Original Research Article

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Management of Spinal Tuberculosis. Our Institutional Experience of 78 Cases

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Abstract

Spine is the most common form of skeletal Tuberculosis with the vertebral body being its preferred site. Spinal Tuberculosis may cause neurological damage, deformity. Predominantly, treatment is anti-tubercular drugs but surgery is required in instability with neurological compromise or deformity. There is a controversy regarding surgical approach to these lesions. Initially anterior approach was used to these lesions and now posterior approach is preferred by some authors. We present to you our operative experience of spinal tuberculosis from Cranio-vertebral junction (CVJ) to lumbosacral junction at our tertiary care referral centre. Our preferred approach was anterior to 55 of these lesions and 21 lesions were addressed by posterior approach in 70 patients. 67 of 70 (95.4) patients had improvement on follow up. Authors feel the good old anterior approach to predominantly anterior compressive lesions holds well in tuberculosis. More studies and longer follow up is required to analyse and compare anterior versus posterior approach.

Keywords: Spinal Tuberculosis; Anterior Approach; Posterior Approach; Surgery.

Introduction

The incidence of Tuberculosis (TB) in 2015 as per WHO 2016 report in the world is 10.4 million cases. Tuberculosis is endemic in India and accounts for one fourth of all cases worldwide [1]. Skeletal tuberculosis accounts for 5% of all tuberculosis out of which spinal tuberculosis accounts 50% of these cases [2]. Tuberculosis is a medical disease with drugs being the mainstay of treatment. In spinal tuberculosis dynamic segment, instability, neurological manifestation and deformity add to its complexities. When to operate is an ambiguity but instability, neurological deficits due to compression have been indication for surgery. Anterior approach was initially preferred [3] but recently with pedicle screws posterior approach has been most commonly favoured [4]. Technological advances in implants, improved experience of the surgeons in using them has changed the way we treat spinal tuberculosis. Surgery helps in stability, early mobilization, for tissue diagnosis, reduction in infection burden, improved drug penetration, decompression of the neural structures and correct deformity.

Aim

A retrospective study to analyse outcome of surgical management of spinal tuberculosis from 2008 October to December 2016 at our institute

Material and Methods

A total number of 78 patients underwent surgery for Potts spine from 2008 October to December 2016 at the Department of Neurosurgery Bangalore Medical College and Research Institute. All histologically TB proven patients who underwent spinal surgery with minimal follow up of six months were included in the study. Eight patients were excluded as we don't have six months follow up. A total of 70 patients underwent spinal surgeries with 6 patients having multiple lesions. Patients underwent anterior approach in form of corpectomy and fusion using cage filled with bone graft from iliac crest in all the

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cases. Plate and screws were used in cervical and cervicothoracic region, screws and rods, ± cages were used in dorsal and lumbar region. CVJ tuberculosis underwent trans-oral anterior decompression and posterior fusion using rods and screws. For posterior approach we used pedicle screws for stabilization. Anterior or posterior approach was based on Surgeons preference, predominant site of compression. Posterior was favoured if there was large epidural abscess, more than three vertebral body involvement where it is generally difficult to do surgery anteriorly or predominantly posterior lesion. No patient in posterior group had significant subluxation of vertebral body into the canal in our study. All patients were followed with routine postoperative x-rays on the day after surgery, 3 and 6 months. All patients received anti-tubercular therapy for 18 months. One patient although improved had implant pull out and has been under observation.

Result

Seventy patients underwent 80 surgeries for 76 lesions where 6 patients underwent surgery for skipped lesions, Four CVJ patients underwent anterior decompression and posterior stabilization. Age ranged from 3-65 years with mean 33.3 yrs. Male is to female ratio was 1.2:1 (Fig. 1). Duration of illness was 4 days to 36 months (Mean 5.8 months). One patient had radiculopathy, rest all of them had myelopathy and pain. Fifty five lesions (72.3%) were addressed by anterior approach and 21 (27.6%) lesions were approached posteriorly as per surgeon's choice and ease of access/familiarity of the approach to surgeons. Craniovertebral junction (CVJ) involvement was in 4 patients, cervical involvement in 6 patients, Cervicothoracic 5 patients, thoracic 38 patients, thoracolumbar (D12-L1 both) 2 patients, lumbar in 20 patients and lumbo-sacral in 1 patient (Fig. 2). 1.8 levels were the average level of vertebrae involved with maximum being 7 and minimum 1 vertebrae. All patients had significant anterior or posterior compression with neurological deficits. 23 patients had 1 level, 32 patients had 2 level and 15 patients had 3 or more level lesions. Power in limbs below the lesion (as per Medical Research Council

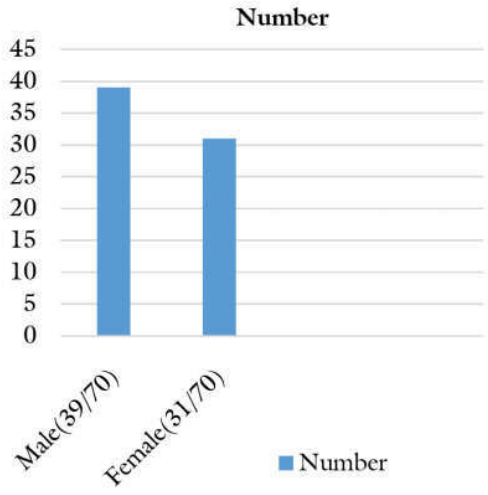

Fig. 1: Ratio of male and female patients

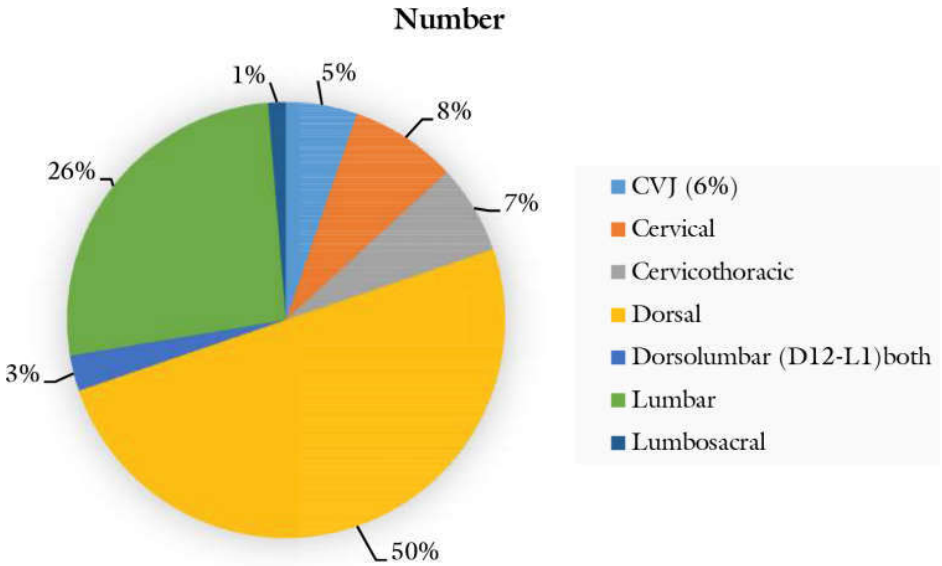

Fig. 2: Showing location of tuberculosis in different spinal segments

grading) was 0/5 in 22 patients, 1/5 in 3 patients, 2/5 in 17 patients, 3/5 in 28 patients, 4/5 in 5 patients and 5/5in 1 patient (Table 1).

Table 1: Grades of power in patients

Grades of power (MRC)	Number of patients (70)
0	22 (31.4%)
1	3 (4.2%)
2	17 (24.2%)
3	28 (40%)
4	5 (7.1%)
5	1 (1.4%)

Sixty eight patients underwent instrumentation and two patients underwent only decompression. Mean follow up was 12.5 months (6-36 months range). 46 patients received alternate day regime as per RNTCP and 24 patients received daily regime. 67/70 patients had improvement in power. 52 patients had grade (4-5)/5 power carrying out daily activities without any support, grade 3/5 in 10 patients, and grade 1-2/5 in 5 patients during last follow up. 1/55 (1.8%) patient in anterior group had severe intercostal neuralgia which resolved over three months. Three 3/70 (3.9%) patients (all posterior) had post-operative wound infection which was treated with wound irrigation and antibiotics. Two (2.8%) patients had transient worsening of power (Anterior group) postoperatively which gradually improved. One (1.4%) patient had drug induced hepatitis which resolved with alternate drug regime. One (1.4%) patient had pedicle screw pull out two years later which were removed and he is under follow up. Lung parenchyma involvement was seen on chest X-ray in 12/70 (17.1%) patients.

Discussion

Tuberculosis is endemic in India [1]. Spinal Tuberculosis is a medical condition with treatment being anti-tubercular drugs for long duration however surgery is needed if there is neurological involvement due to compression, instability or deformity. Diagnostic difficulty is a big problem in spinal tuberculosis as other tumours, pyogenic discitis mimic tuberculosis or vice versa [5]. Choice of approach whether anterior or posterior is still a dilemma [6]. The aim of surgery is for adequate decompression, stability and prevention or correction of deformity [7]. Initially anterior approach was more in practice but with advance in pedicle screws posterior approach is being practiced [8]. Both have their own advantages and disadvantages Spinal tuberculosis predominantly involves anterior body i.e. anterior two columns are involved [9]. Spine is unstable if two columns are disrupted as in trauma [7]. All our patients had neurological deficits in form of myelopathy or radiculopathy, inability to walk due to instability/pain. 50% of the cases in our series as compared to 38% in other series were having dorsal spine involvement as it is the common site for spinal tuberculosis [2]. In our cases, all had anterior body involvement along with varying degree of posterior involvement in 16 lesions. One patient who had L5-S1 root compression due to tubercular abscess underwent laminectomy and decompression. 4 cases of CVJ tuberculosis underwent anterior trans- oral decompression and posterior fusion.

Tuberculosis involves anterior vertebral body in 98% of the cases in some studies [10] and with anterior approach, we can have better reduction in disease burden, ease in placement of anterior cage under compressive load of fusion, less muscle dissection, decreased operative time, easy learning curve, short segment fusion. Disadvantages are unfamiliar anatomy to the spinal surgeons, need for access surgeon, graft subsidence, post op pain, intercostal neuralgia and contamination of sterile pleura or peritoneal cavity. In our study favoured approach was anterior 55 cases where there was severe anterior compression. Lesions and compression being predominantly anterior due to retropulsed vertebrae, we preferred anterior approach wherever surgical access was feasible based on our expertise. Anterior approach was used in 55/76 lesions who underwent removal of the compression anteriorly and fusion involving iliac crest bone graft filled titanium cage (Fig 3a, b and Fig 4a, b). Screws and plates were used in cervical region and screws and rods were used in thoracic/ lumbar region for posterior stabilization only. None of them had clinically significant graft subsidence in follow up x-rays. One of the reasons for opting posterior approach is to avoid violation of sterile pleura or peritoneum however none of the patients who underwent anterior decompression and fusion had any pleural effusion or tubercular peritonitis. Posteriorly fusion was done using pedicle screws and rods. Minimal surgery like stabilization to prevent deformity after decompression is sufficient as bone heals very well in spinal tuberculosis [11]. Posterior approach provides good 360 degree decompression, pedicle screws provide three column stability. Disadvantages are steep learning curve, proper anterior support placement of graft is difficult, longer segment fusion, sinus formation, increased operative time, steep learning curve and weakening of the posterior column which is not routinely involved [2,4,7,8,10,12,13,14].

Fig. 3a:

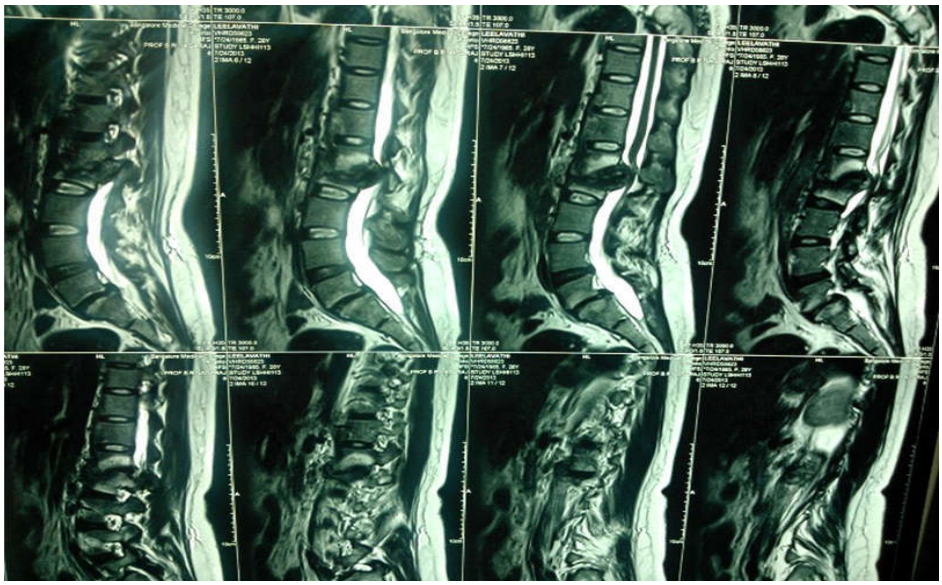

Fig. 3a: Shows MRI T2WI L2 Potts spine preoperative

Fig. 3b: Shows MRI T2WI L2 Potts spine postoperative

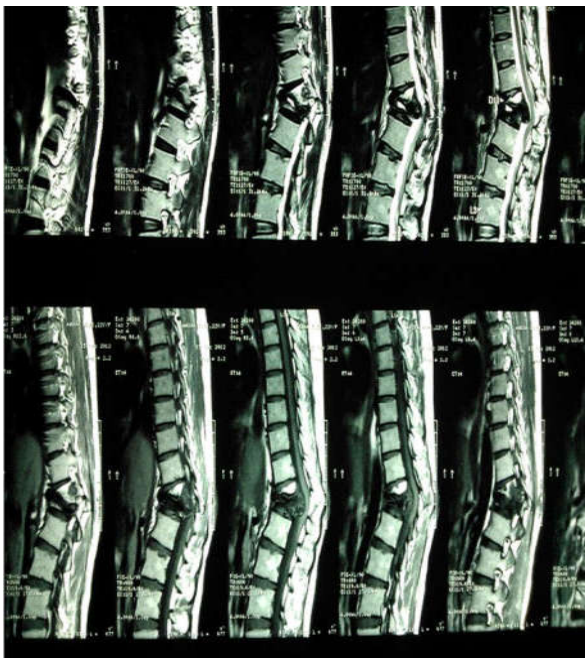

Fig. 4a: T1WI and T2WI sequences of MRI showing d12-l1 complete destruction and cord compression

Spinal tuberculosis require anti tubercular treatment for 6 -18 months. Most of the spinal tuberculosis can be managed by medical management and it shows significant improvement even in myelopathy cases [11]. Authors feel that surgery may help to shorten the duration of treatment although it requires dedicated studies. People have tried anterior decompression, fusion with or without posterior instrumentation in staged procedure or single procedure, posterior decompression, fusion, instrumentation with or without shortening [3,7,10,12,15,16]. No persistent infection is seen after instrumentation in studies after surgery in spinal TB as mycobacterium forms scanty biofilm [17]. Surgical decompression adds to further instability, laminectomy leads to increased neural deficit and paraplegia [18]. Biomechanical stresses are more in junctional areas there is reversal of spinal

curvature from lordosis to kyphosis and vice versa [19] hence sagittal balance can be easily restored with posterior approach. Bone graft provides structural support only in 41% cases [20] and we used titanium cage screws and rod for support. 67/70 (95.7%) patients improved after surgery over period of 6-24 months out of which 20/22 with 0/5 motor power improved. Some studies predict prognosis to be bad if neurological deficits are present more than 3 months [21]. However, we believe to offer surgery to all patients as it may help in improvement of power as 67/70 patients improved after surgery. All surgeons predominantly favoured anterior approach except in cases where there was more than three level vertebral body destruction, predominantly posterior lesion, long segment epidural abscess, and biopsy with stabilization. All except CVJ tuberculosis patients underwent single stage procedure. Six patients underwent surgery for skipped lesion at different sites (Fig. 5a, b, c).

Posteriorly fusion was done using pedicle screws and rods. Tuberculosis heals very quickly with anti-tubercular medications, hence mere anterior approach may suffice in these patients who are having systemic morbidity, malnourishment due to disease, retropulsion as it is easier to perform. We couldn't compare anterior and posterior approach as we didn't perform anterior corpectomy and cage placement via posterior approach in single sitting or staged procedure. Minimal surgery like stabilization to prevent deformity after decompression is sufficient as bone heals very well in spinal tuberculosis. Two patients who have shown no improvement have long standing paraplegia due to dorsal Koch's spine for more than two years, one patient expired due to unrelated cause.

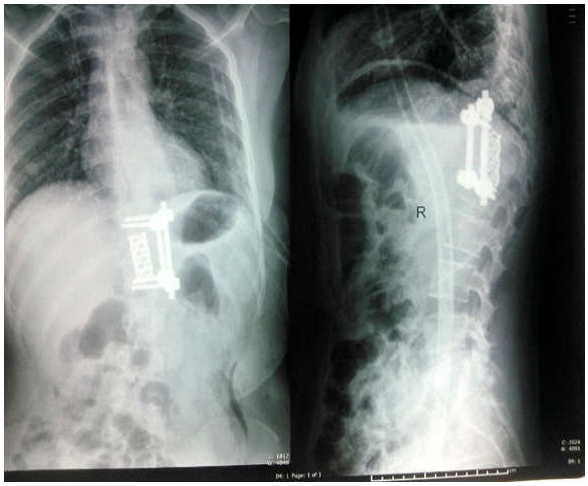

Fig. 4b: Showing postoperative X-ray instrumentation with cage, screws and rods

Fig. 5a: MRI showing Saggital Cervicothoracic junction and L4 tuberculosis

Fig. 5b: Showing post op Cervicalx-ray

Conclusion

Spinal Tuberculosis with neurological compromise has good outcome following surgery by both anterior and posterior approach. Tuberculosis involving

Fig. 5c: Post op Lumbar X-ray

predominantly vertebral body anterior decompression with fusion provides good outcome. More studies are required to compare benefits of both posterior and anterior approach.

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