Editorial

Tuberculosis of the spine

Tuberculosis (TB) has lived in symbiosis with mankind since time immemorial.[1] It has ravaged many civilization over the countries, earning itself the dubious name of "Captain of the men of Death." The incidence of tubercular affection has certainly reduced with improved sanitation, nutrition, and hygiene, however, two-thirds of the world's population is still living in such an environment where mycobacterium tuberculosis is continuing to flourish and propagate. The increasing global travel with frequent migration of the population, co-infection with HIV and reducing immunity of the ageing population worldwide has made tuberculosis common even in the Western population and a global threat to mankind. Medical science and bacteria are evolving and till such time as all pockets of under-nutrition, unhygienic living, and immunocompromised conditions are eliminated, we shall have to face the disease consequences of the mycobacterium, unabated. Every time the medical scientists feel that they have conquered the mycobacterium, it propagates the disease with more vengeance.

The availability of potent antituberculous drugs have made early infections purely a medical disease. Even though successful treatment in the early stages can lead to good healing without any residual sequalae, delay in treatment is very common with considerable bone and joint destruction. Osteoarticular tuberculosis is not a mere infection. The damage to the skeleton add new dimensions due to disturbed biomechanics. The functional performance is affected due to the destruction of the nonweight-bearing joints, while the weight-bearing joints make locomotion energy consuming. Once the disease heals the added rapid degeneration of these deformed joints affect day-to-day life. Spinal tuberculosis heals with sequelae of spinal deformities, with consequent long-term biomechanical consequences. Even if biological control of the disease is achieved, the biomechanical damage of the skeleton keeps on adding morbidities and reduction in the functional performance, in future life.

Osteoarticular TB is a paucibacillary, slow-growing disease, hence, the chances of diagnosing the disease clinicoradiologically, before it produces significant destruction, are remote, although magnetic resonance imaging (MRI) has certainly improved the diagnostics. The introduction of potent antitubercular drugs and operative techniques have reversed the gloomy outlook. Still many questions are unanswered. Spinal tuberculosis is unique, as it is a deep-seated lesion. By the time radiological diagnosis is made, few months of pathogenesis of disease has already set in, hence, spinal deformity starts appearing. Obtaining a tissue requires an invasive procedure. The tissue obtained by percutaneous methods may not be sufficient for conclusive diagnosis. The absolute need for histological diagnosis in areas where the disease is endemic and facilities for biopsy and histopathology are scarce is still controversial. The response to treatment has a radiological delay. The conversion from bacteriological positive to bacteriological negative is not demonstrable, consequently the optimum duration of the antituberculosis therapy (ATT) to affect a cure is not evidence-based as yet.

The spinal tuberculosis poses challenge for early diagnosis before kyphotic deformity/neural deficit appearance. Once diagnosed it should be treated nonoperatively/surgically. Which spine needs instrumented stabilization? Many different surgical approaches such as anterior only, anterior and posterior as single or multiple staged procedures, posterior only procedures have all been described but the exact indication for each is still not clear. Minimally invasive surgery and its place in the overall surgical planning is not defined. Spinal TB in children and adults needs to be considered as a separate entity. Emergence of multidrug resistance is adding a new dimension/complexity.

The present issue of the *Indian Journal of Orthopedics* (IJO) includes a series of articles on spinal tuberculosis. The study by Valsalan, *et al.*,[2] analyzes the efficacy of directly observed, short-course (DOTS), chemotherapy, prospectively in a subset of patients and authors believe that it works well in his series. The intermittent or daily dosage regimen has a sound scientific basis, but the optimum duration of ATT intake needs a prospective study. As the markers of the healed lesions are not available and bacteriological conversion is not demonstrable in a spinal tubercular lesion, this will be an area of research open to researchers.[3]

Tuberculosis of the spine in children is unique. The disease produces severe deformity in children and these deformities continue to grow, even after attaining a healed status. The growth potential is altered as a result of bone destruction and/or surgical intervention with consequent progression

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of spinal deformity. In contrast the spinal deformity remain stationary once it heals in adults. TB spine in children requires a different management algorithm than that in adults.[3-5] The children at risk for deformity should be identified early by the presence of 'spine at risk' radiological signs seen in the plain radiographs and must be selectively advised surgery.[6] As the life expectancy increases, long-term repurcussions of localized kyphotic deformity add the risk of degenerative problems, proximal and distal, to the kyphotic deformity, as well as a risk of late onset of paraplegia. All efforts should be made to treat TB spine and achieve minimal or no kyphosis. Even if the patient reports with a kyphotic deformity, it should be an important consideration while treating them. The articles by Gokce *et al*.,[7] is a report of a series of patients, where the author presents his results on TB spine with kyphotic deformity, with emphasis on sagittal balance and correction of spinal deformity. The surgical correction of healed kyphosis is difficult, and guiding principles have been suggested, such as closing–opening osteotomy of the spine.[5] The broad principles of kyphotic deformity correction are, anterior corpectomy/osteotomy, posterior column shortening, posterior instrumentation, anterior cages/bone grafting, and posterior bone grafting. This surgery is fraught with the risk of neural deterioration, hence, is to be practiced with caution, after ensuring adequate training and infrastructure. Deshpande *et al.*[8] reports a series of healed posttubercular kyphosis in young children treated by posterior spinal fusion. The authors believe that the patients younger than 8 years and have <2 spine at risk signs are best candidate for posterior spinal fusion.

The long-term outcome of TB spine cases, treated over few decades, give a natural history of the disease and provide few important messages to learn. The article by Moon *et al*.,[9] provides a long-term followup of TB spine cases treated for over three decades. The morbidity and effect of the operative procedure should be minimal on the already diseased spine. Minimally invasive techniques are now being propogated for all types of surgeries. The place of minimal invasive techniques in spinal infection, keeping in mind the safety and optimal surgical performance warrants many studies. The study by Kandwal *et al*,[10] reports the outcome of the minimally invasive technique in the surgical treatment of the patient with tuberculosis spondylitis, while Garg *et al*.[11] dwells on the anterior or posterior procedure for surgical treatment of thoracolumbar tuberculosis.

Multidrug resistance tuberculosis is a man-made problem that is likely to attain alarming proportions. Early identification of drug resistance, appropriate investigations and optimal treatment before a bacteriological diagnosis is established are still an unanswered question. The optimum duration of ATT in such situations is more difficult. Jain *et al*.[12] report a series where the author advocates labeling cases as therapeutically refractory TB spine until drug resistance is demonstrated in the culture. HIV-associated TB spine is a challenge for diagnosis and treatment. The differences in the clinical picture and clinico-imaging features need to be established to treat the comorbid state. Camron Anley *et al*.[13] reported an MRI observation in a group of HIV-positive and negative patients and they observed lesser vertebral destruction and bigger epidural compression in HIV-positive patients.

The objective of treatment in peripheral joint TB is to achieve a healed status with a functional joint. This is only possible if we diagnose at the stage of osteomyelitis before arthritis sets in,[14,15] Moon *et al*.[16] stressed on achieving functional, painless mobile hip in children by early diagnosis and achieving an anatomical cephelocotyloid relationship until maturity, in an observational study spread over three decades.

Anil K Jain, S Rajasekaran[1]

Professor of Orthopaedics, University College of Medical Sciences and GTB Hospital, Delhi, [1]Chairman, Department of Orthopaedics, Ganga Hospital, Coimbatore, Tamil Nadu, India

Address for correspondence: Dr. Anil K Jain, Professor of Orthopedics, University College of Medical Sciences and GTB Hospital, Delhi, India. Editor, Indian Journal of Orthopedics. E-mail: dranilkjain@gmail.com

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