

# Success of Non Operative Treatment in Patients with Spinal Tuberculosis.

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## Abstract

**Background:** To determine the success and effectiveness of non operative measures in patients with tuberculosis of the spine presenting with or without neurological deficit thus avoiding the surgical intervention.

**Methods :** Seventy (M=20, F=50) patients were included and the study duration was 02 years. Selected patients were advised strict bed rest and antituberculous therapy (ATT) for 18 months. Surgery was done in those patients who presented with severe neurological deficits or non operative measures did not produce any improvement.

**Results :** Pain was the most common presenting symptom (90%). Motor deficit was seen in 60% and incontinence in 10%. On investigations, end plate erosion was seen in 70% ,disc and body involvement in 30% ,paravertebral abscess in 40 % . Majority of the patients (70%) patients were treated successfully with non operative measures .

**Conclusion:** Results are satisfactory in patients who are advised strict bed rest and ATT for 18 months. This helps in reducing the rate of surgical intervention in patients with spinal tuberculosis. It signifies the importance of ATT as it is the mainstay of treatment in spinal tuberculosis.

**Key Words:** Spinal tuberculosis, Non operative, anti-tuberculous, Endplate erosion, Paravertebral abscess

## Introduction

Tuberculosis is a widespread infectious disease both in developing and developed nations.<sup>1</sup> It is one of the devastating infections killing around 1.45 million people annually.<sup>2</sup> This disease is spreading rapidly not only in developing countries but also in developed ones owing to increased consumption of alcohol, drug abuse, HIV and immunosuppression.<sup>3</sup>

Although the incidence of spinal tuberculosis is less than 1% ,it causes havoc when it involves the vertebral body causing destruction and compression of the adjacent vertebrae. <sup>4</sup> It also causes compression of the

neural elements resulting into quadriplegia, paraplegia or any focal deficit like foot drop, sphincter disturbances and gibbus deformity.<sup>5</sup> The quick and early recognition and diagnosis is very important to lessen the morbidity caused by this calamity.<sup>6</sup> Tuberculosis can affect any part of the spine. <sup>7</sup> Thoracolumbar junction is the most common level affected <sup>8</sup>. Other sites are dorsal, lumbar, cervical and lumbosacral areas in descending order.<sup>9</sup> When ATT is started, symptoms usually improve within few weeks <sup>10-12</sup>. ESR is routinely monitored and its levels decrease with every passing day.<sup>13</sup> If ESR is decreasing it shows good response to ATT and subsequently good response <sup>14</sup>. Even motor weakness improves with these non operative measures.<sup>15</sup> Nowadays, surgery is not the first option in most of the spinal tuberculosis patients.<sup>16</sup> Surgery is advised where there is instability due to vertebral body destruction, severe neurological deficit and no improvement in the pain even with bed rest and few weeks of ATT.<sup>17</sup> Tuberculosis of the spine presents clinically with backache as the major symptom. Other features are paraplegia, quadriplegia or sphincter involvement.<sup>18</sup> It also causes erosion of the end plates, vertebral body destruction and epidural abscess.<sup>19</sup> If timely treatment is not started severe morbidity may occur. <sup>20</sup>

If spinal tuberculosis is diagnosed early then prompt treatment with anti tubercular therapy along with immobilization can be curative. <sup>21</sup> Surgery is required where indicated. Surgery in spinal tuberculosis is not without any risk.<sup>22</sup> There is significant amount of trauma and morbidity during anterolateral and posterolateral approaches.<sup>23</sup> ATT along with the strict bed rest is the mainstay of treatment and the results are satisfactory. <sup>24</sup> This non operative approach is an important prospect in the management of spinal tuberculosis. <sup>25</sup>

## Patients and Methods

Seventy patients (m=20, f=50) were included in the study from January 2014 to December 2015, attending Fauji Foundation Hospital. Informed and written consent was taken from the patients. Spinal

Tuberculosis was diagnosed on the basis of history and clinical examination and relevant investigations two groups were designed .First group included those patients having pain and mild weakness. Second group included those patients having moderate to severe weakness or sphincter disturbances. Forty five patients were included in the first group and 25 patients in the second group. Initially both the groups were advised complete bed rest along with ATT. First group, with mild symptoms, was kept on ATT for 18 months. Patients with severe symptoms, who responded to non operative measures , were kept on ATT only.We started the standard ATT regimen ,consisting of four drugs; isoniazid , rifampicin, ethambutol, pyrazinamide. Pyridoxine was also included in the regimen. This regimen was continued for two months. Pyrazinamide and ethambutol were withdrawn for the remaining period. Then injection streptomycin 1gm intramuscular was given for the period of one month. The aim was to decompress the neural tissue and stability by putting an iliac crest or rib graft and securing it with a rod and screws. Lumbar corset, brace or cervical collar was advised for 4 to 6 weeks after surgery. First follow up was after 1 month of the surgery then after every 3 months till the completion of ATT.X-rays of the involved areas were advised at every follow up visit, while MRI at every year. Improvement of pain and motor deficit along with smoothening of the end plates , fusion and resorption of abscess were considered as the success of non operative management.

### Results

Seventy patients with M:F=1:2.5 were included in the study. Mean age was 35 years. Pain was the most common symptom followed by motor deficit and sphincter disturbances. On radiological investigations end plate erosion ( 70% ) was the commonest finding (Table 1).X-ray showed end plates erosion and a magnetic resonance imaging (MRI) of the spine showed an isointense lesion on T1 or hyperintense lesion on T2 involving the end plates, disc, body and paravertebral region (Figure 1-3).On presentation 14 patients ( 20% ) had MRC 5/5, was seen in 40% (Table 2). Dorsolumbar junction was the most common involved region in ( 50% ) (Table 3) Single level was involved in 90 % and multiple levels in 10 % . At presentation mean ESR was 70mm,it was 35mm after 04 weeks of the treatment. It dropped down to 10mm at the completion of the treatment.

**Table 1: Spinal tuberculosis-Radiological findings**

Finding	No(%)
End plate erosion	49(70)
Paravertebral abscess	28(40)
Disc and body involvement	21(30)
Epidural abscess	10(7)

Twenty one patients underwent surgery. Antero-lateral approach was the commonest surgical approach (Table 4).Forty nine patients ( 70% ) recovered fully with no pain or any residual deficit after 18 months of ATT.

**Table 2 : Showing relationship between grades of power and outcome.**

Grades of power	No(%)	Non operative management	Operative management
MRC 5/5	28(40)	Yes	No
MRC 4/5	14 (20)	Yes	No
MRC 3/5	07(10)	Yes	No
MRC 2/5	10 ( 14)	No	Yes
MRC 1/5	08 (11)	No	Yes
MRC 0/5	03 (5)	No	Yes

**Table 3.Spinal Tuberculosis- Sites involved**

Site	No(%)
Dorsolumbar junction	35(50)
Lumbar spine	21(30)
Cervical spine	7(10)

**Table 4. Spinal tuberculosis-surgical management (n=21)**

Surgical approach	No(%)
Antero-lateral approach	10 (47.61)
Anterior cervical corpectomy grafting with caspar plating	7 (33.33)
Posterior decompression	4 (19.04)

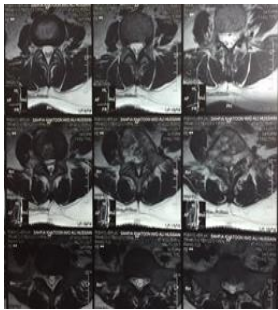
There was no recurrence of the disease in these patients at follow up visits.First group with mild symptoms responded well to bed rest and ATT.All the 45 patients, in the first group, were managed successfully with non operative measures. In group two patients, with moderate to severe symptoms, only 4 patients responded well and avoided surgery and 21 patients underwent surgery. In these surgical patients,ATT was also continued according to our protocol. Dorsal and dorso-lumbar levels were approached thorough thoracotomy. Improvement of pain and motor deficit along with smoothening of the



**Fig 1 :** Showing early tuberculous changes at L3-L4 with end plates erosion. There is also reduced disc space at this level.



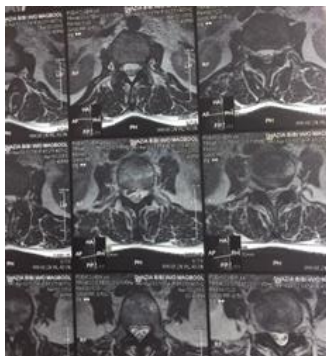
**Fig 2 :** MRI lumbosacral spine, showing hypointense lesion at L4\_L5 level with evidence of endplates erosion as well, consistent with spinal tuberculosis at this level



**Fig 3 :** T2 weighted MRI axial view of lumbar spine showing hyperintense lesion involving the vertebral bodies in spinal tuberculosis.



**Fig 4 :** lateral view of x-ray lumbosacral spine showing smoothing of the end plates at L4-L5.



**Fig 5 :** T2 weighted magnetic resonance imaging showing loss of hyperintensity in the vertebral body consistent with resolution of tuberculosis. end plates , fusion and resorption of abscess were considered as the success of non operative management.

## Discussion

Spinal tuberculosis is a devastating condition and causes destruction of the involved spine.<sup>1</sup> Its incidence is increasing day by day both in developing and developed nations.<sup>2</sup> It is more common in younger age group.<sup>3</sup> Its incidence in older age group is also increasing due to immunodeficiency, alcohol and drug abuse.<sup>4</sup> It causes erosion of the adjacent vertebral end plates, involves and destroys the disc and vertebral body as well resulting into collapse and wedging of the vertebrae.<sup>5</sup> There is a palpable kyphotic deformity and gibbus formation in advanced disease.<sup>6</sup> The dorso-lumbar spine is the most common involved region.<sup>7</sup> most common symptom is the pain followed by motor deficit, sphincters involvement and kyphotic gibbus deformity.<sup>8</sup> spinal tuberculosis is diagnosed with proper history and clinical examination followed by appropriate investigations. X-ray of the suspected area gives clue of the disease but MRI is the investigation of choice and is more sensitive and specific modality of investigating the spinal tuberculosis.<sup>9-12</sup> MRI shows involvement of the disc space, epidural abscess, destruction and collapse of the vertebrae causing deformity of the spine.<sup>13-16</sup> C.T-guided needle biopsy is a less invasive technique to obtain a tissue for histopathological diagnosis.<sup>17-20</sup> ATT is the mainstay of treatment in all patients whether surgery is required or not.<sup>21,22</sup> Surgery is indicated where there is a severe motor deficit, epidural abscess causing compression of the neural tissue, instability of the spine and severe kyphotic deformity and failed non operative management.<sup>23,24</sup> Prognosis is good if early and quick diagnosis is established and prompt action is taken.<sup>25</sup>

In our study we successfully treated 70% of the patients with bed rest and ATT for 18 months and only 30 % of the patients required surgery. The mean age was 35 years ranging from 15 to 70 years which is almost similar in other studies.<sup>1,2,4</sup> Majority of patients were females (M:F=1:2.5). This is partly due to entitlement of a large number of female patients as compared to male patients in our hospital .

Abbas A et al included forty seven patients in their study in four years. They did computed tomography guided percutaneous needle aspiration of the epidural abscess and antituberculous therapy for 12 months. Nine (19.1%) required surgery, 4 of whom had failed percutaneous abscess aspiration attempts and 5 demonstrated progressive neurological deficit. <sup>1</sup> In our study we enrolled seventy patients and 21 (30%) patients required surgery. Abbas et al had better results than our surgery partly due to percutaneous

needle aspiration of the epidural abscess followed by ATT. In another study, conducted by Chandra SP et al, there was a high rate of surgical intervention as 146 patients (81%) out of 179 were operated. <sup>2</sup> New trends are towards a non operative approach as motor deficit is not the indication for surgery. Despite of high intervention rate they also concluded that medical treatment of spinal TB was the mainstay of managing such patients.

Zhang Z et al reviewed 740 adult patients of spinal tuberculosis, 89 patients were given ATT alone. <sup>4</sup> All patients were followed up for at least 2 years upon the completion of the treatment. They concluded that 95.4 % of patients showed a definite and clinical response within one month after starting the treatment, 69 % of patients had excellent to good results, with no complications of the disease, and 77.5 % had asymptomatic local kyphosis with intact neurological function; solid bony fusion of adjacent segment was achieved in 88.8 % of patients. They believed that the mild spinal tuberculosis had responded well to the standard chemotherapy. In our study we also achieved good results in 70% patients and only 30 % of the patients required surgery.

### Conclusion

1. Non operative treatment consisting strict bed rest and ATT for at least 18 months is a successful way of managing the spinal tuberculosis.

2. Surgery can be avoided even in patients presenting with mild to moderate motor deficit. However, even in surgical patients, ATT acts as pivot in the management of spinal tuberculosis.

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