

Mycobacterial Infections: Cutaneous tuberculosis

Learning objectives

- Classification of cutaneous TB
- Description of various clinical presentations
- Diagnostic principles
- Treatment and other related factors

Epidemiology

- Cutaneous tuberculosis occurs worldwide; incidence of different forms varying globally
- A form of extrapulmonary TB
- < 1% of all TB cases and about 15% of extrapulmonary
- Cutaneous tuberculosis- Usually not a marker of immunosuppression and, rarely, associated with HIV infection/AIDS
- In India, scrofuloderma is common in children; lupus vulgaris commoner in adults

Aetiology

- Term 'mycobacterium' - in 1896, group of bacteria producing mould-like pellicles when grown on liquid media
- Caused by *M. tuberculosis*
- Spectrum of cutaneous changes induced by *M. tuberculosis* depend upon:
 - Route of infection
 - Immunological state of the host
 - Size of inoculum
 - Mere presence of *Mycobacteria* in the skin does not lead to the clinical disease

Routes of infection

- Exogenous
 - From an external source, through breach in the skin at the site of trauma
- Endogenous
 - Through contiguous involvement of skin
 - Through lymphatic spread
 - Through haematogenous dissemination
 - Auto-inoculation
- Eruptive

Classification

- Inoculation tuberculosis (exogenous source)
- Secondary and haematogenous tuberculosis (endogenous source)
- Eruptive tuberculosis (tuberculids)

Classification

- Exogenous source
 - Tuberculosis chancre (occasionally)
 - Warty tuberculosis (Tuberculosis verrucosa cutis)
 - Lupus vulgaris (some cases)

Classification

- Secondary tuberculosis (endogenous source)
 - Contiguous spread: Scrofuloderma
 - Auto-inoculation: Orificial tuberculosis
 - Haematogenous tuberculosis
 - Acute miliary tuberculosis
 - Lupus vulgaris (some)
 - Tuberculous gumma

Classification

- Eruptive tuberculosis (tuberculids)
 - Micropapular
 - Lichen scrofulosorum
 - Papular
 - Papulonecrotic tuberculid
 - Nodular
 - Erythema induratum (Bazin)
 - Erythema nodosum

Host immunity	Method of inoculation	Disease
<i>Multibacillary forms</i>		
Naive host	Direct inoculation	Tuberculous chancre (primary inoculation)
Low	Contiguous spread	Scrofuloderma
Low	Autoinoculation	Orificial tuberculosis
Low	Haematogenous spread	Acute miliary cutaneous
Low	Haematogenous spread	Tuberculous gumma (abscess)
<i>Paucibacillary forms</i>		
High	Direct inoculation	Warty tuberculosis (verrucosa cutis)
High	Direct inoculation	Lupus vulgaris (some)
High	Haematogenous spread	Lupus vulgaris
High	?Haematogenous spread	Tuberculids
		Lichen scrofulosorum
		Papulonecrotic tuberculid
		Erythema induratum (Bazin's)

Tuberculous chancre

- Occurs following *M. tuberculosis* inoculation through breach in the skin of a previously non-infected individual (a naïve host)
- Initially, a small papule, scab, nodule or a poorly healing wound
- Gradually - a painless ulcer with a shallow, granular or haemorrhagic base and undermined edges
- Spontaneous healing within 3 to 12 months, with atrophic scar

Tuberculosis verrucosa cutis (Warty tuberculosis)

Pathogenesis

- Previously infected individual with moderate to high immunity
- Accidental superinfection from exogenous sources: butchers, anatomists (anatomists' wart)
- Common sites
 - Adults - fingers and hands
 - Children - ankles and buttocks

Tuberculosis verrucosa cutis

■ Clinical features

- Small, solitary, indurated, red or brown, papule or nodule
- Verrucous plaque (finger-like projections; fissured surface)
- Regional lymph nodes may enlarge due to secondary bacterial infection

Tuberculosis verrucosa cutis

Course

- Verrucous lesions persist; but seldom ulcerate
- Usually chronic course
- Lesions may involute spontaneously, resulting in sunken, atrophic scars

Lupus vulgaris

Pathogenesis

- Most common form of cutaneous tuberculosis
- Occurs in sensitized individuals with moderate to high immunity
- Affects all age groups

Lupus vulgaris

Clinical features

- Small, solitary reddish-brown nodule
- Plaque: Elevated, infiltrated, deep brown in colour
- Slowly expands at one end; heals with scarring at the other end
- Asymptomatic lesions, commonly affects the buttocks and trunk

Lupus vulgaris

Clinical presentations

- Plaque
- Ulcerative and mutilating
- Vegetating
- Tumor-like lesions

Lupus vulgaris

Course

- Untreated lesions- Chronic, indolent, over years
- Lesions undergo ulceration and superficial scarring
- Characteristically thin, white, smooth scars; may break down or become keloidal
- Complications- contractures, tissue destruction, development of squamous cell carcinoma in the scars (8%) – may take up to 25-30 years; rarely basal cell carcinoma

Scrofuloderma

(Tuberculosis colliquativa cutis)

Pathogenesis

- Contiguous involvement of the skin overlying a tuberculous focus, usually a lymph node, an infected bone or joint
- Common in children, adolescents and aged; may affect all age groups
- Sites - Usually affects the face and neck, often bilaterally
- Commonly involves the cervical, parotid, submandibular and supraclavicular lymph nodes; less commonly, axillary and inguinal

Scrofuloderma

Clinical features

- Initially, a firm, subcutaneous nodule, fixed to the overlying skin
- 'Cold' abscess formation [*lacks* the intense inflammation]
- Secondary ulceration, sinus tract formation
- Ulcer - undermined edges with granulation

Scrofuloderma

Course

- Numerous sinus tracts and fistulae develop over a period of several months
- Spontaneous healing may occur, with puckered and cord-like scars
- Scar tracts - bridge the areas of ulceration or even normal skin

Orificial tuberculosis

- A rare form of tuberculosis of the mucous membrane and skin adjoining the orifices
- Presents as a nodule which ulcerates with undermined edges

Orificial tuberculosis

- Site affected depends on the site of internal tuberculosis:
 - Pulmonary tuberculosis: mouth
 - Tuberculosis of pharynx, larynx: lips
 - Intestinal tuberculosis: external genitalia; anus; perianal
 - Genitourinary tuberculosis in women: vulva
- Prognosis: poor due to internal disease

Acute miliary tuberculosis of the skin

- Rare fulminating form due to haematogenous dissemination of *Mycobacteria* into the skin
- Focus - from a meningeal or pulmonary source
- Crops of numerous, minute, erythematous to bluish, macules, papules, vesicles, pustules or purpuric lesions
- Occur on all parts of the body, especially the trunk
- Usually occurs in infants, young children, or following viral infections e.g. measles

Tuberculous gumma (Metastatic tuberculous abscess)

- Haematogenous dissemination of mycobacteria from a primary tuberculous focus, during periods of lowered resistance
- Commonly involves the trunk, extremities or head
- Lesions arise as a single or multiple, firm subcutaneous nodule or fluctuant abscess
- Ulcers with undermined edges, sinuses and fistulae may occur
- Healing occurs with cord-like and puckered scarring

Tuberculids (eruptive)

- Occur as a hypersensitivity reaction *M. tuberculosis* or its products in a patient with *moderate to high* immunity
- Main features:
 - A positive tuberculin test
 - Evidence of current or past tuberculosis
 - A positive response to anti-tuberculous therapy

Tuberculids

Types

Micropapular

- Lichen scrofulosorum

Papular

- Papulonecrotic tuberculid

Nodular

- Erythema induratum (Bazin)
- Erythema nodosum

Erythema induratum of Bazin (Nodular tuberculid)

- A chronic, recurrent, nodular and ulcerative disorder
- Commonly affects young, or middle-aged, obese women; men affected occasionally
- Predominantly affects calves; may also occur on upper limbs, thighs, buttocks and trunk
- The nodules run an indolent course and form ulcers
- Ulcers are ragged, irregular and shallow, with *bluish* edge

Diagnosis of cutaneous TB

- Chronicity of lesions
- Characteristic morphology
- Pathologic feature - caseating granuloma
- Other investigations

Treatment

- Same as TB of other organs
- Rifampin, Isoniazid, Pyrazinamide, Ethambutol x 2 months
- Rifampin, Isoniazid, Ethambutol x 4 months
- Given daily
- Drug resistance in cutaneous – relatively rare
- Response – 6 weeks