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Musculoskeletal Tuberculosis

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Abstract
Tuberculosis (TB) remains the most common cause of death from infectious disease world-wide. In the UK, the incidence of TB has risen by 25% over the last 10 years; and almost one third of all case of tuberculosis are found in South East Asia. Extrapulmonary diagnosis remains challenging and can be delayed. This study evaluates the all aspect of musculoskeletal tuberculosis. To know an overview of general musculoskeletal tuberculosis; indentify the characteristic of patien with musculoskeletal tuberculosis; knowing the prevalance of musculoskeletal tuberculosis and how to treat musculoskeletal tuberculosis patien properly. This reserch use Literatur-Review method. Extra-pulmonary TB and is most often found in the spine, which is about 50% of all cases of tuberculosis of the musculoskeletal system. The common lesions in skeletal TB consist of osteomyelitis and arthritis. The most common signs and symptoms are spinal pain accompanied by weakness of the legs and neurological deficits. In addition, gibbus, swelling and limitation of motion in the joints can occur. Management in cases of musculoskeletal tuberculosis is treat the main etiologic in this case usually mycobacterium tuberculosis with anti-tuberculosis drug treatment.
Keyword : Musculoskeletal Tuberculosis; Musculoskeletal System; Anti-Tuberculosis Drugs; Back Pain; Bone Pain;

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Introduction

Tuberculosis (TB) is an important public health problem on a global scale. Approximately one-third of the world's population has been infected with tuberculosis bacteria, and one-third of the world's TB burden is found in Southeast Asia (Nair et al., 2010). Indonesia itself, as one of 6 countries that contributes as much as 60% of the world's TB cases (Organization, 2013), still has a fairly high TB incidence rate with 185 per 100,000 population (Organization, 2013) The number of TB cases in East Java reached 40,000 people with Surabaya as the largest contributing area reaching 3,569 cases (Kominfo Jatim, 2016). Infections of the musculoskeletal system reach 35% of all cases of extrapulmonary TB and are most often found in the spine, which is about 50% of all cases of TB of the musculoskeletal system (Saputra & Munandar, 2015). The symptoms are often non-specific and the awareness to immediately receive treatment is lacking, even though this disease is classified as severe and is associated with the risk of bone destruction, deformity, paralysis, and disability. Existing treatment has been able to treat the disease effectively, but only if the deformity and neurologic deficits have not yet manifested. This delay in treatment and care can affect a person's quality of life so that sufficient knowledge is needed to detect symptoms and signs as early as possible.

The spine is the side that is most often affected due to the process of spreading tuberculosis to the bones (bony dissemination). In the past, tuberculous spondylitis was the term used for the disease in childhood, especially those aged 3–5 years. Currently, with the improvement in health services, the incidence of this age has changed so that the adult age group is more often affected than children. Tuberculous spondylitis is the most dangerous form of musculoskeletal tuberculosis because it can cause bone destruction, deformity and paraplegia. Spinal TB accounts for about 50% of bone TB cases. Nearly 10% of all TB patients have musculoskeletal involvement. Half of them have spinal lesions accompanied by neurologic deficits in 10–45% of patients (Tutik, 2016).

Method

This article was written using various sources from scientific journals and the World Health Organization (WHO). Source searches are carried out on the portal online of journal publications such as Google Scholar (https://scholar.google.co.id/schhp?hl=id) and the National Center for Biotechnology Information/NCBI (https://www.ncbi.nlm.nih.gov/) , with word searches The key used is *"Musculoskeletal Tuberculosis"*.

Result and Discussion

Definition

Musculoskeletal tuberculosis (TB) accounts for approximately 10% of all extrapulmonary TB cases in the United States and is the third most common type of extrapulmonary TB after pleural and lymphatic disease. Involvement of the vertebrae (tuberculous spondylitis, or Pott's disease) is the most common skeletal type of TB, accounting for about half of all cases of musculoskeletal TB.

Epidemiology

The incidence of TB in the United States decreased significantly for the most part during the 20th century and beyond into the 21st century. Between 1985 and 1992 there were an unexpected additional 40,000 cases of TB in the United States. The emergence of TB is caused by several factors, including the human immunodeficiency virus (HIV) epidemic and the disruption of public health infrastructure in the United States for TB control due to decreased funding. In 2015, a total of 9,557 TB cases were reported in the United States, for the lowest TB rate of 3.8 cases per 100,000 population ever reported. Most cases of TB in the United States (approximately two-thirds) now occur among people born abroad, reflecting the global TB epidemic. Bone and joint TB cases consistently account for 2 to 3% of all TB cases reported in the United States even though total TB cases are declining; in several series reported from outside the United States, >6% of TB cases were due to bone and joint disease. Extrapulmonary TB is more common among patients with HIV infection, but musculoskeletal TB is not always increased in HIV-seropositive patients compared with those who are HIV-seronegative. Inhibitory tumor necrosis factor alpha (TNF-α) has been shown to greatly increase the risk of disseminated TB disease among patients with latent TB infection, and recent reports note that this includes the development of serious musculoskeletal infections. In countries where TB is endemic, older children and young adults are most commonly affected by musculoskeletal TB, whereas in developed countries, the disease is often seen in the elderly. Historically, musculoskeletal TB was a disease of children and adolescents, often seen developing in the years following primary infection. In resource-limited areas, this is still common, whereas in developed countries, musculoskeletal TB is most common as a result of re-infection.

Etiology

The common lesions in skeletal TB consist of osteomyelitis and arthritis. Spread to bone is the result of hematogenous spread of M. tuberculosis (especially after primary infection), but spread to bones and joints can also be due to adjacent lymphatic channels of disease. The growth plate (metaphysis) receives the richest blood supply and is most often the initial site of infection. The tubercle bacilli invade the arterial ends, causing endarteritis and destruction of bone through the epiphysis. After passing through the epiphysis, the bacilli may flow into the joint space, resulting in tuberculous arthritis, or form sinus tracts after being released from the fracture site. M. tuberculosis does not cause the breakdown of cartilage enzymes as seen in pyogenic infections. If the infection progresses without treatment, abscesses around the joints or bone may develop. This is often described as a "cold" abscess.

The abscess may rupture, forming the long-standing sinus tract associated with musculoskeletal TB. The musculoskeletal healing of TB, especially in the joints, involves the formation of fibrous scar tissue. Calcifications are also frequently seen in healed lesions, especially if an abscess, infected bursa, or parasitic mass is involved.

A classification of the psoas muscle in a person with cured Pott's disease (spinal TB) is a classic example of this.

The same hematogenous spread of tubercle bacilli can also primarily infect the synovial sheath, bursae, or tendons. This occurs much less frequently than bony involvement. In children, the main route of skeletal TB infection is through hematogenous spread from a primary source. Children may also develop musculoskeletal TB from reactivation of quiescent foci after the development of latent TB infection, as is not uncommon among adults. Children have historically been most affected with musculoskeletal TB because of the increased vascularity of their bones during growth, making them more susceptible during periods of hematogenous spread (eg, after primary infection). The weight-bearing bones and joints are the most commonly affected. Muscle is rarely infected in adults or children, but tuberculous myositis may occur secondary to infection of the adjacent bone or draining sinus tract, as seen with psoas muscle involvement that occurs with Pott's disease (18).

After bacilli disseminate to bone, a granulomatous inflammatory response occurs. Biopsy of bone samples from people with skeletal TB reveals fewer organisms compared to pulmonary TB. The infected area consists of abscess and granulation tissue, and histology shows giant cells, epithelioid histiocytes, and a coat of lymphocytes and plasma cells, with an outer layer of proliferating fibroblasts and granulation tissue. As the area of infection enlarges, the center becomes necrotic, producing an area of caseous necrosis. It can progress to cause bone expansion and eventually damage to the cortex. The pathological feature of tuberculous osteomyelitis is that there is usually no bone regeneration (sclerosis) or periosteal reaction.

Pathophysiology

The main focus of musculoskeletal tuberculosis is visceral (lungs, kidneys, lymph nodes) and musculoskeletal involvement occurs through hematogenous spread. Once deposited at a site, the organism is digested by mononuclear cells. The mononuclear cells then fuse to become epithelioid cells, and a tubercle forms together when lymphocytes form around a cluster of epithelioid cells. Then the caseosa develops in the middle of the tubercle. The host inflammatory response is increased, resulting in exudation and liquefaction and the formation of a cold abscess (cold abscess). Cold abscesses consist of serum, leukocytes, caseosa, bone debris, and bacilli. The outcome depends on the characteristics and sensitivity of the organism, immune system status, stage of disease at presentation, and treatment. The range of outcomes included resolution with minimal or no morbidity, cured disease with residual deformity, wall lesions with caseous tissue calcification, low-grade chronic granular lesions, and localized or miliary spread of disease that could result in death.

Extra involvement pulmonary is found in approximately 14% of patients, with 1% to 8% develop bone disease. Approximately 50% of bone tuberculosis patients have pulmonary involvement. The most common site of bone involvement is the spine (30-50%) especially in the elderly. But in developing countries, young adults and children

can also be affected. The most commonly involved spinal sections are the thoracic and thoracolumbar segments, but can be seen in any region of the spine. Usually, an active spinal lesion involves a specific segment; two connected vertebral bodies, and discuss.

According to some authors, tuberculosis bacilli require high oxygen tension and affect this area because of the abundant arterial and venous supply. Peridiscal presentation occurs in approximately 80% of patients, with the anterior vertebral body affected and adjacent development through the anterior longitudinal ligament and eventually extension to the adjacent vertebra. Less common lesions occur centrally in the vertebral bodies. These lesions are more difficult to diagnose and may resemble tumors or cause significant spinal deformities.

Patients may have intramedullary granulomas, arachnoiditis, segmental collapse with anterior wedging and gibbous formation (Pott disease). The posterior elements of the spine are rarely the only site affected. Perispinal abscesses with sinus extension to the skin may also arise and extend through tissue planes to reach intraperitoneal structures. They have been reported to occur as far distal to the popliteal fossa (Fig. 1). Patients present with pain, weakness, and end-stage paralysis.

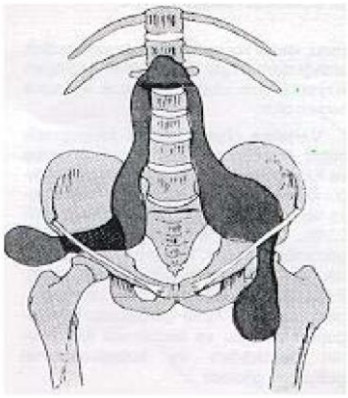

Figure 1: Perispinal abscess reaching distally.

Appendicular joint involvement usually affects the major weight hearing joints of the lower extremities. Lesions involve articular cartilage; the trabecular zone of bone, with subchondral involvement affecting the load-bearing ability of the joint, which can progress to significantly accelerated degeneration of the joint surface. The joints of the ankles, feet, and upper extremities are less frequently involved.

Clinical Manifestation

Spinal pain is accompanied by limb weakness and neurological deficits (Kusmiati T, Pramita HK. 2016) in addition to gibbus, swelling and limitation of motion in the joints (Michael K, at all. 2017). The duration of the symptoms of musculoskeletal tuberculosis ranges from days to months, there is also sinus tuberculosis. Tuberculous osteomyelitis may be seen in bones such as the ribs, skull, spine, pelvis, and long bones. This usually

looks like a solitary lytic lesion that can be diaphyseal or metaphyseal, and can penetrate the physis or adjacent joints.

Symptoms that occur are low-grade fever, night sweats, weight loss, anorexia, constitutional malaise. The duration of the symptoms of musculoskeletal tuberculosis ranges from days to months. Musculoskeletal complaints include swelling, stiffness and pain. Osseous involvement is associated with tenderness, soft tissue swelling and restriction of movement. Findings on spinal involvement include back pain/tenderness, neurological deficits and kyphotic deformity. Swelling and tenderness over the synovial bursa or tendon sheath is seen less frequently. Lymphadenopathy is common. Tuberculous osteomyelitis may be seen in bones such as the ribs, skull, spine, pelvis, and long bones. It usually looks like a solitary lytic lesion it can be diaphyseal or metaphyseal, and can penetrate the physis or adjacent joints (Sanel S. 2017) Spinal pain accompanied by limb weakness and neurological deficits can also occur (Kusmiati T, Pramita HK. 2016) in addition to gibbus, swelling and limitation of motion in the joints (Michael K, at all. 2017)

Treatment

The main goals of treatment for bone tuberculosis are to stop infection, limit deformity, maintain mobility, and reduce discomfort. Based on the 2016 guidelines for TB treatment in Indonesia, TB arthritis therapy according to the extrapulmonary TB OAT regimen is 2RHZE/10RH. Giving OAT for 12-18 months can usually be longer in children or with immunosuppressed conditions. In several studies conducted, it was found that the OAT regimen containing rifampin for 6-9 months was as effective as OAT without rifampin for 18 months

Splints can be used temporarily to relieve acute pain symptoms or long-term to prevent joint damage, although this is rarely done. Conditions that require surgery include severe cartilage destruction, joint deformities, large abscesses.
Operations applied to bone and joint TB include:

1. Arthrotomy includes biopsy, synovectomy, and curettage and bone grafting of articular erosions
2. Joint resection
3. Bone resection
4. Arthrodesis
5. Amputation

Conclusion

Tuberculosis (TB) is an important public health problem on a global scale. Infections of the musculoskeletal system account for 35% of all cases of extrapulmonary TB and are most often found in the spine, which is about 50% of all cases of TB of the musculoskeletal system. The common lesions in skeletal TB consist of osteomyelitis and arthritis.

Signs and symptoms of musculoskeletal tuberculosis are usually non-specific, but the most common symptoms are spinal pain accompanied by weakness of the limbs and neurological deficits in addition to gibbous, swelling, and limitation of motion in the joints. Management of cases of musculoskeletal tuberculosis is the etiological therapy, namely the management of anti-tuberculosis drugs (OAT).

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