International Journal of Orthopaedics Sciences

ISSN: 2395-1958
IJOS 2018; 4(4): 208-210

www.orthopaper.com
Received: 13-08-2018
Accepted: 15-09-2018

Alamgir Jhan
Senior Resident, Department of Orthopaedics GMC Haldwani, Uttrakhand, India

Deepti Randhev
Third Year PG Resident, Department of Radio Diagnosis GMC Haldwani, Uttarakhand, India

Ganesh Singh
Assistant Professor, Department of Radio Diagnosis GMC Haldwani, Uttarakhand, India

Correspondence
Deepti Randhev
Third Year PG Resident, Department of Radio Diagnosis GMC Haldwani, Uttarakhand, India

MRI in spinal tuberculosis: Its use in early diagnosis and initiation of anti-tubercular therapy

Alamgir Jhan, Deepti Randhev and Ganesh Singh

DOI: https://doi.org/10.22271/ortho.2018.v4.i4d.39

Abstract
Objective: With high incidence and prevalence of spinal tuberculosis in developing countries like India MRI can be used for early detection of spinal tuberculosis and can serve as a basis for starting anti tubercular therapy without waiting for definitive confirmation in the form of bacteriological detection microscopically or in culture and without the use of invasive procedures like biopsy for histo-pathological diagnosis. Aims and objectives: To study the role of MRI in early detection and treatment of spinal tuberculosis Materials and methods 94 patients of spinal tuberculosis were diagnosed on history, clinical examination. Lab-investigations, X-ray spine and MRI spine. 2 patients were lost to follow-up and were thus excluded from the study. All the patients were put on ATT. Patients were followed for almost 9 to 12months at monthly intervals for first 6 months and thereafter every 3 monthly. At each follow-up patients were evaluated for pain relief, subsidence of fever, return of appetite, neurological recovery and lastly return to work.
Results: Inter-vertebral disc space reduction, vertebral end plate erosions, Para-spinal collection (psoas abscess), anterior body wedge collapse cord compression, complete vertebral destruction were the consistent findings seen in our patients suggesting tubercular spondylitis. 92 (97.8%) patients responded to anti tubercular therapy with pain relief, absence of fever, improvement in appetite and neurological recovery and completely returned to work. 2 patients were lost to follow up. Conclusion: MRI spine can be used as a tool for early detection of tuberculosis spine and for empirical treatment way long before bacteriological diagnosis is made and thus can act a basis for starting ATT without definitive confirmation.

Keywords: Spine, gibbus, antitubercular drugs, prevertebral, MRI

Introduction
Spinal tuberculosis occurs secondary to haematogenous spread of M. tuberculosis from a primary focus elsewhere in the body e.g.; lungs or genitourinary system. Risk factors for developing spinal tuberculosis are poverty, overcrowding, alcoholism, drug abuse, immuno-suppressants, steroids, HIV infection, malnutrition, older and very young age group [1] Para-discal type of involvement is most common type and occurs through arteries while central type involvement occurs through Batson's venous plexus. Other types like anterior, central, posterior, and skip lesions can also occur though less common [2]. In India with high incidence and prevalence of pulmonary tuberculosis, incidence of spinal tuberculosis is expectedly high. Skeletal tuberculosis forms about 10% of extra pulmonary tuberculosis and out of that spinal tuberculosis constitutes about 50% of cases followed by hip and knee [2, 3, 4]. Pathologically two types of spinal tuberculosis occur: caseous, exudative type with abscess formation and granular type with granulation tissue formation. Early diagnosis and initiation of anti-tubercular therapy is important in controlling the disease and thus preventing the spinal deformity because of vertebral collapse and preventing spinal cord involvement and thus any neuro-deficit and lastly early return to work [1, 2, 3, 4].

Materials and Methods
94 patients of spinal tuberculosis were diagnosed with clinical features of pain in the back, low grade fever, loss of appetite, loss of weight, night cries, and no response to analgesics; Lab investigation like ESR,CRP; X-ray spine with special attention to reduction in disc space, end plate erosions, anterior body wedge collapse, pre and para-vertebral shadow and MRI spine.

MRI spine was studied in depth and evaluated for soft tissue changes [2, 5]. Pattern of involvement, disc space reduction, disc and osseous Edema, pre and para-vertebral collection, psoas abscess, wedge collapse of anterior body of vertebra, complete destruction of vertebra and lastly spinal cord involvement were the features seen on MRI spine and noted. Biopsy of sinus discharging pus revealed chronic granulomatous inflammatory changes suggestive of tuberculosis in 3 patients. Once diagnosed all the patients were put on ATT empirically [6, 7]. Patients were followed for almost 9 to 12 months at monthly intervals for first 6 months and thereafter every 3 monthly. At each follow-up patients were evaluated for pain relief, subsidence of fever, return of appetite, neurological recovery, correction of spinal deformity and lastly return to work. ESR and CRP were done at each follow-up and compared with the initial value. X-ray spine was also done to look for recovery changes at each follow-up

Results

Total patients taken for the study were ninety four (94). Two (2) patients were lost during follow-up and were thus excluded from the study. Males were 38 (41%) and females 54(58.6%) (8). our patients age ranged from 15 to 60 years with mean age of 32.8 years. Table 1 shows the age distribution as follows. Dorsal spine was the most commonly site involved followed by lumbar spine, dorso-lumbar junction and lumbo-sacral junction in that order. We had no case of cervical spine involvement [9]. Table 2 shows the disease distribution in our patients. MRI spine showed features like disc space reduction, pre and para-vertebral collection, wedge collapse of body, psoas abscess, total body destruction and spinal cord compression [10, 11] figure 1 shows MRI features in a 56 year old patient with Pott's spine. Percentage distribution is shown in table 3. Most common clinical compliant was pain in back followed by low grade fever, cold abscess, weakness in lower limbs, loss of appetite, gibbus deformity and loss of weight [2, 12] in that order as shown in table 4. All the 16 patients with lower limb weakness had stage 2 Pott's paraplegia [13]. 12(13%) patients had a family member with pulmonary tuberculosis either treated or were taking ATT during the study. Anti-tubercular drugs used were isoniazid, rifampicin, ethambutol, pyrazinamide. Dose varied depending upon the weight of the patient and stage of the disease. In all patients 4 (HREZ) drugs were used during the intensive phase for 4 to 6 months. During maintenance phase 3 drugs (HRE) were used for 3 months and 2 drugs (HR) were function test and frequent ophthalmic examination by an ophthalmologist was done to detect any drug related side effects [14]. All of our patients had improvement in back pain, fever, appetite, started showing improvement in neurological recovery just after 1 month of empirical ATT therapy and completely returned to the work by the end of anti-tubercular therapy.

Table 1: Age distribution

Serial number	Age group	Percentage (n)
1	11-20	16.3% (15)
2	21-30	56.5%(33)
3	31-40	35.8%(25)
4	41-50	13%(12
5	51-60	0.07%(7)

Table 2: Site of spine involvement

Serial number	Site involved	Percentage (n)
1	Dorsal spine	42.39% (39)
2	Dorso-lumbar junction	36.9%(34)
3	Lumbar spine	15.9%(14)
4	Lumbo-sacral junction	0.05%(5)

Table 3: MRI findings

Serial number	MRI finding	Percentage (n)
1	Reduction in disc space	84% (78)
2	Para-spinal Abscess	65.2% (60)
3	Anterior wedge compression of vertebral body	28.2% (26)
4	Cord compression	19.5% (18
5	Complete vertebral body destruction	10.8% (10)

Table 4: Clinical features

Serial number	Clinical features	Percentage (n)
1	Pain	69.5%(64)
2	Low grade fever	34.7%(32)
3	Cold abscess	32.6%(30)
4	Lower limb weakness	17.4%(16)
5	Deformity spine	15.2%(14)

Discussion

Spinal tuberculosis [15] is a disease caused by haematogenous spread of M. Tuberculosis from primary foci like lungs or lymph nodes. The central type of vertebral tuberculosis spreads along Batson's plexus of veins, while the paradisiac infection spreads through the arteries. Extension of abscess beneath the anterior longitudinal ligament and Periosteum leads to anterior vertebral tubercular disease. The disease usually occurs in first three decades of life in developing nations [16]. While in developed nations it is usually a disease of adults. In our study the patients age ranged from 15 years to 60 years the with mean age of 32.8 years. 56.5% [33] patients were in age group of 21 to 30 years, first three decades, comparable to the other studies. Sajid Ansari *et al.* [2] did the same study in about 30 patients. Their patients ranged from 15 to 75 years comparable to our study where we had patients ranging from 15 to 60 years. Nineteen [19] 63.3% were females and eleven(11) 36.6% were males in their study(2) as compared to our study where we had 54 (58.6%) were females and 38 (41%) were males. In our study the most commonly involved site was dorsal spine 42.39% (39 cases) followed by lumbar spine 36.9% (34 cases), dorso-lumbar junction 15.9% (14 cases), lumbo- sacral junction0.05% (5 cases). We had no case of cervical spine tuberculosis [1, 2]. In a study by Amber Goraya *et al.* [1], they had thoraco-lumbar spine as most frequently involved site (47%), thoracic spine (22%), lumbar spine (19%) and cervical spine (8.3%). Spinal tuberculosis has a spectrum of clinical presentation with most common symptom being back pain. Patient can present with low grade fever and neurological deficit. Spinal gibbus deformity. Lower limb weakness (paraparesis) can present in various stages of Pott's paraplegia [16]. In our study pain was the most common presentation in 69.5% (64 cases). Pain was of mild to moderate intensity. Low grade fever was the next common presentation in 34.7% (32 cases), cold abscess in 32.6% (30 cases), lower limb weakness grade 2 Pott's

paraplegia in 17.4% (16 cases). Gibbus deformity was present in 15.2% (14 cases).in a study by Ambar Goraya *et al.* [1], low grade fever was commonest presenting clinical feature (84%) followed by back pain (65%). Lab investigations ESR, CRP though less reliable in diagnosis but were helpful in monitoring response to treatment in our study. X ray spine was the first investigation prescribed in our patients, not much helpful in diagnosis but gave important clues like disc space reduction, end plate erosion, wedge collapse, para-vertebral soft tissue shadows as indications to advice for an MRI spine. MRI spine as mentioned in the literature is the most sensitive and specific radiological investigation for diagnosing spinal tuberculosis. In our study disc space reduction was most common MRI finding in 84% (78 cases). Para-spinal collection (psoas abscess) was present in 65.2% (60 cases). Anterior body wedge collapse occurred in 28.2% (26 cases). Cord compression in 19.5% (18 cases.) Complete vertebral destruction in 10.8%(10 cases), comparable to other studies like Ambar Goraya *et al.* [1], Sajid Ansari *et al.* [2]. In the literature 82 to 92 % cases of spinal tuberculosis respond to anti-tubercular therapy of 9 to 12 months duration. In our study all the patients responded to medications used for 9 to 12 months. In our patients pain relief occurred just after 4 to 6 weeks of anti-tubercular therapy though complete relief occurred in just 90% of patients. Residual pain was explained most probably because of the vertebral collapse that occurred in 10% of our patients. Fever subsided in 6 to 12 weeks. Neurological recovery occurred in 10 cases (62.5%). In 6 (37.5%) cases, paraplegia progressed to grade 3 explained because of cord compression secondary to vertebral body collapse, deformity spine and were referred to higher centre for surgical decompression [17, 18].

Conclusion

MRI is neuro-imaging of choice for diagnosis of spinal tuberculosis. MRI is more sensitive and more specific than X ray and CT scan [19, 20] MRI demonstrates involvement of vertebra, disc space reduction, disc destruction, cold bcess, vertebral collapse, abscess formation, collection and expansion of granulation tissue adjacent to the vertebra which is highly suggestive of tuberculosis [21, 22] Combined with clinical features, X-ray and lab investigations, MRI can be used for diagnosis of spine tuberculosis and for initiation of anti-tubercular therapy without bacteriological, cultural or biopsy confirmation [23, 24, 25, 26].

References

1. Amber Goraya, Uzma Habib, Aysha Anjum. MRI findings in spinal tuberculosis. PJHMS. 2013; 7(4):1166-69.
2. Sajid A, Raj Kumar R, Kanchan D, *et al.* MRI evaluation of spinal tuberculosis. Al Ameen J Med Sci. 2013; 6(3):219-225.
3. Dunn R. The medical management of spinal tuberculosis: SAOJ Autumn 2010; 9:37-41
4. Jain AK. Tuberculosis of spine. A fresh look at an old disease. J Bone Joint Surg Br. 2010; 92:905-13.
5. Bajwa GR. Evaluation of the role of MRI in spinal tuberculosis. A study of 60 cases. Pak J Med Sci 2009; 25(6):944-947.
6. Polley P, Dunn R. Noncontiguous spinal tuberculosis. Incidence and management. Eur. Spine J. 2009; 18:1096-101.
7. Chauhan A, Gupta BB. Spinal tuberculosis. India Academy of Clinical Medicine. 2007; 8:110-4.
8. Danchaivijitr, Jevarans S, Thempmongkhol K, *et al*. Diagnostic accuracy of MR imaging in tubercular spondylitis. J Med Asso Thai. 2007; 90:1581-89.
9. Moore MS. Tuberculosis of spine. Contemporary thoughts on current issues and perspective. Curr Orthop. 2007; 21:364-79.
10. Tuli SM. Tuberculosis of the spine. A historical review. Clin Orthop Relat Res. 2007; 460:29-38.
11. Bone CM. Spectrum of spine infections in patients with HIV: A case report and review of literature. Clin Ortho Relat Res. 2006; 444:83-91.
12. Govinder S. Spinal infections. J Bone Joint Surg Br. 2005; 87B:1454-58.
13. Na-Young Jung, Won-Hee Jee, Kee Yong Ha, *et al*. Discrimination of tubercular spondylitis from pyogenic spondylitis on MRI. AJR. 2004; 182:1405-1410.
14. Muckey T, Schiltz T, Kirschner M. Psoas abscess: the spine a primary source of infection. 2003; 28(6):106-13.
15. Alothman A, Memish ZA, Awada A, *et al*. Tuberculosis of spine: Analysis of 69 cases from Saudi Arabia. Spine. 2001; 26:565-70.
16. Bareau NT, Cardinal E. Imaging of musculoskeletal and spinal infections in AIDS. Radio Clin North Am. 2001; 39:343-355.
17. Moor SL, Rafi M. Imaging of musculosketal and spinal tuberculosis. Radio Clin North Am. 2001; 39:329-342.
18. Catran SR, Kumar V, Tuclin C. Robbins Patologic basis of disease. 6th ed. Philadelphia: Sanders, 1999: 349-352.
19. Vidyasagar C, Murthy HK. Spinal tuberculosis with neurological deficit. Natl Med J India. 1996; 9(1):25-27.
20. Shanley DJ. Tuberculosis of spine. Imaging features. AJR. 1995; 164:659-64.
21. Sherif HS, Morgan JL, Shaheed MS, *et al*. Role of CT and MRI imaging in management of tubercular spondylitis. Radio Clin North Am. 1995; 33:787-804.
22. Desai SS. Early diagnosis of spinal tuberculosis by MRI. J bone Joint Surg Br. 1994; 76:865-9.
23. Jallah RD, Kuppusamy I, Mahayddin AA. Spinal tuberculosis: a five years review of cases at a national tuberculosis centre. Med J Malaya. 1991; 46(3):269-73.
24. Smith AS, Weinstein MA, Mizushine A, *et al*. MR imaging characteristics of tubercular spondylitis vs vertebral osteomyelitis. A JNR. 1989; 10:619-625.
25. Tulsi SM. Treatment of neurological complications of tuberculosis of spine. J bone Joint Surg. 1969; 51A:680-92.
26. Hodgson AR, Skinsner OK, Leong CY. The pathogenesis of Potts paraplegia. J Bone Joint Surg. 1967; 49:1147-1156.