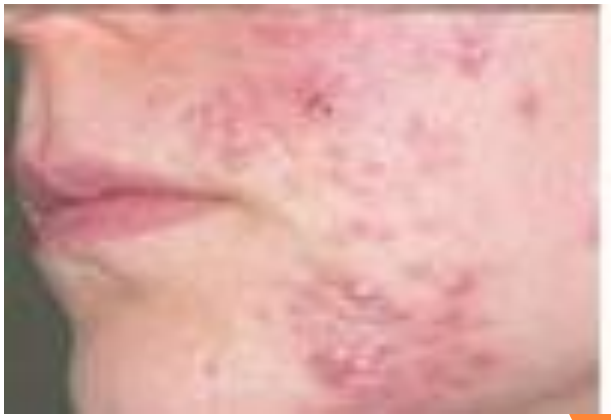


- Gram-negative Folliculitis
  - This condition is a bacterial infection characterized by pustules and cysts, possibly occurring as a complication resulting from a long-term antibiotic treatment of acne vulgaris. It is a rare condition, and it is not known if it is more common in males or females. Isotretinoin (Accutane) is often effective in combating gram-negative folliculitis.



- Pyoderma Faciale (rosacea fulminans)
  - This type of severe facial acne affects only females, usually between the ages of 20-40 years old, and is characterized by large painful nodules, pustules and sores, all of which may scar. It begins abruptly, and may occur on the skin of a woman who has never had acne before. It is confined to the face and usually does not last longer than one year, but can wreak havoc in a very short time. Isotretinoin (Accutane) as well as a systemic corticosteroid are often prescribed.





Pathophysiology

- Multi-factorial.
- Key factor is genetics
- Interplay of 4 factors
  - Follicular epidermal hyperproliferation with subsequent plugging of the follicle
  - Excess sebum production
  - The presence and activity of the commensal bacteria Propionibacterium acnes
  - Inflammation

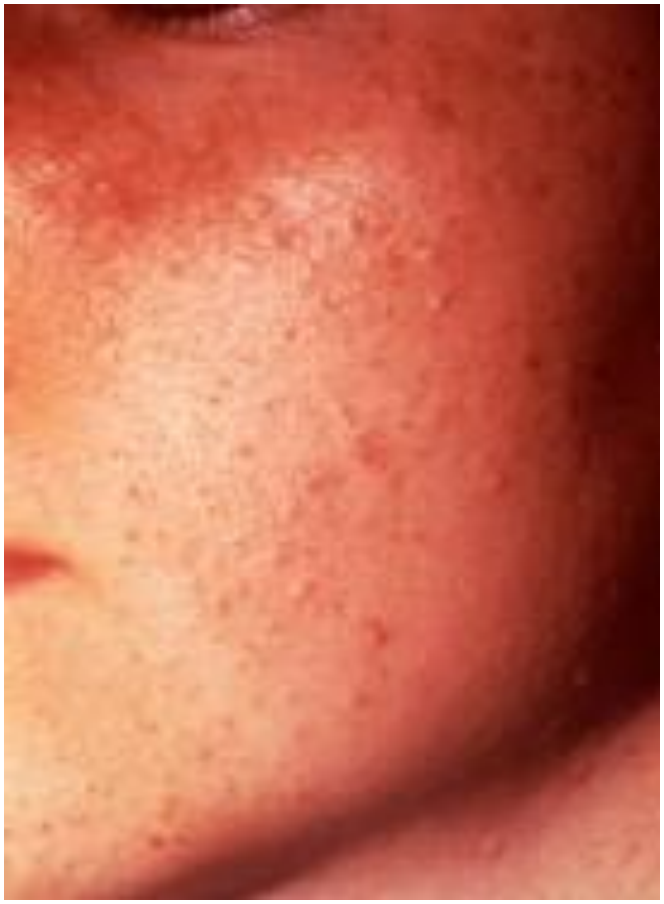
History

- Local
  - May include pain and tenderness
- Systemic
  - Most often absent in acne vulgaris
  - Acne fulminans – systemic S&S's such as fever
  - Acne conglobata – multiple comedone without systemic S&S's
  - May have a psychological impact

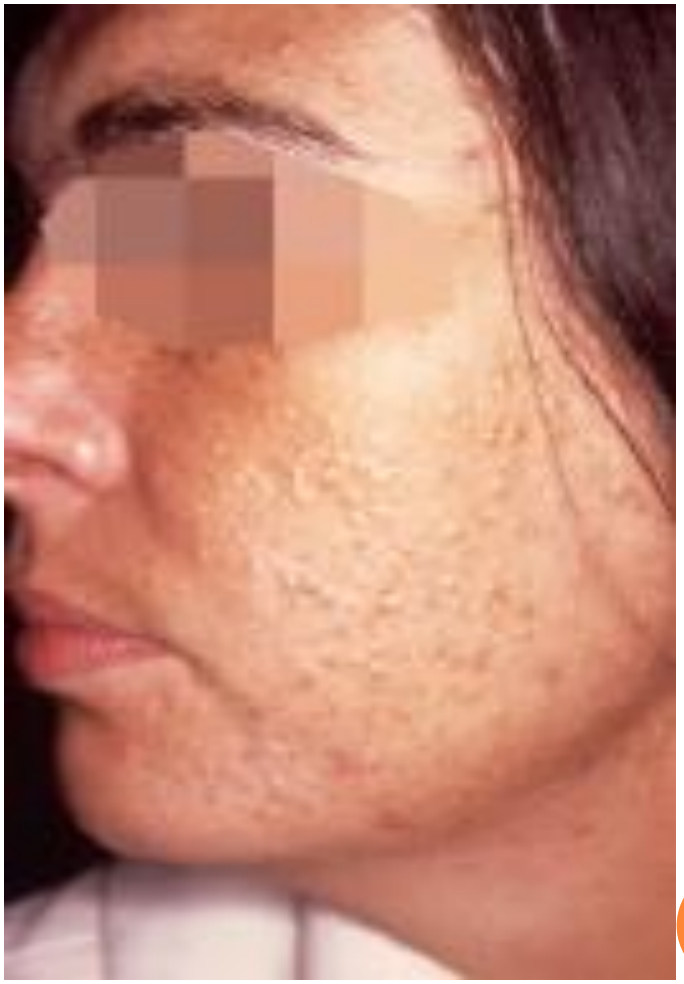
Physical Examination

- Characterised by comedone, papules, pustules and nodules in a sebaceous distribution
  - E.g. face, upper chest, back
  - Face may be only involved skin surface

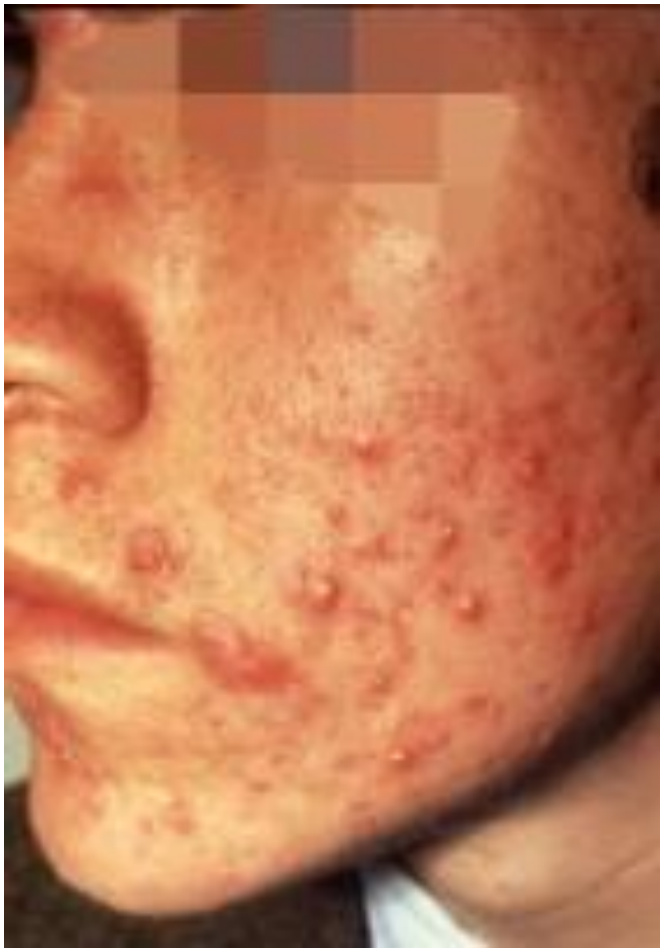
- Grade I
  - In comedonal acne, patients develop open and closed comedone but may not develop inflammatory papules or nodules



- Grade II
  - Mild acne is characterized by comedone and a few papulopustules



- Grade III
  - Moderate acne has comedone, inflammatory papules, and pustules. Greater numbers of lesions are present than in milder inflammatory acne



- Grade IV
  - Nodulocystic acne is characterized by comedone, inflammatory lesions and large nodules >5mm in diameter. Scarring is often evident

Causes

- The main underlying cause of acne is a genetic predisposition. In addition, the following aggravating factors are recognized
  - Cosmetic agents and hair pomades (hair waxes) may worsen acne
  - Medications that can promote acne development include steroids, lithium, some antiepileptics and iodides
  - Congenital adrenal hyperplasia, polycystic ovary syndrome, and other endocrine disorders associated with excess androgens may trigger the development of acne vulgaris. Even pregnancy may cause a flare-up
  - Mechanical occlusion with headbands, shoulder pads, back pads or under-wire bras can be aggravating factors
  - Excessive sunlight may either improve or flare acne. In any case, the UV exposure ages the skin.

Laboratory Studies

- Diagnosis of acne vulgaris is clinical
  - In a female patient with dysmenorrhoea or hirsuitism, a hormonal evaluation should be considered. Patients with evidence of virilization must have their total testosterone levels measured. Many authorities also measure free testosterone, DHEA-S, luteinizing hormone, and follicle-stimulating hormone levels.
  - Skin lesion cultures to rule out gram-negative folliculitis are warranted if the patient does not respond to treatment or improvement is not maintained

Histologic Findings

- The microcomedo is characterized by a dilated follicle with a plug of dense keratin. With progression of the disease, the follicular opening becomes dilated, and an open comedo results. The follicular wall thins, and it may rupture. Inflammation and bacteria may be evident, with or without follicular rupture. Follicular rupture is accompanied by dense inflammatory infiltrate throughout the dermis. Later, extensive fibrosis and scarring may develop.

Treatment

- Mild acne
  - Psychological impact can be disproportionate
  - Single topical treatment
    - Topical retinoid or benzoyl perixide as 1st line
    - Azelaic acid if both topical retinoids and benzoyl perixide are poorly tolerated
    - Combined therapy is rarely necessary for mild acne
  - Consider standard COCP in women who require contraception
  - Follow-up in 6-8 weeks

- Moderate acne
  - Consider single topical drug in limited acne unlikely to scar
    - Benzoyl perixide or topical retinoid
  - Consider combined topical treatment in those at risk of scarring
    - Topical antibiotic (12 weeks course) with benzoyl perixide or a topical retinoid
    - Topical retinoid with benzoyl perixide as an alternative
  - Consider an oral antibiotic combined with either a topical retinoid or benzoyl perixide if acne on back or shoulders that is extensive or hard to reach, or significant risk of scarring or substantial pigment change
    - Oral tetracycline, doxycycline – 1st line
    - Erythromycin as an alternative
  - Consider COCP in women who require contraception
  - Follow-up in 6-8 weeks

- Severe acne
  - Oral antibiotic with topical drug
    - Oral tetracycline, doxycycline – 1st line
    - Erythromycin as an alternative
  - Consider COCP in women who require contraception

Self-Care

- Do not wash more than twice daily
- Mild soap/cleanser and lukewarm water
- Do not use vigorous scrubbing
- Do not attempt to ‘clean’ blackheads
- Avoid excessive makeup and cosmetics
- Use fragrance-free, water-based emollient if dry skin