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Orthopedics

STUDY OF 25 CASES OF SKELETAL TUBERCULOSIS IN APOLLO INSTITUTE OF MEDICAL SCIENCES & RESEARCH (AIMSR)

Dr.D.Srinivasa Murthy M.S.(ORTHO) AIMSR, HYDERABAD

ABSTRACT Study was conducted in AIMSR over a period of three years (Apr. 2014 to Apr 2017) on skeletal tuberculosis and the results were analyzed. It is found that TB Spine (Pott's spine) is the commonest skeletal tuberculosis and response to conservative treatment is good in all cases and surgical treatment can be reserved for cases with gross deformity or incapacitation of the patient.

KEYWORDS : Skeletal tuberculosis, Pott's spine

INTRODUCTION: Skeletal tuberculosis (TB) refers to TB involvement of the bones and/or joints. It is an ancient disease; features of spinal TB have been identified in Egyptian mummies dating back to 9000 years ago. The most common form of skeletal TB is Pott's disease, a disease of the spine; this entity comprises approximately half of musculoskeletal TB cases. The next most common form of musculoskeletal TB is tuberculous arthritis, followed in frequency by extra spinal tuberculous osteomyelitis. Skeletal tuberculosis (TB) accounts for 10 to 35 percent of cases of extrapulmonary tuberculosis & TB spine is about 50% of skeletal TB..Spinal TB (Pott's disease) most often affects the lumbar and lower thoracic region; upper thoracic and cervical disease is less common but potentially more disabling. Tuberculous abscess, a complication of spinal TB, is frequently bilateral. Tuberculous arthritis tends to occur in the weight-bearing joints, the hip and the Knee, and is usually monoarticular. However, multifocal lesions are reported in 10 to 15 percent of cases in developing countries.

PATHOGENESIS — The bacillemia associated with primary M. tuberculosis infection typically seeds organisms throughout the body; bone and synovium may be infected during this stage. Vertebral bodies are especially vulnerable to this seeding since blood flow remains high even in adulthood. In the majority of cases, small foci of disseminated infection are confined by local immune processes and the extrapulmonary infection is clinically inapparent. Following primary infection, there is evidence of ongoing containment of small, reactivating foci by the cellular immune response. In addition, CD4 and CD8 lymphocytes play critical roles, as does IFN-gamma. Genetic determinants may also play a role in maintaining immunity. When local immune defenses fail, as with poor nutrition, advancing age, HIV infection, or renal failure, reactivation with progression to clinically apparent disease may occur. Thus, active tuberculosis can develop immediately or after decades. In highly endemic regions, musculoskeletal TB usually manifests within about one year after primary lung infection and mainly occurs in the young. In industrialized countries, bony tuberculosis is more commonly associated with late reactivation of infection and mainly occurs in adults. Rarely, bones and joints are involved in contiguous spread of TB from another site. Contiguous spread from an apical pulmonary focus of active TB, for example, can lead to atlantoaxial TB, involving the joint between the first and second cervical vertebrae.

CLINICAL MANIFESTATIONS — The indolent nature of tuberculous bone and joint disease often leads to delayed or missed diagnosis, sometimes with devastating consequences for the patient.

Spinal tuberculosis — In spinal TB, the most common symptom is local pain, which becomes more severe over several weeks to months, sometimes associated with muscle spasm and rigidity. In a classic text, the description of the patient with spinal TB reads: "The muscle spasm, which extends beyond the diseased area, sometimes produces the well-known erect posture and 'aldermanic' gait. The patient walks with short deliberate steps to avoid any jarring of the spine. Constitutional symptoms, fever, and weight loss are present in less than 40 percent of cases.

The most important complication of spinal tuberculosis is cord compression during the active phase of the infection resulting in paraplegia (Pott's paraplegia). In countries where the incidence of tuberculosis is low, the diagnosis of spinal tuberculosis is often greatly delayed because of a low index of suspicion. Unfortunately, presentation also tends to be late in highly endemic areas because of poor access to medical care and/or poverty; in this setting, 40 to 70 percent of patients have symptoms and signs of cord compression at the time of diagnosis. Noncontiguous spinal disease at more than one level is uncommon although it was reported in one South African series in 16 of 98 cases. Less common late presentations of skeletal TB include distant abscesses (e.g., psoas abscess) (picture 1).

Late-onset paraplegia may occasionally occur due to internal gibbus and other chronic degenerative changes at a site of previous infection. TB of the pedicles and other posterior spinal elements is well-described but uncommon.

Extraspinal osteomyelitis — Extraspinal tuberculous osteomyelitis may manifest as a "cold abscess", which presents with swelling, modest erythema or pain, and little or no local warmth. The onset of these infections is often insidious but rarely onset may be acute or subacute. Spontaneous drainage of such cold abscesses may occur. Virtually any bone can be infected (including the ribs, skull, phalanx, pelvis and long bones). Involvement of multiple bones (which is rare) may result in an erroneous diagnosis of widespread metastatic malignancy. An antecedent history of trauma may also lead to diagnostic confusion.

The highly variable and unpredictable location of tuberculous osteomyelitis are Sternal osteomyelitis following coronary artery bypass surgery, TB rib presenting as breast mass or chest wall mass, spontaneous occurrence of TB of small bones of hand without evidence of pulmonary Koch's, TB mastoiditis extending into skull to produce facial nerve palsy &Lytic bony tubercular lesions in areas as unusual as the symphysis pubis, sacroiliac joint, and elbow can be misdiagnosed as metastatic malignancy.

Joint disease — Articular TB most often involves a single joint, but multifocal lesions can occur. Involvement of the hip joint is the most common. Important clinical features are swelling, pain, and/or loss of joint function that progresses over weeks to months, rather than days. 'Night cries' are one feature of hip disease when relaxation of muscle spasm is accompanied by unguarded movement of the joint. Erythema, warmth, and other signs of acute infection are usually absent in such so-called "cold joints."

Constitutional symptoms, fever, and weight loss, occur in only about 30 percent of patients with tuberculous arthritis. Patients who present late in the course of their infection may have evidence of joint destruction including local deformity and restricted range of motion. Some patients with far advanced disease have draining sinuses.

Poncet's disease — Poncet's disease is a rare reactive acute symmetrical polyarthritis involving large and small joints associated with active extrapulmonary, pulmonary, or miliary TB but without evidence of active infection of the involved joints. Pathogenesis is unclear, although evidence suggests an immune-mediated disease. HIV co-infection may be a risk factor. The arthritis resolves within a few weeks of initiation of antituberculosis therapy with no residual joint destruction.

Differential diagnosis — The differential diagnosis of skeletal TB includes subacute or chronic infections due to organisms such as Staphylococcus aureus, brucellosis, actinomycosis, candidiasis and histoplasmosis, depending upon epidemiologic factors. Bony metastatic disease may also be considered.

DIAGNOSIS — Clues to the diagnosis of skeletal TB usually come from the history, which should include questions about the country of birth, a family history of TB, and a history of prior known or possible TB contact. Before discussing the modalities used to establish the presence of tuberculous infection, it is useful to first review potential pitfalls in diagnosis that can occur.

The most common cause of delay in the diagnosis of bony tuberculosis is failure to consider the diagnosis, especially in patients who have normal chest radiographs. A number of other problems also can occur in patients who present with draining sinuses, cultures of the sinus exudate may reveal colonizing bacteria or fungi that are erroneously assumed to be the causative pathogen. Over 90 percent of immunocompetent patients with skeletal TB have a positive tuberculin skin test.

Radiographic findings — In skeletal tuberculosis infection, there may be radiographic evidence of osteopenia, and bone destruction with relative preservation of cartilage space or disc space. Later features include structural collapse, sclerotic changes, and soft tissue calcification.

Spinal TB rarely occurs at more than one level but involvement of contiguous vertebrae is not uncommon. Infection is usually first seen in the anterior aspect of a vertebral body, with demineralization of the end plate and loss of definition of the bony margin. The opposing vertebra soon becomes involved and a paravertebral abscess may become apparent on plain films. As tuberculous infection of the spine progresses, the disc space becomes obliterated with anterior wedging and angulation. Reactive sclerotic changes remain localized and the remainder of the vertebral structures is often spared.

In some patients, spinal tuberculosis presents with pure osteolytic lesions without disk space involvement. These lesions may even occur at multiple sites. .

In tuberculous arthritis, Phemister's triad may be seen: juxta-articular osteopenia, peripherally located osseous erosions, and gradual narrowing of the disc space

Similarly, TB osteomyelitis has no specific diagnostic features. In children, cystic changes may be seen in the metaphysis of long bones and in flat bones, such as the skull. In tuberculous dactylitis, involving a hand or foot, there is a ballooned appearance of a phalangeal bone.

Chest radiography — Chest radiography is not a sensitive test for the diagnosis of skeletal TB since more than 50 percent of such patients do not have evidence of active chest disease. On the other hand, the diagnosis of skeletal tuberculosis should be considered in patients with focal bony or joint abnormalities and a chest radiograph compatible with old or active tuberculosis.

Other radiographic modalities — Computerized tomography (CT) and magnetic resonance imaging (MRI) are occasionally useful in diagnosis of skeletal TB. MRI is particularly valuable in demonstrating soft tissue extension and encroachment on nearby vital structures, such as the spinal cord. The technetium-99 bone scan is less reliable.

Biopsy and culture — Whenever possible, the diagnosis of TB should be confirmed by microscopy and culture of infected material. Needle aspiration and biopsy (and in areas where the technology is readily available, CT-guided biopsy), are recommended, especially for confirming spinal disease.

Examination of peripheral joint fluid is usually unhelpful, and suspected TB is one of the few indications for synovial biopsy. Routine antimicrobial susceptibility testing of isolates is essential.

Other tests — The clinical utility of newer T cell-based assays to detect skeletal and other forms of extrapulmonary tuberculosis has been studied in large cohorts of patients. In general, these studies have shown the same results as testing in patients with pulmonary tuberculosis; such assays lack sufficient sensitivity and specificity to rely on them in the absence of traditional diagnostic testing such as biopsy and culture and imaging studies.

TREATMENT

Antimicrobial therapy — The mainstay of treatment of skeletal TB consists of antituberculous chemotherapy using regimens that are adequate for pulmonary TB. Four drug regimens isoniazid [INH], rifampin [RIF], pyrazinamide [PZA], and ethambutol [EMB] are advocated and, for the most part, highly successful when administered according to recommendations.

The role of surgery in skeletal tuberculosis is limited

Duration — Traditionally 12 to 18 month courses of therapy were advocated for musculoskeletal TB, because of concerns about poor drug penetration into osseous and fibrous tissues

Surgery — Surgery can be a useful adjunct to medical therapy for patients who require decompression and stabilization of the spinal cord, abscess drainage, and/or debridement of infected material. In some circumstances, reconstructive surgery may be important once antimicrobial therapy has been completed.

A combination of medical and surgical therapy may be warranted for patients with spinal disease and advanced neurological deficits or progressing neurological deficit while on treatment and with kyphosis of >40 degree and those with chest wall cold abscess.

Monitoring clinical response — The response to therapy is best monitored by clinical indicators such as pain, constitutional symptoms, mobility, and accompanying neurologic signs. The role of ESR in monitoring the response to TB therapy is limited. There is often apparent radiographic progression of disease during the first six months of appropriate and effective treatment.

MATERIALAND METHODS:

In AIMSR 25 cases of skeletal TB were registered in Ortho op and only 12 cases got admitted and remaining cases were treated as out patients with regular follow-ups. Diagnosis was done by history, clinical findings, X-ray, MRI, HPE of tissue(eg. synovium) & CBNAAT of aspirations (fluid or pus).These patients were kept on bed rest and ATT for12-18 months with initial intensive 4drug therapy with Rifampicin, INH, Ethambutol and Pyrazinamide and continuous 2drug therapy with rifampicin and INH. Conservative management (eg.skin traction) for synovitis and arthritis of hip & knee joints, minimal surgical interventions like aspiration of cold abscess and synovectomy were done in necessary cases. Patients were followed up once a month. Improvement was assessed by history of relief of symptoms (pain , improvement of appetite)X rays (showing sclerosis at the site of lesion). Erythrocyte sedimentation rate was reduced in all the cases showing improvement. Considerable improvement was seen with conservative management in all the cases.

Picture 1: Lytic Lesions in Proximal Ulna & Dstal Humerus

Picture 2: Involvement of 4th Metacorpal

Picture 3: Lytic Lesion in 2nd metatarsal base

Picture 4: MRI of a Patient showing TB, D12 and L1

RESULTS:

Results were analyzed and given as below

TABLE 1 - INCIDENCE

	NO.		%
IP/OP	IP	12	48%
	OP	13	52%
SEX	MALE	13	52%
	FEMALE	12	48%
AGE	<10yrs	2	8%
	11-20yrs	11	44%
	21-40yrs	4	16%
	41-60yrs	8	32%
	>60yrs	Nil	0
BUILT	THIN	17	68%
	MODERATE	8	32%
	WELLBUILT	NIL	0%
F/H OF KOCH'S	PRESENT	4	16%
	ABSENT	21	84%

TABLE 2 : E/O OF PRIMARY FOCUS OF SKELETAL TB

E/O PRIMARY FOCUS IN THE PATIENT	PRESENT	4	16%
	ABSENT	21	84%

TABLE 3: INVOLVEMENT OF SKELETAL TB

BONE	6	24%
JOINT	6	24%
SPINE	13	52%

TABLE 4 SKELETAL LESION WITH ASSOCIATED OTHER SYSTEM INVOLVEMENT

SKELETAL+PULMONARY	4	16%
SKELETAL+LN (CERVICAL)	2	8%
SKELETAL+CUTANEOUS (LUPUS VULGARIS)	2	8%
SKELETAL ONLY	17	68%

TABLE 5: MANAGEMENT OF SKELETAL TB

BEDREST+MEDICAL MANAGEMENT	18	72%
BEDREST+MEDICAL MANAGEMENT + SKIN TRACTION	5	20%
BEDREST+MEDICAL MANAGEMENT + ASPIRATION OF COLD ABSCESS	2	8%

DISCUSSION:

In the study group incidence is more in <20 yrs aged thin built patients with a little increased incidence in males. In 84%family history of Koch's is absent. Though skeletal tuberculosis is always secondary to primary focus elsewhere in the body (lungs, lymph node and GIT) evidence of primary focus could not be identified in majority of cases.One case had tuberculous infection involving multiple bones in the present study . Involvement of spine is seen in 52%of cases. Along with skeletal lesion pulmonary involvement is more when compared to lymph node involvement.8% cases showed cutaneous involvement (Lupus vulgaris).72% patients showed marked improvement (weight gain, relief of symptoms, sclerosis at the site of lesion and ambulation) with bed rest and ATT. Only 8% required aspiration of cold abscess .20% required conservative management of skin traction (hip &knee TB) along with ATT.

Major surgical procedures were not required for the patients in the study group.

CONCLUSIONS:

With the present ATT drugs majority of the skeletal TB patients can be treated conservatively & major surgical procedures like anterior spinal fusion, arthrodesis can be reserved for patients with deformities and neurological deficit.

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