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*Research Article*

## OUTCOME OF CONSERVATIVE TREATMENT IN CARIES SPINE

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### ABSTRACT

**Background:** Tuberculosis remains endemic and major public-health problem in most part of the world. Despite the reduction in the prevalence of the tuberculosis and the advent of new drugs for tuberculosis, the incidence of extra pulmonary tuberculosis continues to increase at world level. In spite of all the advancements regarding diagnosis, treatment and total control of many diseases, this slow but grave disease still affects considerable number of cases and makes them disabled and even paralyzed.

**Objective:** To assess the outcome of conservative treatment in caries spine.

**Design:** Descriptive case series study.

**Duration of Study with Dates:** One year (1<sup>st</sup> March, 2009 to 28<sup>th</sup> February, 2010)

**Methodology:** History and clinical examination performed for sinus, abscess, effectiveness of chemotherapy and biplane X-rays of affected area of seventy three patients were taken. Patients followed-up and outcome was ascertain favorable according to British Medical Research Council if there were no symptom of pain, no sinus or abscess on clinical examination and radiological healing of spinal lesion at the end of one year.

**Results:** Out of 73 patients, 28 were males and 45 were females between 18-60 years. According to site of lesion thoracic spine was commonly involved (36 patients), lumbar spine in 23 patients followed by thorocolumbar junction in 14 patients. At end of follow-up, 55 (75%) patients achieved favourable status and 18 (25%) patients had unfavourable status.

**Conclusion:** Current study gave uniformly echo the fact that spinal tuberculosis is a “medical condition” and can be effectively treated by conservative treatment.

**Key words:** Caries spine, Conservative treatment, Anti-tuberculous therapy, Radiological healing of spinal lesion, Kyphosis

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## INTRODUCTION

Worldwide tuberculosis (TB) is the most common cause of infection related death. In 1993, the World Health Organization (WHO) declared tuberculosis to be a global public health emergency.<sup>1</sup> *Mycobacterium tuberculosis* is the causative microorganism of tuberculosis in humans. Three related organisms *Mycobacterium tuberculosis*, *Mycobacterium africanum*, and *Mycobacterium bovis* are the causes of tuberculosis. *Mycobacterium tuberculosis* is by far the most common. Spinal tuberculosis often called Pott's disease or caries spine is by definition, an advanced extrapulmonary manifestation of tuberculosis caused by mycobacterium tuberculosis complex affecting vertebral column.<sup>2,3</sup>

Osteoarticular tuberculosis represents 3-5% of all cases of tuberculosis and between 10-15% of extrapulmonary tuberculosis. Spinal tuberculosis represents 50% of osteoarticular form.<sup>4</sup> It was reported that tuberculosis spine is more common in males than females. Percivall Pott gave his name to spinal deformity with curvature due to abscess and vertebral destruction associated with paralysis of lower limbs as Pott's paralysis.<sup>5,6</sup>

Though there has been a remarkable improvement of pulmonary tuberculosis management, but treatment of tuberculous spondylitis whether surgical or conservative, is still controversial. Regarding the aims of treatment, there is a universal consensus that these should be, first to arrest the progression of disease, and secondly to achieve a stable spine. With the advent of the chemotherapy, there has been a general inclination towards conservative form of therapy. Specific and effective conservative treatment is now the mainstay of treatment.<sup>7,8</sup>

The dilemma was much solved by Medical and Research Council and Working Party (MRC&WP) trials, which were a series of six prospective studies. They recommended chemotherapy as a standard first line treatment. In selective patients the results were much better with anterior surgery especially during the first 18 months. But the last and latest report of, MRC&WP have shown no statistically significant difference in the outcome of both the procedures 10-15 years after the treatment.<sup>9</sup> Currently the trends are towards the less radical middle path regimen. This unclear rather confusing situation leads to the need of a local study to look upon the results of non-operative ambulatory treatment of caries spine.<sup>10</sup>

Tuberculous spondylitis being endemic in underdeveloped countries including Pakistan and ranks 6<sup>th</sup> among the 22 high-burden tuberculosis countries worldwide, posing strong economical set back to whole family and state.<sup>11</sup>

Surgery attempts only to extirpate the complications arising from disease process. In many developing countries it may not be possible to undertake this surgery because of limited facilities, inadequate hospital beds and financial constraints. Under such circumstances the best available method of treatment for spinal tuberculosis appears to be chemotherapy on an ambulant basis. Our study of conservative treatment will help to generate local data to assess its efficacy in treatment of caries spine.<sup>12</sup>

Modern treatment of T.B. spine began with Hibbs (1911) who noticed natural ankylosis of spine and advocated deliberate surgical induction, thus inventing first surgically achieved spinal fusion. Albee described spinal fusion with a bone graft in the same year. In 1934, Ito, Tusuchija and Asami reported the first radical debridement and bone grafting procedure. It was Hodgson & Stock who first time popularized the anterior decompression as the Hong Kong

procedure. They aimed their method at the complete surgical excision of diseased and avascular focus to allow the free access of the antitubercular drugs to the site of the lesion. But this left the spine unstable. So a modification was devised to place a tricortical bone graft for the stabilization of the spine and achievement of early arthrodesis, this is known as Modified, "Hong Kong Procedure".<sup>13,14</sup>

These trials were performed at different centers. Results of up till 15 years of follow up have shown that initial period of POP immobilization has little if any long term benefits. Conservative treatment showed comparable results to that of anterior decompression.<sup>15</sup>

### **Objective**

The objective of this study was to assess the outcome of conservative treatment in caries spine.

### **Operational Definitions**

**Outcome:** will be assessed in terms of

**a-Symptom of pain** (Using numeric rating scale (NRS) If zero (0) means no pain and ten (10) means pain as bad as it could be.

**b-Sinus or abscess** on clinical examination.

**c-Radiological healing** of spinal lesion ( bony fusion and sclerosis of the contiguous surfaces of affected vertebral bodies with reduction or disappearance of intervening disc space).

Outcome will be ascertained favorable if there will be

No Symptom of pain, no Sinus or abscess on clinical examination and radiological healing of spinal lesion at the end of one year.

## **MATERIAL AND METHODS**

**Study design:** Descriptive case series study.

**Setting:** The study was conducted at Department of Orthopaedic Shaikh Zayed Hospital, Lahore and Madina Teaching Hospital, Faisalabad, Pakistan.

**Study Duration:** One year (1<sup>st</sup> March, 2009 to 28<sup>th</sup> February, 2010)

**Sample size:** The sample size is 73 cases by using WHO sample size calculator for single proportion with absolute precision required 9%, confidence level taking 95% expected percentage of favorable status (No symptom of pain, no Sinus or abscess on clinical examination and radiological healing of spinal lesion) with conservative treatment in caries spine i.e. 81%.

**Sampling technique:** Non-probability purposive sampling

### **Sample Selection**

**Inclusion Criteria:** Tuberculosis of spine involving any vertebra in dorsolumbar region, age 18 years or more and patients of both sexes.

**Exclusion Criteria:** Patients excluded from study with motor deficits at time of presentation on clinical examination, kyphosis >40 degree at the effected level on radiograph at presentation, deteriorating neurological functions on clinical examination while on antituberculous therapy, involvement of three or more vertebrae, pregnant women and diabetes mellitus.

## Data Collection Procedure

Patients attending at Orthopaedics outpatient department, Shaikh Zayed Hospital, Lahore and Department of Orthopedic Madina Teaching Hospital, Faisalabad, for treatment of back pain was our study population. Seventy three patients fulfilling the selection criteria were identified. They were explained about the study and an informed consent got signed about their inclusion in the study. The demographic profile (i.e. age, sex) were noted, clinical examination was performed for sinus or abscess and biplane x-rays of affected area were taken. Conservative treatment was started with initial phase of four drugs.

Patients were followed up in outpatient department and pain was rated using NRS. Outcome of the study was evaluated at the end of one year from start of chemotherapy. Outcome was ascertained favorable if there was no symptom of pain, no sinus or abscess on clinical examination and radiological healing of spinal lesion at the end of one year. Effect modifier like age was addressed using stratification. All this information was collected through specially designed proforma.

**Data Analysis:** All the collected information was entered into SPSS version 10.0. Qualitative variables i.e. sex, pain (Yes, No), abscess or sinus (Yes, No) and radiological healing (Yes, No) and status of conservative treatment (Favorable, unfavorable) were presented as descriptive statistics, calculating their frequencies and percentages. Quantitative variables i.e. age was presented as numerical statistics, calculating its mean and standard deviation.

Data was stratified for age to address effect modifier.

## RESULTS

The study was conducted in Orthopaedics outpatient Department, Shaikh Zayed Hospital, Lahore and Madina Teaching Hospital, Faisalabad. The study was conducted on 73 patients during one year. There were 28 males (38%) and 45 females (62%). Male to female ratio was 1:1.6 (Data presented in table 1).

The patient's presented in Table 1 were also grouped into three age profile. The first age group patients aged ranged 18-32 years (n = 39) 53%, in second age group patients aged between 33-46 years (n = 19) 26% and in the third age group patients aged 47-60 years (n = 15) 21%. The mean±SD between the ages was 34.62±13.95 years. The male and female ratio in frequency and percentage also presented in the same table (1).

According to the site of lesion involvement of thoracic spine was higher involved 36 patients (49%) as compared to, thoracolumbar junction in 14 patients (20%) and lumbar spine in 23 (31%) [Table 2]. The male and female ratio in frequency and percentage also presented in the same table (2).

All the patients were having pain prior to starting treatment. At the end of study 61 (84%) patients were pain free and did not pain relief in 12 (16%) patients. Seventeen out of 73 patients were having sinus or abscesses at the start of treatment. At the completion of study 6 patients (35.29%) remained with sinus or abscesses clinically while 11 completed improved. All the patients were having radiological active disease prior to starting treatment. At the end of study 55 patients had radiological healing of spinal lesion [Table 3]. (Figure 1a,b,c,d).

In 18 patients (25%) there is no radiological healing. At the end of one year after start of conservative treatment, favorable status achieved in 55 patients (75%) and 18 patients (25%) remained with unfavorable status. The male and female ratio in favorable and unfavorable status are 23:32 and 5:13 respectively (Table 4).

**Table 1. Frequency distribution of patients according age and sex**

| Groups  | Age (years) | Frequency (M:F) | Percentage (M:F) |
|---------|-------------|-----------------|------------------|
| 1       | 18 – 32     | 39 (14:25)      | 53.0(36:64)      |
| 2       | 33 – 46     | 19 (6:13)       | 26.0(32:68)      |
| 3       | 47 – 60     | 15 (8:7)        | 21.0(53:47)      |
| Mean±SD |             | 34.62±13.95     | (n = 73)         |

**Table 2. Frequency distribution according to site of lesion**

| Site of lesion         | Frequency (M:F) | Percentage (M:F) |
|------------------------|-----------------|------------------|
| Thoracic               | 36(12:24)       | 49.0(33:67)      |
| Thoracolumbar junction | 14(6:8)         | 19.0(43:57)      |
| Lumbar                 | 23(10:13)       | 32.0(43:57)      |
| (n = 73)               |                 |                  |

**Table 3. Pre and post treatment frequencies of variable**

|                      | Pre-treatment |            | Post-treatment |            |
|----------------------|---------------|------------|----------------|------------|
|                      | Frequency     | Percentage | Frequency      | Percentage |
| Pain (using NRS)     | 73            | 100.0      | 12             | 16         |
| Sinus or abscess     | 17            | 24.0       | 6              | 35.29      |
| Radiological healing | -             | -          | 55             | 75         |

**Key:** NRS Numerical rating score (n = 73)

**Table 4. Frequency distribution according to final outcome**

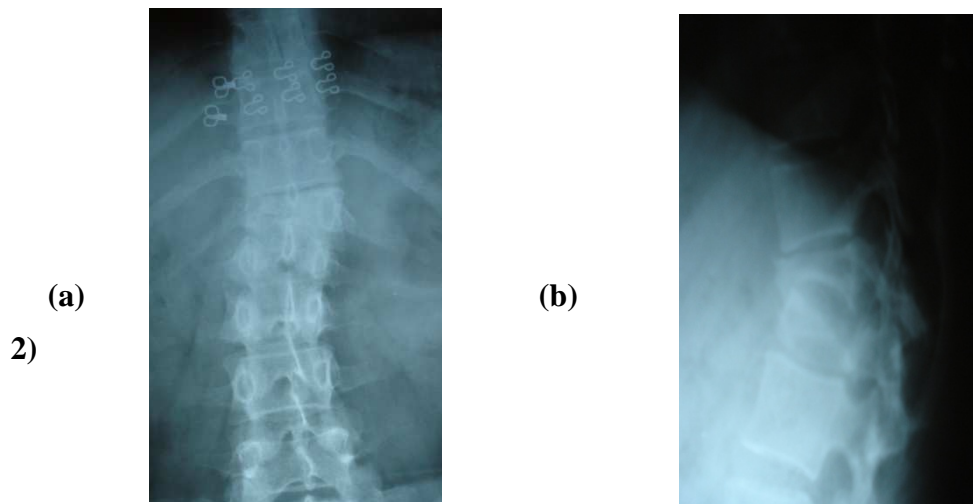
| Outcome     | Frequency (M:F) | Percentage (M:F) |
|-------------|-----------------|------------------|
| Favorable   | 55(23:32)       | 75.0(44:56)      |
| Unfavorable | 18(5:13)        | 25.0(28:72)      |



(a)

(b)

**1) Represented X-Rays of pre-Treatment AP & lateral views of patients with caries spine D12 – L1**

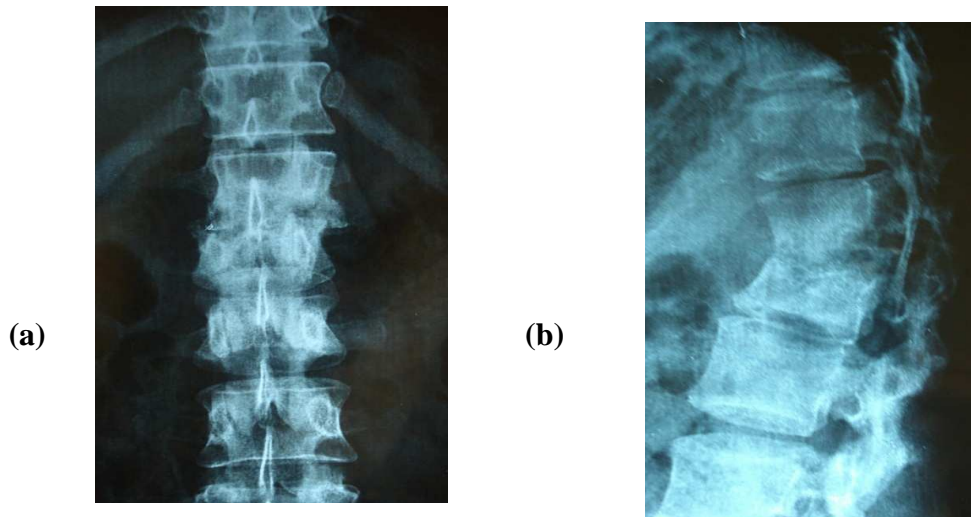


**Represented X-Rays of Post-Treatment AP & lateral views of patients with caries spine D12 – L1**

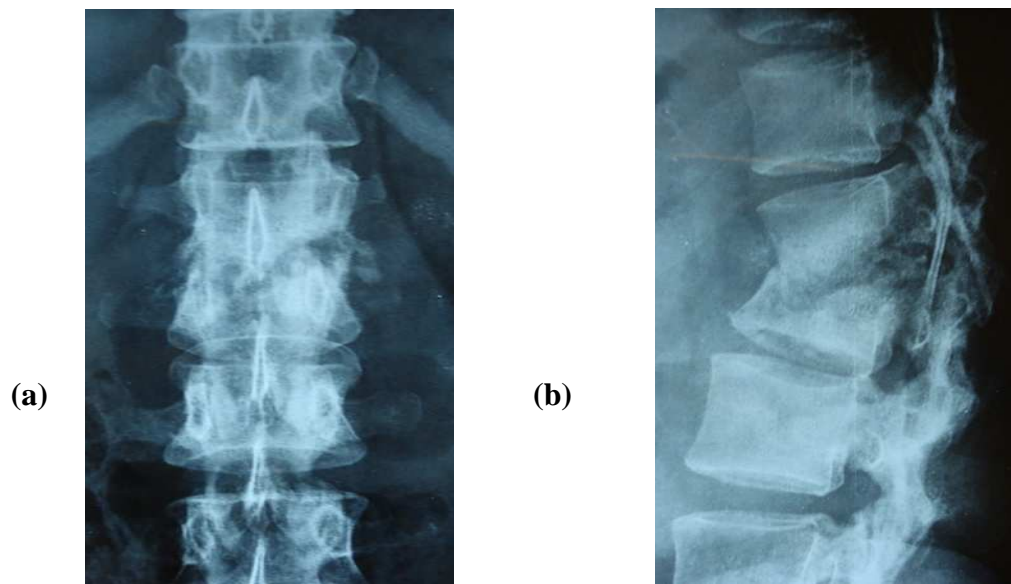
**DISCUSSION**

Tuberculosis remains a major public-health problem in most of the world especially in developing countries. Though there has been a remarkable improvement of pulmonary tuberculosis management, but treatment of tuberculous spondylitis whether surgical or conservative, is still controversial. With the advent of the chemotherapy, there has been a general inclination towards conservative form of therapy.<sup>17</sup>

In our study the average age of the patients at the time of the chemotherapy was 34.62 years with range 18 to 60 years they were further splitted into three sub groups to uniform the data and study. (Table 1). In a study done by Nene and Bhojraj<sup>9</sup> the average age of the patients was 37 years. In another study reported by Parthasarathy et al<sup>17</sup>, the mean age of the patients was younger age group. In a study by Park et al<sup>18</sup> the average age of the patients was  $44.07 \pm 16.57$  years.



**1) Represented X-Rays of pre-Treatment AP & lateral views of patients with caries spine L1 – L2**



**2) Represented X-Rays of post-Treatment AP & lateral views of patients with caries spine L1 – L2**

Patients presented at younger age in present study which is good agreement with the study conducted by Nene and Bhojraj<sup>19</sup>. In under developed countries it effects the people of the younger age group. In the developed countries it involves people at the extreme of age mostly old people.

Out of 73 patients 45 (62%) were female and 28 (38%) were male. The male to female ratio was 1: 1.6 (Table 1). In a study done by Nene and Bhojraj<sup>19</sup> and reported 71% female and 29% male. In another study by Parthasarathy et al<sup>17</sup> reported 47.40% were females and 52.60% males. In a study done by Dharmalingam<sup>20</sup> reported 27% women and 73% men. In a study by Kursat et al<sup>21</sup> reported 29% were females and 71% males. In a study by Park et al<sup>10</sup> reported 69 patients were males (50.40%) and 68 were females (49.60%). In our study, there is female

predominance as they constitute 52% population of our society where male gender is given preference over females in all aspect of life. Might be that reason, they could not fulfill their nutritional demands and remained more prone to diseases like tuberculosis.

In our study, the most common vertebral area involved was the thoracic (49.0%) then Lumbar (32%) and thoracolumbar junction (19%). Preponderance in dorsal spine is due to close anatomical relationship with lungs, which is the most common site for tuberculous seeding.<sup>22</sup> In a study conducted by Nene and Bhojraj<sup>19</sup> they only included cases of thoracic spine. In the study thoracic spine involvement was (84.3%) and thoracolumbar junction in (15.7%). In a study by Parthasarathy et al<sup>17</sup> reported that thoracic involvement was (37%) and lumbar involvement (42%) and followed by thoracolumbar junction in (14%). In a study by Park et al<sup>18</sup> reported thoracic involvement was (33.1%) and lumbar involvement (44%) and followed by thoracolumbar junction in (9.7%).

In our study 17 patients with sinus and abscesses on admission, 11 patients (65%) resolved in one year. Results of present study were differ to other reported studies which were of long duration and follow-up as abscesses or sinuses required longer duration to resolve. In study by Nene and Bhojraj<sup>19</sup> reported the abscesses resolved with medical treatment in follow up of 27 months. In 12<sup>th</sup> report of the MRCW party on tuberculosis of the spine the rate of resolution was similar in all the series 83% lesions resolved by 24 months.<sup>8</sup> In study by Parthasarathy<sup>12</sup>, 80% abscesses resolved in six years.

In our study radiological healing of spinal lesion was observed in 75% patients in one year. Radiological healing was low in present study as study was of short duration. Results may be improved with longer study duration and follow-up. In study by Nene and Bhojraj<sup>19</sup> reported the radiological healing in 98% of cases in 27 months. In another study done by Parthasarathy<sup>17</sup> 80% by six years.

In present study, 75% patients achieved favorable status in one year. Our results were not in line to the other reported studies, because short duration of study. Results can be improved with longer study duration and follow-up. In a study by Nene and Bojraj<sup>19</sup> reported results of 98% favorable status was achieved with nonsurgical ambulatory treatment in 27 months. In a study by Parthasarathy<sup>17</sup> who reported favorable status in 94% patients in 10 years. MRC&WP<sup>7</sup> reported 77% favorable status in 3 years.

## CONCLUSION

With the advent of chemotherapy and understanding the resistance now ATT is the main stay in the treatment of caries spine. Uncomplicated cases of caries spine is a medical condition and can effectively managed with conservative treatment in a vast majority of cases and indications for surgery are few and specific. So it was concluded that conservative treatment is very effective in the treatment of spinal TB, involving vertebral bodies without paraplegia. It is recommended for better results of such study with longer duration and follow-up needs to be conducted.

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