



Spinal tuberculosis – a retrospective analysis of 1 year in a tertiary center.

Neurosurgery

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ABSTRACT

Introduction: Tuberculosis is one of the oldest diseases of the mankind. Skeletal involvement is seen in approximately 10% of all patients with extra pulmonary TB. Spinal TB constitutes 50% of all extra pulmonary TB. It most commonly affects lower thoracic and thoracolumbar regions followed by the lumbar and cervical regions.

Aims and Objectives: To analyse the results of outcome of the patients with spinal tuberculosis who presented with us over a period of one year from 2015 to 2016 in a single neurosurgery unit in Government Medical College Thiruvananthapuram, Kerala, India.

Materials and Methods: In this retrospective study, all consecutive patients with diagnosis of spinal tuberculosis from January 2015 to December 2016 were enrolled. This comprised of 14 patients. All patients underwent MRI prior to admission. The diagnosis was based upon clinical suspicion supported by radiological evidence. The patient characteristics and radiological parameters were entered into database and analysed using SPSS trial version. Neurological assessment was done using Asia scale at admission, after surgery and at discharge. Patients who presented with neurological deficits underwent surgery with posterior decompression with transpedicular fixation. Outcome was assessed with improvement in ASIA scale in patients with neurologic deficit and improvement in VAS scale in patients who presented with back pain. All patients were given DOTS 4 drug regimens and were followed up regularly. Any drug related complications were recorded and managed accordingly.

Results: There were total 14 patients of 8 were males and 6 females. 6 patients presented with acute neurologic deficits and 2 with instability, all of these patients underwent posterior decompression and fixation. All 14 patients were given DOTS 4 drug regime which constituted of HRZE in intensive phase of 2 months and followed by 2 drug HR in continuation phase for 7 months. All patients had their blood profile monitored for any intolerance to ATT and also to monitor for the response to treatment. Out of 8 patients who underwent surgery, 3 had excellent outcome, 2 had good outcome, 1 had fair outcome and 2 died. The remaining 5 who presented with back pain had significant improvement in VAS score at the end of the treatment.

Conclusion : TB spine constitutes a diagnostic dilemma at many occasions. Early decompression can reverse neurologic deficit. DOTS with posterior decompression and fixation offers a good option in the management of tuberculous spondylodiscitis who present with acute neurologic deficit whereas in ambulant patients intermittent DOTS gives good pain relief with healing at the end of the treatment.

KEYWORDS:

INTRODUCTION

TB is a global problem and the epidemic is larger than previously expected. There were an estimated 1.8 million TB deaths in 2015 including 400,000 WITH HIV and TB¹. 65 % of these cases occur among 6 countries in the world which includes India. Our country is also among the forefronts in the rankings of Rifampicin resistant TB. Of all patients with TB nearly 5% have involvement of skeletal system^{2,3}. Of them 50% will have involvement of the vertebral column. TB spine is being detected more accurately with advancements in imaging techniques. MRI is now the imaging modality of choice for tuberculous spondylodiscitis⁴ which helps in early detection and management of patients with Anti Tuberculous Therapy (ATT) before the devastating sequelae of weakness and deformity sets in. The management of TB spine of Potts spine has witnessed a sea of changes over the decades. The discovery of new drugs and the introduction of newer regimes has improved the morbidity and mortality related to the disease¹. We present our retrospective study of one year.

MATERIALS AND METHODS

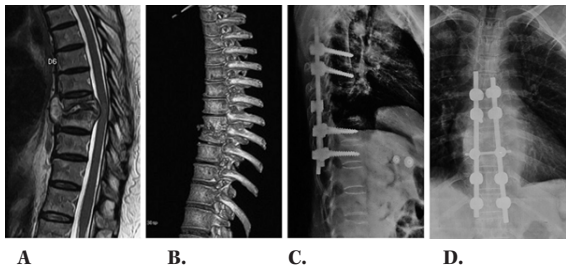
Data of patients with tuberculous spondylodiscitis were reviewed from January 2015 to December 2016 consisting of 14 patients who were diagnosed with Tuberculous spondylodiscitis. All patients were primarily admitted and investigated under general medicine unit.

Neurosurgery consultations were sent on suspicion of diagnosis of TB. On high index of suspicion all patients were transferred to neurosurgery unit. The diagnosis of high suspicion was made on clinical grounds which consisted of presence of constitutional symptoms of weight loss, evening rise of temperature, loss of appetite, history of contact with TB. This was reinforced on the presence of clinical examination and laboratory findings viz. – presence of lymph nodes, mantoux positivity and high ESR. All patients underwent Gadolinium enhanced MRI which showed the characteristic paraspinal collection or features of tuberculous spondylodiscitis. All patients were started on ATT. Patient's neurologic status were recorded using ASIA impairment scale. Patients who presented only with back pain had their intensity charted on the Visual analogue scale. This was charted at admission, immediately before surgery, at discharge and at the end of treatment. Patients who had acute neurologic deficit underwent immediate surgery which consisted of laminectomy and transpedicular fixation. During surgery, the all tissue/abscess specimen obtained was subjected to biopsy, GeneXpert and culture. All the patients were regularly followed up on outpatient basis. They were subjected to laboratory investigations which consisted of Liver function tests (LFT) and ESR. The response to therapy was monitored on clinical grounds which was- return of appetite, weight gain and feeling of wellbeing in addition of fall in ESR. The LFT was monitored to assess any toxicity to ATT.

Surgery

The surgery was performed under general anaesthesia. Preoperatively the collapsed vertebra is usually marked with a marker x ray which is usually a coin affixed at the level to be operated. This is particularly helpful in Thoracic levels. Patient is positioned prone with 1 bolster beneath chest and another below pelvis so that the abdomen could hang free. This position may help in reducing some amount of kyphosis due to gravitational pull. With midline incision and stripping of the paravertebral muscles, the pedicle screws were inserted in the unaffected vertebrae (1 or 2 level above and another below the diseased site). The affected segments were avoided in the instrumentation. After the pedicular screw insertion posterior decompression was done. The position of the screws is ascertained with intra operative C-Arm. The levels of decompression were determined by the preoperative MRI. Illustrative case shown in fig.1.

FIG1.



- A – MRI- showing collapse of D8 vertebra with mild collection at the anterior and posterior part. Mild epidural compression is present.
- B. 3D CT reconstruction of the spine
- C. Post-operative lateral view of the x-ray showing posterior fixation with transpedicular screws.
- D. posterior view of x-ray of the posterior view of the construct with the cross link.

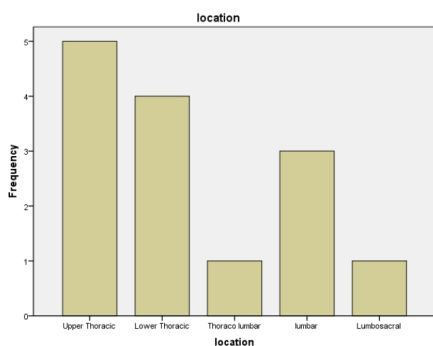
Antituberculous therapy

All patients were given standard ATT which consisted of isoniazid (5-10 mg/kg), rifampicin (10 mg/kg), pyrazinamide (15-30mg/kg), and ethambutol (15-20 mg/kg) for 2 months in the intensive phase followed by isoniazid and rifampicin for the next 7 months in the continuation phase. In 2 cases Pyrazinamide was continued for 4 months at surgeon's discretion.

RESULTS

There were 14 patients in total of which there were 8 males and 6 females. The mean age of the patients were 53 years (21 -70yrs). Constitutional symptoms were present in 10 patients (71.4%) and absent in 4(28.6%). There were no comorbidities in 5 patients while 8 where diabetic, and one was hypertensive. ESR was high in all the 14 patients. A positive mantoux was detected in 60% of patients and negative in (28.6%). Location of the disease was in upper thoracic (35.8%), lower thoracic (28.6%), thoracolumbar (7.1%), lumbar (21.4%) and lumbosacral (7.1%) (Fig 2)

Fig2. Distributions of disease across the vertebral levels.



No of vertebral levels involved by the disease were 2 in 11 patients (78.6%) and 3 in 3 patients (21.4%). Paravertebral collection was present in 8 patients (57.1%) and absent in 6(42.9%). The ASIA scale of the patients at admission are given in the table no 1. The mean duration of symptoms before admission was 2.2 ± 1 week. This excluded the constitutional symptoms of fever, weight loss and loss of appetite. The compelling symptoms to admissions were usually worsening of back ache, radiculopathy or acute onset of weakness. Of the 14 patients, 5 developed acute paraplegia. Among them there was 1 male and 4 females. There were 3 patients with features of instability. All of them underwent posterior decompression in the form of laminectomy and transpedicular fixation. After surgery, all of them regained their power upto some extent although not fully. Patients who developed paraplegia the disease was located in thoracic region in 4 and cervicothoracic in one. One patient where the location was in lumbosacral region underwent minimally invasive tubular biopsy from sacrum for confirmation of diagnosis. All the specimen obtained was subjected to GeneXpert which was positive in 5 cases (62.5%) and negative in 3 (37.5%) cases. The specimen was also sent for culture which was positive in only 2 cases (20%). The histopathology was consistent with Tuberculosis in all the cases which showed granulation tissue. All the patients were started on DOTS with standard dose. patients who underwent surgery were discharged after suture removal on the 8th day. None had any surgery related complications. All the 14 patients were followed up on outpatient basis with regular monitoring of LFT and ESR. 2 patients had severe hepatotoxicity that required admission. They ultimately succumbed to the disease. 2 patients had mild hepatotoxicity which required minor dose adjustments, upon which the LFT became normal and thereafter full dose was restarted. All the surviving 8 patients had good outcome. clinically their pain subsided, they became fully ambulant, their constitutional symptoms subsided. Radiologically the paravertebral collection as well as the compression on the cord disappeared. The comparison of the ASIA scale at admission, at surgery, at discharge and at end of treatment is given in Table no 2.

outcome

All patients who underwent surgery improved in their power. 5 patients had excellent outcome. All were ambulant without support. 3 patients had more than 3 ASIA scale score at follow up, 2 patients had 2-point improvement. 1 patient had fair outcome with only 1 point improvement but he was ambulant with support. (Table 1) 2 patients died during the follow up. Of the 5 patients who presented with back pain all of them had inferior VAS scores at the end of the treatment.

Table.1

No	ASIA AT ADMISSION	ASIA AT DISCHARGE	ASIA AT END OF TREATMENT
1	B	C	E
2	B	D	E
3	C	D	D
4	C	D	E
5	A	A	EXPIRED
6	C	C	E
7	B	B	EXPIRED
8	B	D	E

DISCUSSION

The global epidemic of Tuberculosis is rising, but the modern medicine dares it with all the armamentarium it has to tackle it. Before the antibiotic era only 25 % achieved healing in a sanatorium, while remainder died from military disease³. The accuracy of imaging modalities has made it to detect and treat TB spine effectively before it manifests its debilitating sequelae of deformity or neurologic deficit. MRI detects Tuberculous spine with overall sensitivity and specificity of 100% and 88.2% respectively. The imaging features of high sensitivity and high specificity are disruption of end plate, 100% & 81% respectively, para vertebral soft tissue shadow (96.8%,85.3%)

and a high signal intensity of the intervertebral disc on the T2 weighted image (80.6%, 82.4%)⁶. In our series 60% of patients had paravertebral collections and all of them had end plate disruptions. In advance centres FDG PET offers even better rates of detection of spinal TB. The SUV max of FDG PET is higher in cases of TB spine compared to the pyogenic infections^{7,8}. Additionally it offers to monitor the response to ATT. Although major guidelines across the world do recommend a biopsy for confirmation of extrapulmonary TB like spine this is less followed in India. This is in part because the incidence of TB far exceeds the incidence of TB in the western world and so does the experience of the physicians handling them. In major centres across India which have published large series have solely relied on radiology for the diagnosis of Spinal tuberculosis^{9,10}.

Pott's spine is a medical disease and should be managed with adequate rest, antituberculous therapy and mobilisation with orthosis^{3,11,12}. Surgery is reserved for uncertain diagnosis, pan vertebral lesion, potential instability, refractory disease, adult with >60° kyphosis and in children when kyphosis is likely to progress with growth¹³. In our series of 10 patients there were 5 patients who presented with acute neurologic deficit. All these patients had epidural compression of the cord. In a review by Danchaijitr et al epidural involvement was seen in 80% of cases in spinal tuberculosis without clinical evidence of neurological deficit⁶. However, in the presence of instability a neurologic deficit can occur at a lesser degree of canal encroachment¹⁴. All our operated patients had radiological evidence of instability. All patients were operated with posterior decompression and fixation. Posterior decompression and fixation has shown to be a good option for treating tuberculous spondylodiscitis in addition to ATT. This has shown to achieve equal kyphosis correction and good radiological fusion rates on follow up¹⁵. All the specimen during decompression was subjected to GeneXpert. 4/5 of the specimen was positive for GeneXpert. The advantage of GeneXpert is the quickness of the result and also the detection of Rifampicin resistance. None of our positively detected patients had any Rifampicin resistance. The sensitivity GeneXpert in detection of Pott's spine from sample taken during surgery is 95.8%¹⁶. Although culture is the gold standard in the diagnosis of TB this is not always positive in the cases of spinal TB. This is because the bacterial load contained in the abscess cavity are usually less than 10³-10⁴ bacilli/ml (live bacilli). In our series, a positive culture was obtained in only 2 cases. All patients were started on extended DOTS which contained standard dosage of ATT given intermittently. This regime has been tried by different researcher from the author's native state and has reported excellent result in 63.4%, good result in 14.6% and fair result in remaining 14.6% in a series on 46 patients¹⁷. This intermittent regime has an added advantage of lesser incidence of adverse reactions to ATT compared to daily regime. In our series, we had 4 patients who had adverse reactions. Among them 2 were serious which needed hospitalization. Both the patients ultimately succumbed to the disease. Both these patients were in advanced diseased stage and also aged with poor performance status and immunity. The remaining 2 patients who had elevation in their Liver enzymes had to stop the treatment temporarily until normalization of the LFT. ATT was reintroduced each drug one at a time and then treatment was regularized.

All our patients who underwent surgery improved. Patients who were conservatively managed with ATT also had reduction in their VAS scores at the end of the treatment.

CONCLUSION

Posterior decompression and transpedicular fixation along with DOTS intermittent ATT is offers a valid option in patients with tuberculous spondylodiscitis presenting with paraplegia. DOTS intermittent ATT improves back pain and shows response to treatment as good as daily regime therapy.

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