ORIGINAL ARTICLE

Efficacy of Conservative Management with Anti Tuberculosis Treatment in Patients with Spinal Tuberculosis

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ABSTRACT

Introduction: *Spinal TB is a result of haematogenous dissemination from primary focus in lungs or lymph nodes. Most of the under developed and developing world is endemic with TB as these populations are poorly nourished, overcrowded and live in sub standard social conditions and TB being an infectious disease spreads and sustains well in these overcrowded settings. Spinal TB is a common pathology in developing countries like Pakistan. We present a cohort study on findings of conservative treatment in patients suffering from spinal TB.*

Objective: *To determine the efficacy of conservative treatment (ATT) in TB spine.*

Material and Methods: *A cohort study was conducted in Bolan Medical Complex, Quetta in a period of 4 years from 2009 to 2013. A total of 135 cases of spinal tuberculosis were selected. Patients with cervical and cranio-cervical, and sacral TB were excluded from the study and also patients with any malignancy and other associated chronic joint conditions related to back were not selected. Patients were confirmed as a case of spinal TB using standard laboratory and radiology diagnostics. The patients were treated with ATT and followed up for 9 months until the completion of therapy.*

Results: *The average age of patients was 48.8 years. Both male (50.4%) and female (49.6%) were equal in proportion in this study. Lumbar region was more affected (71.1%) with TB spine. Almost all study patients (99.3%) were cured with ATT whereas 1 (0.7%) patient was managed surgically.*

Conclusion: *ATT is effective in the treatment of spinal tuberculosis provided timely diagnosis and initiation of therapy.*

Keywords: *Spinal TB, efficacy, conservative treatment (ATT).*

Abbreviations: *ATT = Spinal TB, efficacy, conservative treatment. IIP = Initial Intensive Phase. CP = Continuation Phase.*

INTRODUCTION

Tuberculsosis (TB) of the spine is one of the oldest diseases of human kind.[1] Spinal TB is a result of haematogenous dissemination from a primary focus in lungs or lymph nodes. It is a common pathology in Pakistan. Most of the under developed and developing world is endemic with TB as these populations are poorly nourished, overcrowded and live in sub standard social conditions and TB being an infectious disease spreads and sustains well in these overcrowded settings. The incidence of TB is 63 per 1000 in the settings of developing countries whereas in Pakistan it stands 231 cases per 100,000 population.[2] Around 1% of TB cases may have an affected spine and of these one to two thirds have associated pulmonary disease.[3,4]

Spinal TB cases present with various signs and symptoms including leg or back pain, kyphotic deformity, palpable mass in the paraspinal region and neurological compromise[5]. The regular symptoms like night sweats and weight loss are not as common in spinal form as in the case of pulmonary TB.

The increased erythrocyte sedimentation rate

(ESR) usually reflects the severity of disease and may return to normal ranges with effective treatment in a few months, however, in a few cases spinal TB (9%) the ESR may be normal at presentation.[2] The other diagnostic confirmations are imaging studies such as MRI and CT scan which is crucial to detect early TB before enough bony damage. The severe bony damage can become evident on plain x-rays.[6,7]

The mode of treatment can be finalized on the basis of CT or MRI. Both conservative therapy (ATT) and surgical options are available in these patients. Effective chemotherapy for TB is available for over 5 decades now.[8] The anti TB regiment consists of two phases; an initial intensive phase (IIP) and a continuation phase (CP). There is best effective short course chemotherapy available for the treatment of TB in adults, children, pregnant and lactating females and other cases associated with Diabetes and HIV.[9,10] The first line anti tuberculosis drugs are Isoniazid (H), Rifampicin (R), Ethambutol (E), Pyrazinamide (Z) and Streptomycin (S).

There is limited evidence on spine TB management at national as well as local level. A study was planned to determine the efficacy of conservative treatment (ATT) in the management of TB spine. The cohort was followed up during whole therapeutic period till final outcome of treatment.

MATERIAL AND METHODS

Patients and Setting

A cohort study was conducted in which 135 patients with spinal TB were enrolled. The study was conducted in Bolan Medical Complex, Quetta from January 2009 to December 2013. The subjects were screened through standard TB diagnostic procedures and spinal TB was finalized on the basis of radiological evidence of bone deformity or significant damage.

Study Procedures

All adult patients of both genders undergoing conservative management of TB spine were included in the study. Patients with cervical and cranio-cervical, and sacral TB were excluded from the study. Also patients with any malignancy and other associated chronic joint conditions related to back were not selected in the study. The diagnosis of TB spine was done on the basis of clinical findings and through routine blood complete picture, ESR and tuberculin tests. The patients underwent x-rays, MR / CT and USG / CT guided.

The patients received conservative treatment of ATT in standard four drug regime consisting of rifampicin (15 mg/kg), isoniazid (5 mg/kg), ethambutol (15 – 25 mg/kg) and pyrazinamide (15 – 30 mg/kg) for 3 months. Finally pyridoxine was given to all patients until the completion of ATT. Patients admitted for therapy were advised bed rest till pain vanished and ambulatory patients were advised for some form of brace for a period of three months.

Outcome Measures and Statistical Considerations

The study outcome was determination of effectiveness of ATT therapy in spinal tuberculosis patients. Data analysis was done using SPSS software where for categorical variables frequency and percentages were measured. For continuous numerical variables mean and standard deviation were calculated.

RESULTS

In this study a total of 135 patients with tuberculosis spine were enrolled. The average age of patients was 48.8 ± 6.9 ranging from 15 to 71 years. Gender was equally distributed in the current study with (49.6%) males (Table 1).

Table 1: *Demographic characteristics (n = 135).*

Age	**Number**	**Percentage**
Up to 20	28	20.7%
21 to 30	25	18.5%
31 to 40	29	21.5%
41 to 50	17	12.6%
51 to 60	15	11.1%
61 or above	21	15.5%
Sex		
Male	67	49.6%
Female	68	50.4%

The site diagnosed as affected by lumbar spine tuberculosis was assessed, L_3 L_4 was the most prevalent (14.8%) site involved, followed by L_4 L_5 (13.3%), L_1 L_2 (11.8%), L_2 L_3 (8.8%), L_5 L_1 and D_{12} L_1 (7.4%) each and L_1 (5.9%). The other common sites of lumbar spine TB were noted to be D_{11} D_{12} (4.4%) whereas

(2.9%) patients each had TB of L_3 D_1, D_4 D_5, D_7 D_8, L_3 and L_4 (Table 2).

Erythrocyte sedimentation rate (ESR) was found above normal cut off in more than (90.0%) cases whereas (9.6%) had it up to 20 mm/Hr (Table 3).

All the patients (100.0%) were given conservative treatment with anti tubercular drugs. The cure rate was found to be (99.3%) in this study. ATT therapy failed in only 1 (0.7%) patient which needed surgical procedure for the management of the spinal tuberculosis. All the study patients used ATT with (100.0%) compliance rate (Table 4).

Table 2: *Site of lumbar spine TB in study patients (n = 135)*

	Number	Percentage
L_3 L_4	20	14.8%
L_4 L_5	18	13.3%
L_1 L_2	16	11.8%
L_2 L_3	12	8.8%
L_5 L_1	10	7.4%
D_{12} L_1	10	7.4%
L_1	8	5.9%
D_{11} D_{12}	6	4.4%
L_3 D_1	4	2.9%
D_4 D_5	4	2.9%
D_7 D_8	4	2.9%
L_3	4	2.9%
L_4	4	2.9%
D_5 D_6	3	2.2%
D_1	3	2.2%
D_{12} L_3	2	1.5%
L_5	2	1.5%
L_5 D_1	1	0.7%
D_{10} D_{11}	1	0.7%
D_9 L_1	1	0.7%
D_6 D_7	1	0.7%
D_7	1	0.7%

Table 3: *ESR results in the study patients (n = 135).*

	Number	Percentage
ESR		
Up to 20 mm/Hr	13	9.6%
> 21 mm/Hr	122	90.4%

Table 4: *Final outcome of patients (n = 135).*

ATT Treatment	Number	Percentage
Therapy success	134	99.3%
Therapy failure	1	0.7%
Surgical procedure done	1	0.7%
Compliance	135	100.0%

DISCUSSION

The goal of treatment for spinal tuberculosis is to cure the disease with minimum residual spinal deformity. Therefore, treatment at lumbar spine should be aimed at maintenance of lordosis by preventing additional progress of bony destruction during the treatment period and thereafter.[11] The anatomical features of the lumbar and lumbosacral spine make tuberculous infection in this region amenable to conservative treatment as this region can "accommodate" lesions better. A capacious spinal canal, with rotating nerve roots which behave like peripheral nerves, can be relatively tolerant to compression because of abscess or granulation tissue, which may develop slowly.[12]

In this study the cure rate was found to be 100.0% after anti tuberculosis therapy. All the patients were compliant in taking anti tuberculosis drugs and followed the standard therapy protocol.

Gender was found equally distributed in the current study. A regional study from Nepal by Pradhan RL noted that male gender had preponderance of TB spondylitis in dorsolumbar and lumbar spine[13]. Another study by Kostov K[14] reported similar distribution with male to female ratio of 2.7: 1. The difference shows that both male and females are equally affected by tuberculosis in our local settings. Similarly, the average age of current study patients was 48.8 years. Pradhan RL and colleagues reported the average age of 58.6 years whereas in another study by Kostov K also a similar mean age of 59.3 years was found.[13,14] This difference could be due to geographical variations and overall population mean life as evident from our study patients who got affected in younger ages.

In the current study more than 90% cases had raised ESR levels (> 20 mm/Hr), however, 9% patients had ESR below 20 mm/Hr. In the study by Karaeminogullari O and colleagues all patients had elevated ESR (mean 64.5 mm/hr) whereas at final follow-up, the mean results for ESR were 20.5 mm/hr.[15] We found out similar results regarding ESR as well. ESR level always elevates in TB patients and is a reliable test for tracking and monitoring the progress of disease and its control.[16]

In the current study radiographic changes associated with TB spine include rarefaction of the vertebral endplates, disc space narrowing, anterior wedging, and bone destruction, but these findings may not be visible on plain radiographs for up to 8 weeks[17]. All others had empirical ATT and all improved in their symptoms after 3 months of the drugs. Nevertheless, spinal tuberculosis progresses slowly and insidiously, and early diagnosis before abscess formation and disc degeneration is difficult.[11] For this reason, a detailed patient history is very important in these cases. In the early stages, single-level disc degeneration can be detected by MRI. In this study lumbar region was found more prevalently (71.1%) affected with TB spine then dorsal.

Furthermore, there have been many studies that report that in South Asian countries where TB is endemic, histopathogical confirmation is not mandatory and a therapeutic trail of ATT is a practical alternative to taking a biopsy.[18]

In the current study conservative ATT treatment provided a 100% efficacy in patients suffering from spinal TB. It was found out that after 18 months of therapy 99.3% cases recovered to normal life whereas one patient (0.7%) still had residual abscess at the end of therapy period and was managed surgically. Pradhan RL also reported a similar cure rate after ATT in TB spine patients.[13] Karaeminogullari et al reported that all study patients achieved pain relief after an average 3 months of drug treatment and on long term follow-up none of their cases had recurrence of disease.[15] These reports validate the findings of current study regarding successful treatment of TB spine with conservative therapy i.e. ATT.

Moreover, the duration and number of drugs to be given in TB spine is still a controversial issue.[19,20] Studies in the past have diverse duration ranging from six months to two years. WHO guideline for extra pulmonary TB has recommended treatment for more than for pulmonary TB and has mentioned for how long.[21] Pulmonary tuberculous lesions are "open lesions," while in contrast, the "closed lesions" in skeletal and spinal tuberculosis do not communicate with air and have far smaller bacterial population. Anti tubercular drugs are most effective against the rapidly replicating bacterial population. Dormant bacilli tend to retain viability despite chemotherapy, and the need to kill them is the reason why skeletal and spinal tuberculosis require a long duration of drug therapy.[22]

Most of the investigators have advocated short-term chemotherapy. Griffith[23] reported results with a 6 or 9 – month course of rifampin and isoniazid. After 3 – 4 years of follow-up, he found that this protocol was at least as effective as an 18 – month course of isoniazid and paraaminosalicylic acid. Upadhyay et al[24] reported that 6 months of triple – drug chemotherapy in conjunction with radical surgery was adequate for managing spinal TB, as this produced results comparable with 9 – month and 18 – month chemotherapeutic regimens. In our series, the duration of the treatment was a 9 – month course of isoniazid and rifampicin, as advocated by most guidelines on Tuberculosis of the Spine.[25-27]

The advantages of this study include a large cohort which was successfully treated with ATT. Similarly, the 100% compliance rate was also exceptional. After completion of therapy only 1 patient still had deformity of lumbar spine who was radically operated and on monthly follow-up was found symptom free.

The limitations of the study are related to the detailed reporting regarding the clinical and epidemiological data of these patients. The study aimed to only report the efficacy of conservative treatment of TB spine. A more detailed data collection tool would have given a more detailed insight of the study cohort as well as addition of a long term follow-up would have been a plus to monitor long term outcome after this therapy process.

CONCLUSION

The anti tuberculosis drug (ATT) treatment is effective for tuberculosis of the lumbar spine. This study achieved a 100.0% cure rate, though it was patient behavior dependent as 100.0% compliance was also witnessed which is a key and justified cause of success in the treatment of TB. Clinical and radiological diagnosis may be adequate to initiate ATT medication as early as possible. Surgical treatment is a successful treatment modality but limited to patients with progressive destruction, improper or slow healing. But surgery has its own limitations in the form of operation related

complications, wound infection and chance of continued deformity and improper functional movement.

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