KESANS : **International Journal Of Health and Science**
e-ISSN : 2808-7178, p-ISSN : 2808-7380
Web : http://kesans.rifainstitute.com/index.php/kesans/index

Cutis Tuberculosis

Yudika Ilhami Rusdi, Rahmi Hijriani Hardianti, Lalu Wahyu Alfian, Cahya Nabila, Uni Nurul Milenia
Faculty of Medicine, University of Mataram, Indonesia
yudikair@gmail.com, rahmi.hijriani0808@gmail.com, unynurul07@gmail.com, cahyanabila2000@gmail.com, alfianwahyu333@gmail.com

Article Information
Accepted :**08 Nov 2021**
Submitted : **13 Nov 2021**
Online Publish : **20 nov 2021**

Background: *Tuberculosis (TB) is spreading globally, and more than two billion people (about 30% of the world's population) are thought to be infected with M. tuberculosis. Tuberculosis cutis is an extrapulmonary Mycoterium tuberculosis infection that attacks the skin.* ***Research Methods:*** *The writing of this article includes various sources originating from scientific journals and government guidelines and related agencies. Source searches were conducted on the online portals of journal publications such as MedScape, Google Scholar and NCBI (ncbi.nlm.nih.gov).* ***Results:*** *Cutaneous TB can be transmitted through exposure to the lungs or infected aerosols entering the lungs. Cutaneous TB is divided into True Cutaneous TB which consists of primary and secondary TB, and Tuberculid Overall, the treatment of cutaneous TB is similar to that of systemic TB, which tends towards multi-drug therapy. Several anti-tuberculosis drugs such as isoniazid, rifampin, and pyrazinamide have been recommended as drugs for the treatment of cutaneous tuberculosis. It was reported that in a five-year follow-up approximately 12.5% of cutaneous TB patients showed relapse after standard anti-TB therapy.* ***Conclusion:*** *To reduce the mortality rate, the public needs to be given education regarding the dangers and ways to prevent TB disease to increase public awareness. More long-term studies are needed to understand the recurrence rate of various cutaneous tuberculosis under current treatment recommendations, especially in immunocompromised patients.*

Keywords : Tuberculosis; Tuberculosis Cutis; Mycobacterium Tuberculosis;

Introduction

Tuberculosis (TB) is an ancient disease caused by Mycobacterium tuberculosis, this disease mainly attacks humans (Chen, Chen and Hao, 2019). With the pandemic of HIV infection and the emergence of antimicrobial resistance to Mycobacterium tuberculosis, TB has re-emerged in recent decades and is a growing threat to public health and economic growth (Chen, Chen and Hao, 2019). Humans are the only known host where *M. tuberculosis* lives and reproduces naturally. The organism is spread primarily as airborne aerosols from individuals in the infectious stage of the disease, although transdermal and gastrointestinal (GI) transmission is also possible (Jilani *et al.*, 2021).

Tuberculosis is spreading globally, and more than two billion people (about 30% of the world's population) are thought to be infected with M. tuberculosis. In 2003, the global incidence of tuberculosis peaked but has continued to decline slowly since then. Most of the new cases of the disease in 2016 were reported from Asia (about 45%), followed by Africa (about 25%). WHO reported in 2016 that about 10.4 million people were infected with tuberculosis, of which about 1.7 million died (Organization, 2017). Young adults have the highest rates of active tuberculosis globally, but in developed countries, it is the elderly who have the highest rates of tuberculosis (Jilani *et al.*, 2021).

The majority of patients with a diagnosis of tuberculosis had a good outcome. Especially in patients receiving effective treatment. Patients who do not get treatment will increase the mortality rate by more than 50%. Groups of patients who are prone to worse outcomes or death after tuberculosis infection are the elderly, infants, young children, people who are late to receive treatment, severe respiratory disorders requiring mechanical ventilation, and immunosuppression (Adigun and Singh, 2021)

Tuberculosis cutis was first reported in 1826 by Laennec. He reported wounds on his hands caused by the entry of the causative organism into his skin. However, the causative organism was unknown until 1882 when Robert Koch first discovered Mycobacterium tuberculosis. Cutaneous tuberculosis is rare, although the prevalence of tuberculosis is high and increasing worldwide. Of all patients presenting with extrapulmonary manifestations of tuberculosis, 1% to 2% have cutaneous tuberculosis. The prognosis for cutaneous tuberculosis is good in patients who do not have a weakened immune system. However, even aggressive treatment may be ineffective in patients with compromised immune systems and resistance to some drugs (Charifa, Mangat and Oakley, 2018)

Mycobacterium tuberculosis, Mycobacterrium bovis, and the Bacillus Calmette-Guerin (BCG) vaccine can cause tuberculosis involving the skin. Cutaneous tuberculosis can be acquired exogenously or endogenously and presents as many different clinical morphologies (Frankel, Penrose and Emer, 2009)

Bacillus Calmette-Guerin (BCG) is a lyophilized vaccine developed in 1908, made from a live attenuated strain of Mycobacterium bovis. Side effects associated with the BCG vaccine are rare, but local or systemic complications can occur. Although

generally safe, vaccine reactions such as skin complications are well known and can include local hypersensitivity reactions, skin granulomas, and cutaneous tuberculosis. Although it can cause disease in men, M. bovis is considered a zoonotic disease that usually affects the tonsils, lymph nodes, and intestines. It may rarely be the cause of the cutaneous form of tuberculosis (Dias *et al.*, 2014)

Research Methods

The writing of this article includes various sources originating from scientific journals and government guidelines and related agencies. Source searches were carried out on online portals for journal publications such as MedScape, Google Scholar (scholar.google.com) and the National Center for Biotechnology Information/NCBI (ncbi.nlm.nih.gov), with the keyword being "Cutaneous Tuberculosis".

Research Result

Tuberculosis is an infectious infectious disease caused by *Mycobacterium tuberculosis* (Adigun and Singh, 2021). *M. tuberculosis* is an obligate-aerobic, nonmotile, non-spore forming, catalase-negative, and facultative intracellular bacterium. The high lipid content of *M. tuberculosis* gives it many unique clinical characteristics. These include resistance to some antibiotics and the ability to survive many extreme conditions. It also takes a long time to divide, which is about 16 to 20 hours, slower than other bacteria which usually takes less than an hour (Jilani *et al.*, 2021).

Tuberculosis is a significant cause of illness and death in developed countries, especially among individuals with compromised immune systems. People with HIV are particularly vulnerable to death from tuberculosis. It was reported that in 2015 tuberculosis accounted for 35% of global deaths in individuals with HIV/AIDS (Adigun and Singh, 2021). According to the *World Health Organization* (WHO), TB is the ninth leading cause of death worldwide and the leading cause as a single infectious agent (Organization, 2017). The incidence of TB varies widely globally. Developing countries have the largest burden of this disease, China, India and Indonesia alone accounting for 45% of global cases (Chen, Chen and Hao, 2019). In more developed countries, high burden of tuberculosis is seen among new arrivals from tuberculosis endemic zones, health workers, and HIV-positive people. The use of immunosuppressive agents such as long-term corticosteroid therapy is also associated with an increased risk

Tuberculosis often attacks the lungs (pulmonary TB) or the respiratory system, but in some cases tuberculosis can also attack various other organ systems such as the gastrointestinal (GI) system, lymphoretic system, central nervous system, musculoskeletal system, reproductive system, liver, and skin. otherwise known as cutaneous tuberculosis (Adigun and Singh, 2021); (Charifa, Mangat and Oakley, 2018). Pulmonary TB is the most common type, accounting for more than 80% of TB cases, while about 20% is extrapulmonary TB (Chen, Chen and Hao, 2019)

As one of the extrapulmonary TB, cutaneous tuberculosis is a relatively rare disease (Chen, Chen and Hao, 2019). The incidence of cutaneous tuberculosis is only 1-2% of tuberculosis as a whole. It was reported at a hospital that Scrofuloderma was the most common cutaneous tuberculosis which was around 84%, followed by verrucous cuticular tuberculosis about 13%. Tuberculosis cutis verrucosa is widely found in developing countries, especially in low socioeconomic groups and generally in children and young adults (Puspitasari and Henrica, 2020). Extrapulmonary TB has a stronger association with HIV infection, emergence of multidrug-resistant TB, and immunosuppressive treatment. Skin tuberculosis is not adisease*well-defined* but consists of many skin changes, classified according to the primary source of infection and the individual's immune status. Even though effective antitubercular treatment has been found, this disease still poses a diagnostic challenge due to the inexperience of doctors as well as the patient's lack of self-awareness (Maghwal *et al.*, 2020, p. 429)

Pathophysiology and Clinical Manifestations

Cutaneous tuberculosis can be transmitted by exposure to the lungs or by infected aerosols entering the lungs. Aerosols have a size of 1-5 m in diameter, TB bacteria are able to grow and develop in the body (lungs) for 2-12 weeks to reach 1000-10,000 bacteria (Herchline, Amorosa and Bronze, 2020). Skin invasion ofcutaneous *M. tuberculosistuberculosis* causes. This invasion can be exogenous or endogenous. Endogenous invasion is usually caused by spread of pulmonary TB via hematogenous or lymphatic spread. Exogenous invasion is due to direct inoculation of bacteria. This causes an immune cascade in the skin cells that leads to the formation of granulomas, a hallmark of tuberculosis. It presents with various clinical lesions (Jilani *et al.*, 2021). The classification of cutaneous tuberculosis is as follows:

1. True Cutaneous Tuberculosis: the causative germ is found on the skin.
    a. Primary cutaneous tuberculosis

    Abnormalities where the germs first entered. Papules, pustules or ulcers are indolent, resonant, and surrounding livid. Then there will be lymphadenitis and lymphangitis after a few weeks or months. This entire abnormality is referred to as the primary complex. The younger the patient, the more severe the symptoms will be. Positive tuberculin reaction (Tanto *et al.*, 2014)

A 50-year-old man with primary tuberculosis as a chronic foot ulcer

(Chen, Chen and Hao, 2019)

b. Secondary Cutaneous Tuberculosis

i. Scrofuloderma

Occurs due to continuous spread of organs under the skin that have been attacked by Mycobacterium, most often from lymph nodes, but can also originate from joints, tendons, synovial fluid and bone. The clinical picture is grouped or solitary lymphadenitis without pain. The base of the mass on the skin undergoes discontinuity softening, the consistency is rubbery and causes softening (cold abscess), then the abscess becomes suppurated, ruptures and forms a linear and irregular ulcer, surrounding it is bluish red (livid) (Hehanussa *et al.*, 2010). Enlarged lymph nodes without signs of acute inflammation and periadenitis leading to adhesions of the nodes to the surrounding tissue. Enlargement of the gland causes a softening known as a cold abscess, which then ruptures and forms a fistula that expands into an ulcer. Ulcers have a resonant wall, livid surroundings, and seropurulent pus which when dry will become yellow crusts. Ulcers may heal spontaneously and form an irregular elongated cicatrix, and a skin bridge over the cicatrix.

.

A 24-year-old man with tuberculous scrofuloderma abscess and erosions
(Chen, Chen, and Hao, 2019)

ii. Lupus Vulgaris Erythematous

Nodes that can turn yellow (*apple jelly color*) when stressed. These nodes will form plaque that is destructive to form an ulcer, which will then form a cicatrix.

A 38-year-old man with lupus vulgaris of the sternum more than 5 years old
(Chen, Chen, and Hao, 2019)

iii. Tuberculosis Kuti's Gumosa The spread of the

disease is hematogenous. Subcutaneous infiltrates, circumscript and chronic, then develop into soft and damaging (Tanto *et al.*, 2014)

iv. Tuberculosisverrucosa

Tuberculosisverrucosa is aform verrucous reinfection of exogenous tubercle bacilli on the skin of people who already have moderate or high levels of immunity to *M. tuberculosis*. Tuberculosis cutis verrucous has a predilection for exposed and frequently traumatized body parts (Hehanussa *et al.*, 2019). Germs directly enter the skin due to damage or decreased skin resistance. The clinical picture is a verrucous plaque with irregular edges, rough or soft inconsistency in the middle, surrounded by a hyperpigmented halo and there is a crescent-shaped lesion with serious spread (Tanto *et al.*, 2014); (Hehanussa *et al.*, 2010)

v. Tuberculosis Cutis Orificalis

The ulcer of the wall resonates and the surrounding is livid.

A 42-year-old woman with orifice tuberculosis involving the anus
(Chen, Chen and Hao, 2019)

vi. Tuberculosis Cutis Miliaris

In the form of circumscript erythema, papules, vesicles. pustules, scales, generalized purpura with a negative tuberculin reaction (Tanto *et al.*, 2014)

vii. Tuberculids

an immunological reaction of the skin to the presence of tuberculosis, which is often hidden (Kajal, Prasanth and Dadra, 2020). Germs are not found on the skin, but are found in other organs.

viii. Erythema induratum

Erythema and indolent nodes which then suppurate and form ulcers. If suppuration does not occur, a hypotrophic tissue will be formed in the form of an indentation (Tanto *et al.*, 2014)

A 35-year-old woman with induratum erythema on both calves
(Chen, Chen, and Hao, 2019)

ix. Lupus Miliaris Diseminatus Fasiei

is a rare granulomatous inflammatory dermatosis that mostly affects young adults (Toda-Brito, Aranha and Tavares, 2017). Round erythematous papules <5 mm in diameter can then leave the cicatricial (Tanto, 2014).

x. Erythema nodosum

Characterized by tender erythematous nodules mainly on the lower limbs in the pretibial area. Evidence of circulating immune complexes in early lesions supports the notion that antigens, antibodies, and complement play an important role in pathogenesis and that circulating immune complexes may contribute to tissue injury Clinical features of erythema nodosum: bilateral erythematous soft nodules on the shins (Pérez-Garza *et al.*, 2021)

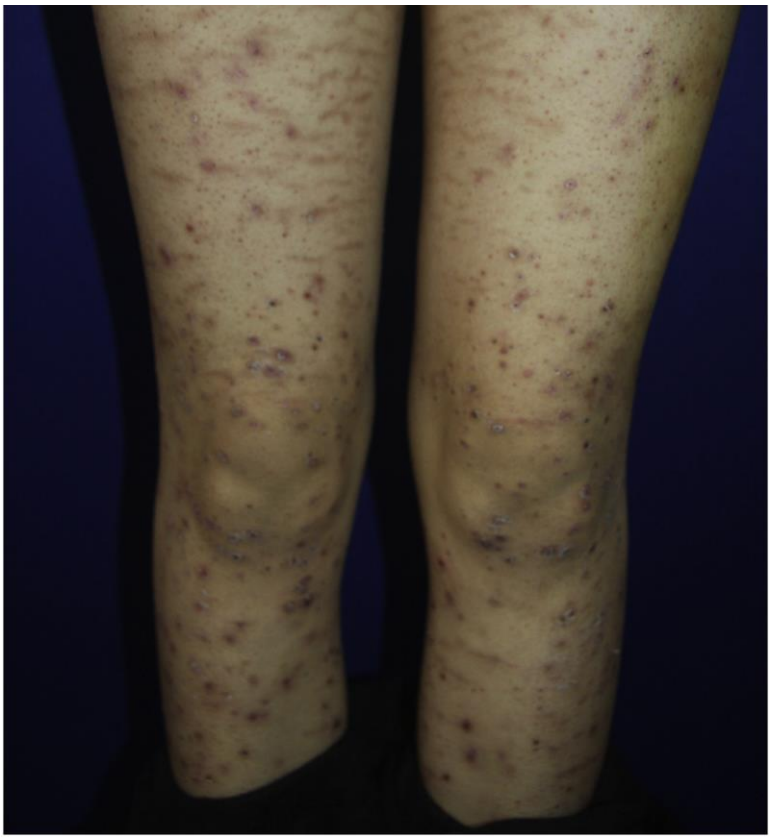
xi. Lichen Skrofulosorum

LS is a rare tuberculid that occurs mostly in children and young adults. The eruption consists of small, perifollicular, lichenoid papules arranged in clusters. Papules have a flat top or may have small spines or fine scales on their surface. Individual papules rarely exceed 5 mm in size (Kajal, Prasanth and Dadra, 2020). Erythematous or skin-colored papules that are initially arranged separately then form a sirinar arrangement.

A 12-year-old boy with lichen scrofulosorum on the anterior arm
(Chen, Chen, and Hao, 2019)

xii. Papulonecrotic tuberculids Erythematous papules

that develop into pustules. Within 8 weeks, the pustules will rupture to form crusts and necrotic tissue (Tanto, 2014).



An 18-year-old woman with papulonecrotic tuberculids mimicking pityriasis lichenoides chronica
(Chen, Chen and Hao, 2019)

Management

Overallof cutaneous TB is the same as systemic TB which tends towards multi-drug therapy (Charifa, Mangat and Oakley, 2018). As for some anti-TB drugs such as isoniazid, rifampicin, pyrazinamide, which have been recommended as drugs for the treatment of cutaneous TB since 1979, they were changed by adding ethambutanol in the first two months of 2019. We recommend that you take 4 types of anti-TB drugs given (RIPE) 1 or 2 hours before eating (breakfast) In the treatment of extrapulmonary TB cases, it is carried out for 6 months except for meningiocephalitis with 9 months of treatment (Santos *et al.*, 2014)

Therapy for adolescents and adults during the intensive care phase is given anti-TB in the form of rifampin, isoniazid, pyrazinamide, and ethambutanol (RHZE) in tablet form with a dose of 150/75/400/275 mg each adjusted for body weight in 2 months, while in thephase *maintenance* rifampin and isoniazid are given at a dose of 300/200 mg or 150/100 mg adjusted to body weight in tablet or capsule form for 4 months.Treatment of cutaneous TB in children under 10 years during the attack phase

(*a tack phase*) is given 2RHZ with each maximum dose (in children weighing >45 kg) as much as 600, 400, 2000 mg per day for 2 months, in thephase the *maintenance* patient is only given 4RH for 4 months with a maximum dose of each. as much as 600 and 400 mg. In pregnant women, the use of streptomycin and ethambutanol should be avoided because of the teratogenic effects if given. Therefore, to prevent prophylaxis and seizures in infants given pyridoxine and isoniazid as much as 25 mg per day, also the concentration of these drugs is low in breast milk so it is allowed to breastfeed. In elderly patients, treatment is adjusted according to body weight (dos Santos *et al.*, 2014). Tuberculous treatment follows the same regimen recommended for true CTB. For erythema induratum, a longer treatment period with maintaining isoniazid up to two years is proposed. Dapsone, potassium iodide, and doxycycline have been reported as adjuvants to treat inflammation in erythema induratum, whereas corticosteroids or tuberculin proteins in various dilutions for desensitization are sometimes used (Chen, Chen and Hao, 2019).

Recurrence of cutaneous tuberculosis after medical treatment is of concern, although there are few available data. It was reported that in a five-year follow-up of eight patients with erythema induratum, one of them (12.5%) showed relapse after standard anti-TB therapy (Chen, Chen and Hao, 2019).

Conclusion

Tuberculosis is an infectious disease that is often found and the most common cause of death in Indonesia. There are many types of TB disease, one of which is Cutaneous Tuberculosis, which is caused by Mycobacterium, which accounts for at least 1-2% of all cases. In the treatment, cutaneous TB is the same as TB treatment in general, where pharmacological treatment can be given anti-TB which is adjusted to age, weight, and phase of infection. To reduce the mortality rate, the community needs to be given education regarding the dangers and how to prevent TB disease to increase public awareness. More long-term studies are needed to understand the recurrence rate of various cutaneous tuberculosis under current treatment recommendations, especially inpatients *immunocompromised*.

REFERENCE

Adigun, R. and Singh, R. (2021) 'Tuberculosis.(2021). Oct 27', *StatPearls [Internet]. Treasure Island (FL): StatPearls*.

Charifa, A., Mangat, R. and Oakley, A. M. (2018) 'Cutaneous tuberculosis'.

Chen, Q., Chen, W. and Hao, F. (2019) 'Cutaneous tuberculosis: a great imitator', *Clinics in dermatology*, 37(3), pp. 192–199.

Dias, M. F. R. G. *et al.* (2014) 'Update on cutaneous tuberculosis', *Anais Brasileiros de Dermatologia*, 89, pp. 925–938.

Frankel, A., Penrose, C. and Emer, J. (2009) 'Cutaneous tuberculosis: a practical case report and review for the dermatologist', *The Journal of clinical and aesthetic dermatology*, 2(10), p. 19.

Hehanussa, A. *et al.* (2010) 'Diagnosis skrofuloderma dan tubekrulosis kutis verukosa pada seorang pasien', *Berkala Ilmu Kesehatan Kulit & Kelamin*, 22(3), pp. 221–226.

Kajal, N. C., Prasanth, P. and Dadra, R. (2020) 'Lichen scrofulosorum: An uncommon manifestation of a common disease', *Lung India: Official Organ of Indian Chest Society*, 37(5), p. 461.

Maghwal, N. *et al.* (2020) 'A clinicopathological pattern of cutaneous tuberculosis and HIV concurrence in western Rajasthan', *International Journal of Mycobacteriology*, 9(4), p. 429.

Organization, W. H. (2017) *Global diffusion of eHealth: making universal health coverage achievable: report of the third global survey on eHealth*. World Health Organization.

Pérez-Garza, D. M. *et al.* (2021) 'Erythema nodosum: a practical approach and diagnostic algorithm', *American journal of clinical dermatology*, pp. 1–12.

Puspitasari, D. and Henrica, F. (2020) 'A Case of Lupus Vulgaris Diagnosed without Skin Biopsy', *Journal of Medicine and Health*, 2(5).

Santos, J. B. dos *et al.* (2014) 'Cutaneous tuberculosis: diagnosis, histopathology and treatment-Part II', *Anais brasileiros de dermatologia*, 89, pp. 545–555.

Tanto, C. *et al.* (2014) 'Kapita selekta kedokteran', *Jakarta: Media Aesculapius*, pp. 329–330.

Toda-Brito, H., Aranha, J. M. P. and Tavares, E. S. (2017) 'Lupus miliaris disseminatus faciei', *Anais brasileiros de dermatologia*, 92, pp. 851–853