

Medical Treatment of Spinal Tuberculosis

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INTRODUCTION

Tuberculosis is still a major health problem in developing countries. Indonesia is the third largest TB population in the world, after China and India. Extra-pulmonary TB accounts for 17.9% - 19.4% of all tuberculosis cases. About 11% of extra-pulmonary TB showed osteoarticular involvement; spinal lesions constitute a major bulk among this osteoarticular TB; it is the commonest form of osteoarticular tuberculosis and contributes to about 50% (25-60%) of all cases of skeletal tuberculosis in various reported series (Tuli et al 1969, Martini et al 1988) (from Agarwal et al⁽²⁾; spinal tuberculosis is relatively an uncommon form of tuberculous infection occurring in about 1% of patients with tuberculosis.⁽³⁾

Bone and joint TB was found more often in certain racial/ethnic groups, HIV positive group, immigrants from countries with high TB prevalence, elderly, children under 15 years of age and other immunocompromised conditions. In HIV patients, the incidence of tuberculosis is 500 times higher than that of general population. On the other hand, about 25-50% of new cases of tuberculosis in USA were HIV positive⁽¹⁾.

DIAGNOSIS

About 80% of tuberculosis infections are caused by activation of dormant bacteria. Bacteria living in scars left by the initial infection - usually in the top of one or both lungs - may begin to multiply. Activation of dormant bacteria can occur when the person's immune system becomes impaired, for example from AIDS, the use of corticosteroids or in very advanced age. Spinal tuberculosis is often the result of haematogenous dissemination from primary focus, usually in the lungs. The detection of primary focus or an associated visceral tuberculous lesion however depends greatly upon the amount of efforts put into investigations⁽¹⁾.

The disease begins in the anteroinferior portion of the vertebral body and tends to spread beneath the anterior longitudinal ligament to involve adjacent vertebral bodies. Because the anterior portion of a vertebral body is much more

likely involved than the posterior portion, a sharp kyphosis may occur. Simultaneous involvement of anterior and posterior elements of vertebra in spinal tuberculosis is rare. Even with the resolution of acute infectious process, the kyphosis may continue to cause anterior compression of the cord and late neurological sequelae. Multiple sites in affected. Other investigators found thoracal vertebra is more often affected, and cervical vertebra is the least often affected. In Cipto Mangunkusumo Hospital, Jakarta, thoracal vertebra was involved in about 71% spinal tuberculosis cases. There is 5%-7% incidence of multiple level vertebral involvement, mostly between 1 to 5 vertebral body with an average 2.51. Narrowing of the disc space occurs as a late phenomenon. In a majority of spinal tuberculosis patients, a typical paradiscal lesion characterised by destruction of adjacent bone end plates with reduction in disc space is seen. Extension of the infection into the adjacent paraspinal soft tissues, with abscess formation, particularly beneath the fascia of the psoas muscle is frequent. Subligamentous spread and posterior extension into the epidural space occur less commonly.

Tuberculous spondylitis can have myriad, variable clinical presentations. Classically, the typical complaint is spine pain and manifestations of chronic illness including weight loss, malaise, fever, and/or night sweats.

Physical examination may demonstrate deformity (gibbus), local tenderness, muscle spasm, restricted motion, a mass in the groin, thigh or flank and neurologic deficit⁽³⁾. Neurologic injury may be caused by pressure on the spinal cord from a paraspinal abscess, inflammatory vasculitis with thrombosis of spinal vessels, cord transection from vertebral collapse or spinal root compression from arachnoiditis or abscess. This situation occur in 12 to 50 % of cases⁽⁸⁾. The most serious complication of spinal tuberculosis is paraplegia (Pott's paraplegia) which may occur either early or late in the course of the disease. Butler and Seddon, working independently, agreed with Sorrel-Dejerine to divide Pott's paraplegia into two types : 1). Paraplegia of early onset, coming on during the florid phase of the spinal disease usually within the first 2 years, and 2). Paraplegia of late onset,

appearing even many years after the disease has become quiescent and sometimes without evidence of reactivation⁽⁸⁾. The pathology of Pott's paraplegia was described elsewhere in the literatures.

Erythrocyte sedimentation rate is generally elevated, but is usually nonspecific⁽³⁾. The raised CRP serum concentration were strongly associated with pus formation (Hadi and Sapardan, 1997). Tuberculin purified protein derivative (PPD) skin test is usually positive but only indicates a history of exposure (remote or current). Sputum specimens are positive only if there is active pulmonary disease. The only laboratory finding which can absolutely confirm the diagnosis is a positive culture from a spinal lesion biopsy^(1,5,9,12).

Plain radiographs showed rarefaction of the vertebral end plates, soft-tissue abscess, increasing loss of disc height, variable degrees of osseous destruction and newbone formation. In short, classic picture of spinal tuberculosis showed narrowing of the disc space, vertebral collapse and paraspinal abscess⁽¹⁾. Computed tomography (CT) scan will delineate the extent of bony destruction as well as soft tissue changes around the spine and in the canal. It also helpful for the guidance of biopsy and in the planning of operative procedures. Magnetic resonance imaging (MRI) is the imaging modality of choice because it will delineate soft-tissue masses in both the sagittal and the coronal plane and for indicating the extent of disease and the spread of tuberculous debris under the anterior and posterior ligaments^(1,5,9).

Differential diagnosis is broad, including other infections such as brucellosis or pyogenic bacterial infection, neoplasm and sarcoidosis⁽⁴⁾.

Despite newer modalities of imaging of the spine and spinal cord, diagnosis is best made by examination of biopsy material, obtained by CT-guided or open biopsy^(1,3,5,6,8).

TREATMENT

The treatment of musculoskeletal tuberculosis is primarily medical. Operative intervention is an adjunct to appropriate antituberculous therapy. It is important to recognize and treat early, before damage to the backbone causes nerve damage and paralysis. Spinal tuberculosis can be successfully treated with antituberculous chemotherapy alone, particularly if the diagnosis is made early prior to gross bone destruction (Fam and Rubenstein, 1993). With early, complete treatment the damaged bones will usually heal and the patient may live normally, although often somewhat hunched over. Treatment options for spinal tuberculosis are selected based on the presence or absence of spinal instability, neurologic deficits and the level of surgical expertise available⁽¹⁾. In countries where adequate surgical facilities are lacking, an acceptable alternative is antituberculous chemotherapy combined with a spinal brace or cast. In Indonesia, however, the problem is not only in the early treatment, but also in case finding. Among 40.300 estimated tuberculous patients in Central Java (population 31 million), only 4668 cases (18%) were detected and undergone therapy for tuberculosis⁽¹³⁾ (Kompas, March 31, 2001).

The goal of treatment are to eradicate infection, and to

prevent or to treat neurological deficits and spinal deformity. Use of antituberculosis drugs has virtually eliminated the severe distortion of the spinal segment occurring late in the course of the disease, which in the past often produced a deforming gibbus or severely fixed scoliosis and pelvic obliquity. Successful medical treatment of tuberculosis requires the prolonged administration of a minimum of three drugs susceptible to the organisms, and at least one of these drugs must be bactericidal.

Isoniazid is the most potent bactericidal drug available and is particularly effective against actively growing organisms. It is relatively non-toxic, easily administered and inexpensive. The usual adult dosage is 3-5 mg/kg/day. Hepatic toxicity is major side effect. Ten milligrams of pyridoxin/day should be given in conjunction with isoniazid to prevent peripheral neuropathy. *Rifampicin* and *pyrazinamide* are the most effective sterilizing drugs, and they are specifically effective against bacilli that are dormant and undergo periodic burst of activity. The usual adult dosage for rifampicin is 10 mg/kg/day; for pyrazinamide, the dosage is generally 20-25 mg/kg/day. *Ethambutol* is bacteriostatic. Retrobulbar neuritis is the most frequent and serious adverse effect of this drug; the dosage is 15-25 mg/kg/day, and discontinued after 2-3 months.

The optimum duration of treatment has been an issue of considerable debate, and much of the information now available concerns the treatment of pulmonary disease. Watts and Lifeso recommend that treatment be continued for a minimum of twelve months for osteoarticular involvement, extending to perhaps eighteen months for certain problems. Parthasarathy et al reported their experience on 235 spinal tuberculosis patients without paraplegia treated by three different regimens : a) radical anterior resection with bone grafting plus six months of daily isoniazid plus rifampicin; b) ambulant chemotherapy for six months with daily isoniazid plus rifampicin; c) similar to b), but with chemotherapy for nine months. Ten years from the onset of treatment, 90% of a), 94% of b) and 99% of c) had a favourable status. They concluded that ambulant chemotherapy for a period of six months with daily isoniazid plus rifampicin (b) was an effective treatment for spinal tuberculosis except in patients aged less than 15 years with an initial angle of kyphosis of more than 30° whose kyphosis increased substantially⁽¹⁵⁾.

The Medical Research Council Committee for Research for Tuberculosis in the Tropics concluded that the treatment of choice for spinal tuberculosis in developing countries is ambulatory chemotherapy for 6 or 9 months with isoniazid and rifampicin. Surgery is reserved for biopsy, management of myelopathy, abscesses and sinuses and for stabilization to prevent or correct kyphotic deformity especially if there is an associated and progressive neurologic deficits.

The recommendations for duration of TB treatment in HIV-infected persons are the same as for persons not infected with HIV⁽⁵⁾.

Surgical intervention, once the mainstay of management, is now less frequently required. Indications include diagnostic biopsy when needle aspiration and biopsy are unsuccessful, drainage of a large paraspinal abscess and spinal decom-

pression and fusion in patients with progressive neurologic deficit, and in those with gross destruction and/or increasing spinal deformity, particularly of the cervical or thoracic spine. Another indications for operative intervention have been proposed by several authors. Watts and Lifeso pointed out absolute and relative indications for operative intervention.

SUMMARY

Tuberculosis infection is still a major health problem in developing countries. Indonesia has the third largest TB population in the world, after China and India. Spinal tuberculosis is found in about 1 % of tuberculous infection. Pott's paraplegia can occur early or late in the course of the disease. The choice of therapy depends on the condition of the patient, the stage of the disease, availability of surgical facilities and trained personnel.

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