

Conservative Management of Pott's Spine and Its Outcome: An Institute-Based Observational Study

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Abstract

Objective: To analyze the functional outcome of cases with Pott's disease treated solely by antitubercular drugs.

Methods: This observational study was conducted at the Department of Orthopedics of a tertiary care medical college. Sixty patients with Pott's disease were included in this study based on predefined inclusion and exclusion criteria. All patients received antitubercular drugs for nine months. The Modified McCormick Scale (MSS) was used to assess the outcome of patients.

Results: Out of 60 patients, 37 (61.67%) were females, and 23 (38.33%) were males, with an M: F ratio of 1:0.62. Most patients had some or the other risk factors and belonged to low socioeconomic status. The most common presenting complaint was low back pain, and the thoracolumbar spine was most commonly involved. There was a significant improvement in the patient's functional status as assessed by the MSS score.

Conclusion: If diagnosed early, patients with Pott's disease can be treated solely by antitubercular treatment with excellent outcomes.

Keywords: Functional outcome, mccormick scale, pott's disease, tuberculous spondylitis

Introduction

Pott's disease is one of the forms of infection of the spine that is caused by *Mycobacterium tuberculosis*. This disease has been associated with significant morbidities and serious functional impairments, and comes second as the most common forms of tuberculosis after pulmonary tuberculosis.¹ In most cases, the initial symptoms are non-specific, requiring a high index of suspicion for an early diagnosis and prompt medical management. A delay in diagnosis and antitubercular treatment linked to catastrophic complications, such as paraparesis, scoliotic deformity, as well as paraplegia. This tubercular infection usually reaches the spine through a hematogenous route, and the common vertebral lesions include paradiscal, central, and anterior subligamentous lesions.² Symptoms in initial stages of Pott's disease are non-specific and, often times, they are attributed to less serious

causes such as spondylosis. The common symptoms of Pott's disease include low grade fever, backache, unexplained weight loss, and local tenderness. A past history of pulmonary tuberculosis may be present in many cases. If untreated, neurological manifestations may occur, such as impaired sensations, radicular pain, paraparesis or paraplegia. Unlike in other spinal pathologies, the neurological complications due to Pott's disease are usually symmetrical and gradually progressive. In addition, the clinical presentation may differ depending upon the site of involvement, with thoracic spine as the most common site, followed by lumbar and cervical spine. If cervical spine is affected, complications such as stridor, dysphagia and, in serious cases, paraplegia or even quadriplegia may be observed.³ Once suspected, the diagnosis of Pott's disease is usually confirmed through imaging techniques such as X-Ray, computed tomography (CT), and magnetic resonance

imaging (MRI). Though X-Ray of the spine is widely available, it has, however, a very low sensitivity for the diagnosis of Pott's disease, particularly in early stages, because in early stages of disease the vertebral space is usually preserved. In some cases, X-Ray may show reduced vertebral height with the irregularity of endplate. In untreated cases, the Pott's disease may present as gibbus deformity and vertebra plana. MRI is the imaging method of choice to assess the extent of involvement because it has a distinct advantage of showing the presence of epidural component of the involvement and cord compression. MRI may also show presence the paraspinal collection which may require a surgical intervention to be done.⁴ The Pott's disease in majority of the cases managed by antitubercular drugs. Though the duration of treatment is a topic of debate majority of the researchers are of the opinion that the treatment should be continued for a total of 9 months. Total duration of treatment is divided into intensive phase (4 drugs given for 2 months) followed by continuation phase (2 drugs for 7 months). Surgical interventions are not needed if an early diagnosis is promptly followed by antitubercular treatment. In some cases, surgical procedures such as laminectomy, abscess drainage, costo-transversectomy, or anterolateral decompression may be required. Novel techniques, such as minimally invasive spine surgery and implantable devices, have also shown promising outcomes in selected cases.⁵ This institution-based observational study was undertaken to analyze the functional outcome of cases with Pott's disease treated only by antitubercular drugs.

Methods

This was an observational study conducted at the Department of Orthopedics, Bharati Vidyapeeth Medical College and Hospital, Sangli, India. The study period was 2 years, starting from April 2021 to March 2023. During this period, 60 adult patients with Pott's disease treated solely by antitubercular drugs and having modified McCormick Scale (MSS) I, II or III at the time of presentation were included in this study. Patients having MSS IV or V at the time of presentation, as well as those with pre-existing neurological diseases likely to affect the functional outcomes and those with congenital or acquired spinal deformities were excluded from the study. The sample size was calculated on the basis of a pilot study done on patients with Pott's

disease, assuming 90% power and 95% confidence interval. Based on this calculation, the sample size required was 48 patients. By referring to the central limit theorem, sample size was determined to be adequate if it was more than 50. Thus, 60 patients were included. Demographic details, such as age, gender and socioeconomic status, were noted in all cases. A detailed history with respect to history of Koch's contact or any previous history of pulmonary or extrapulmonary tuberculosis was also collected and noted. Signs and symptoms including the presence of low-grade fever, backache or neurological symptoms, as well as the presence of sphincter involvement was also recorded and a thorough clinical examination was performed with respect to the presence of local tenderness or swelling over the affected part of spine. A thorough general and neurological exams were also performed. Deep tendon reflexes were elicited and the presence of any abnormality was noted. In all patients, routine investigations, such as complete blood count, erythrocyte sedimentation rate (ESR), and chest X-ray to rule out presence of active or previous pulmonary tuberculosis was conducted in all cases. Spine X-ray and magnetic resonance imaging was also performed in all cases. Percutaneous CT guided needle aspiration of abscess was done and the aspirate was sent for Acid fast bacillus (AFB) smear and culture sensitivity tests.

All patients received 2 months of intensive phase therapy using four drugs (isoniazid, 5 mg/kg; rifampicin, 15 mg/kg; ethambutol, 15-25 mg/kg; and pyrazinamide, 15-30 mg/kg) followed by 7 months of continuation phase using two drugs (isoniazid and rifampicin). Patients were advised to do regular monthly follow up for 3 months and, after that, every 3 months for 15 months, with the last follow up visit scheduled 6 months after the completion of antitubercular treatment. During the follow up visits, routine investigations such as complete blood count, erythrocyte sedimentation rate (ESR), and detailed neurological examination was performed. The X-Ray of the affected spine was performed every 2 months. In selected cases MRI was done during follow up visits if X-Ray was inconclusive. At the time of final follow up visit MRI was done in all the cases. During each follow up visit functional outcome was assessed using MMS which is used for assessment of global functional impairment in terms of neurological function and walking ability.⁶ SPSS 21.0 software was used for data analysis. Descriptive statistics were depicted

Table 1 Age Distribution and Socioeconomic Status of The Studied Cases

Demographic Profile		No of Cases	Percentage
Gender Distribution	Male	23	38.33%
	Female	37	61.67%
	Total	60	100 %
Age Group	18–30 years	7	11.67%
	31–40 years	21	35.00%
	41–50 years	17	28.33%
	Above 50 years	15	25.00%
	Total	60	100 %
	Mean Age	42.12 +/- 9.80 years	
Socio-Economic Status	Upper Class	1	1.67%
	Upper Middle Class	4	6.67%
	Middle class	15	25.00%
	Lower Middle Class	18	30.00%
	Lower Class	22	36.67%
	Total	60	100 %

in the form of means and standard deviations for continuous variables, and frequencies and percentages for categorical variables. P value less than 0.05 was taken as statistically significant.

Results

Sixty patients diagnosed with Pott’s disease

and treated by antitubercular drugs for 9 months were included in this study. Out of 60 patients 37 (61.67%) were females and 23 (38.33%) were males with an M: F ratio of 1:0.62. The analysis of the age group of the patients showed that the most common affected age group was between 31-40 years (35 %) followed by 41-50 years (28.33 %). The mean age of affected patients was

Table 2 Predisposing Factors and Presenting Complaints of Studied Cases

Predisposing Factor and Presenting Complaints		No of Patients	Percentage
Predisposing Factors	H/o Pulm Kochs	13	21.67%
	H/O Kochs Contact	7	11.67%
	Hypertension	3	5.00%
	Diabetes	5	8.33%
	Hypertension and DM	2	3.33%
	HIV infection	7	11.67%
	Steroids/Immunosuppressant	3	5.00%
Presenting Complaints	Back pain	43	71.67%
	Low grade fever	34	56.67%
	Weight loss	23	38.33%
	Generalized weakness	13	21.67%
	Night sweats	5	8.33%
	Neurological manifestations	3	5.00%

Table 3 MRI Imaging Features and Affected Site in Studied Cases

	Age	No of cases	Percentage
MRI Imaging features	Vertebral body involvement	18	30.00%
	Disc Involvement	14	23.33%
	Endplate changes	12	20.00%
	Paravertebral Abscess	10	16.67%
	Gibbus deformity	6	10.00 %
	Total	60	100 %
Site of MRI changes	Thoracolumbar	32	53.33%
	Lumbar	16	26.67%
	thoracic	7	11.67%
	Lumbosacral	5	8.33%
	Total	60	100 %

found to be 42.12 +/- 9.80 years (Table 1). The distribution of the patients based on the Modified Kuppuswamy scale showed that in studied cases a majority of the patients belonged either to lower class (36.67%) or lower middle class (30 %). 15 (25%) patients belonged to middle class. Only 1(1.67%) patient belonged to upper class (Table 1).

The analysis of patients on the basis of predisposing factors or presence of co-morbidities showed that 13 (21.67%) patients had history of having received antitubercular treatment in past. History of recent contact with Kochs patient was found in 7 (11.67%) patients. 10 (16.67%) patients were having

either diabetes mellitus or hypertension or a combination of both. 7 (11.67%) patients were HIV infected whereas 3 (5%) patients were on long term steroids or immunosuppressant. The analysis of patients on the basis of presenting complaints showed that the most common presenting complaint was low back pain which was seen in 43 (71.67%) patients. The other common complaints included low grade fever (56.67%), weight loss (38.33%) and weakness (21.67%). Night sweats and Neurological manifestations were seen in 5 (8.33%) and 3 (5.00%) patients respectively (Table 2).

On clinical Examination point of maximal

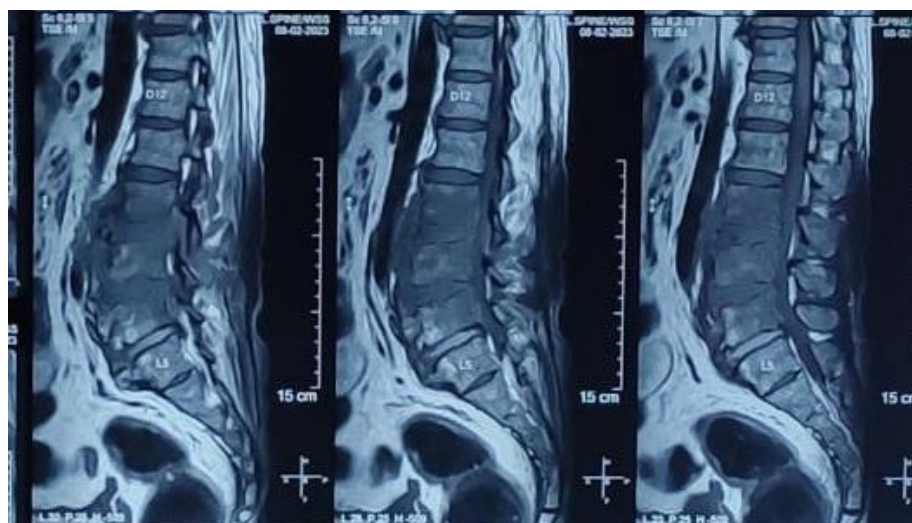


Fig. 1 Fusiform Pre- and Para-Vertebral Collections Seen Extending From L2 to L4 vertebrae. Affected Vertebrae Appears Hypo Intense on T1. Features s/o Tuberculous spondylitis

Table 4 Modified McCormick's Scale (MMS) in Studied Cases During Follow Up

Modified McCormick's scale (MMS)	1 st Consultation	3 months	6 months	9 months	12 months	15 months
I	29 (48.33%)	35 (58.33%)	58 (96.67 %)	58 (96.67%)	59 98.33 %	59 98.33 %
II	25 (41.67%)	23 (38.33%)	2 (3.33%)	2 (3.33%)	1 3.33 %	1 3.33 %
III	6 (10%)	2 (3.33%)	0 (0.00%)	0 (0.00%)	0 0%	0 0%
IV	0	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 0 %	0 0 %
V	0	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 0%	0 0%
Mean MMS	1.61 +/- 0.66	1.46 +/- 0.56	1.03 +/- 0.18	1.03 +/- 0.18	1.01 +/- 0.12	1.01 +/- 0.12

tenderness was found in thoracolumbar region in 32 (53.33%) patients whereas lumbar, thoracic and lumbosacral area (8.33%) tenderness was found in 16 (26.67%), 7 (11.67%) and 5 (8.33%) patients respectively. All patients underwent MRI. The most common abnormality found on MRI was vertebral body involvement (seen as low signal on T1-weighted, high signal on T2-weighted images) which was seen in 18 (30.00%) patients followed by Disc Involvement (loss of disc height, altered signal intensity) which was seen in 14 (23.33%) patients. Endplate changes (20%), paravertebral abscess (16.66 %) and gibbus deformity (10%) were other MRI findings in studied cases (Table 3).

The functional assessment on the basis of MSS score showed that at the time of first consultation 29 (48.33%) patients belonged to MSS I whereas 25 (41.67%) and 6 (10%) patients belonged to scale II and III respectively. At the time of final follow up at 15 months 59 (98.33%) patients were found to have a MSS score of I (intact neurologically with no sensory or motor abnormalities) and 1 (1.67%) patient had MSS score of II (mild sensory deficit but functionally independent). There was remarkable improvement in functional status of the patient as assessed by MSS score and the difference was statistically highly significant ($p < 0.0001$) (Table 4).

Discussion

In this study of patients having Pott's disease and treated solely by antitubercular management out of 60 patients 37 (61.67%) were females and 23 (38.33%) were males with an M:F ratio of 1:0.62. Jagiasi *et al.*⁷ conducted a study of 44 patients diagnosed as Tuberculous spondylitis to delineate the importance of middle path regime and short

course chemotherapy in the management of spine tuberculosis.⁷ The analysis of gender distribution in this study showed that there was a significant male preponderance and out of 44 patients, 10 (22.73%) were males and 34 (77.27%) were females. Similar female preponderance was also reported by the authors such as Kothari⁸ and Peer *et al.*⁹ The mean age of patients in this study was found to be 42.12 +/- 9.80 years. Wang *et al.*¹⁰ conducted a study of 44 patients with Pott's disease. For this purpose the authors collected data of 597 patients with Pott's disease. These patients had no major neurological deficits or severe spinal deformities. The study population consisted of 313 male (52.43 %) and 284 female (47.57 %) patients, with a mean age of 43 years (range 13–89 years). The mean age of patients in this study was found to be similar to this study. Similar mean age of patients with Pott's spine was also reported by the authors such as Divya *et al.*¹¹ and Mittal *et al.*¹². The analysis of patients on the basis of predisposing factors or presence of co-morbidities showed that 13 (21.67%) patients had history of having received antitubercular treatment in past. History of recent contact with Koch's patient was found in 7 (11.67%) patients. Other predisposing factors in this study were immunosuppression due to HIV and long-term steroid therapy. Previous history of pulmonary tuberculosis and immunocompromised status were common factors leading to Pott's disease in many of the studies. Vaishnav B *et al* conducted an observational study of 100 cases of Pott's spine.¹³ These findings were similar to the findings of this study since in this study also majority of the patients had either previous history of pulmonary tuberculosis. Similar predisposing factors were also reported by the authors such as Jurcev-Savicevic *et al.*¹⁴ In this study majority

of patient's belonged lower and lower middle class and poor socioeconomic status was a significant factor seen in patients presenting with Pott's disease. Glassman *et al.*¹⁵ also reported malnutrition and poverty to be one of the significant risk factors for development of Pott's disease. In this study most common area involved was thoracolumbar area. MRI showed involvement of either thoracic or lumbar or thoracolumbar vertebrae in majority of the cases (91.67%) cases. Only in 5 (8.33%) patients' lumbosacral area was involved. The most common abnormality found on MRI was vertebral body involvement (seen as low signal on T1-weighted, high signal on T2-weighted images) (30.00%) followed by Disc (23.33%) patients. Endplate changes (20%), paravertebral Abscess (16.66%) and gibbus deformity (10%). Misra *et al.*¹⁶ conducted a study of MRI findings in patients of Pott's disease. For this purpose the author's analyzed MRI findings of 36 patients with Pott's disease. The authors found vertebral changes in form of spondylodiscitis in 33 (92%), epidural abscess in 29 (81%), spinal cord changes including edema and granuloma in 17 (47%), paravertebral abscess in 29 (81%), and vertebral body collapse in 12 (33.3%) patients. Similar MRI findings in cases of Pott's disease was also reported by the authors such as Rivas-Garcia *et al.*¹⁷ and Kubihal *et al.*¹⁸ All the patients were treated by antitubercular

treatment for 9 months and were followed up till 6 months after completion of antitubercular treatment. Patients' functional outcome was assessed by MMS. There was a significant improvement in functional status of the patient as assessed by MSS score and the difference was statistically highly significant ($p < 0.0001$). No patient had any significant impact on functional independence and only 1 patient had mild sensory disturbance at the time for final follow up. Similar excellent outcome after complete course of antitubercular treatment was also reported by the authors such as Talebzadeh *et al.*¹⁹ and Bakhsh *et al.*²⁰ Pott's disease or tubercular spondylitis needs early diagnosis and prompt antitubercular treatment for adequate period of time. Patients diagnosed early can be successfully treated by antitubercular drugs without any need for surgical interventions. Majority of the adequately treated patients have excellent functional outcome without any residual motor or sensory disturbance.

The main limitation of this study was that it was a purely observational study. More randomized controlled trials are needed to further substantiate findings of this study.

In conclusion patients with Pott's disease if diagnosed early can be treated solely by antitubercular treatment and have excellent outcome and remain intact neurologically with no sensory or motor abnormalities.

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