Clinico- radiological manifestation of TB spine and its complications

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Abstract
Background: Vertebral tuberculosis is the most common form of skeletal tuberculosis and it Constitute 50% of all skeletal tuberculosis. Nearly 88% of cases of chronic infection of spine are of tuberculosis in origin. In developing countries diagnosis of tuberculosis of bone and joints can reliably made on clinical and radiological examinations. Here we had taken up the study of clinic radiological manifestation of TB spine and its complications.
Methodology: Patients attended OPD and IPD of Chest and TB Dept. of VSS Medical College and hospital, Burla with TB spine were taken up for study after taking proper consent. The patients who showed clinical evidence of TB spine were selected basing on hematological findings, radiological examinations, Mantoux test with clinical signs and symptoms for the diagnosis. Children under 10 years were excluded from the study.
Results: 30 patients with TB spine were taken up for the study. It was found that TB spine is more prevalent among males then females with highest incidence in the age group of 41 to 50 years. Majorities of patient with low socioeconomic status. Dorso-lumabar vertebra is the most commonly involved. Back pain and spinal tenderness are the most common features. About 16.6% cases pulmonary involvement seen. There is moderate degree of anemia with raised ESR seen in 93.2% of cases. About 80% cases found to have tuberculin positive. Bony destruction and joint space reduction seen in most of the cases.
Conclusion: Patients having pain in back, fever and weight loss should be investigated in the line of tuberculosis. Of spine so that early diagnosis can be done and complications could be prevented.

Keywords: Tuberculosis, Spine.

Introduction
Vertebral tuberculosis is the most common form of skeletal tuberculosis and it constitute 50% of all skeletal tuberculosis [1]. Nearly 88% of cases of chronic infection of spine is of tuberculosis in origin [2]. In developing countries diagnosis of tuberculosis of bone and joints can reliably made on clinical and radiological examinations. Here we had taken up the study of clinic radiological manifestation of TB spine and its complications.

Materials and Methods
Patients attended OPD and IPD of Chest and TB Dept. of VSS Medical College and Hospital, Burla with TB spine were taken up for study. The patients who showed clinical evidence of TB spine were selected basing on hematological findings, radiological examinations, Mantoux test with clinical signs and symptoms for the diagnosis.

Inclusion Criteria
Patients having TB spine in the age group of 10-70 years taken in the study.

Exclusion Criteria
Children less than 10 years, pregnant ladies were excluded in the study.

The present study comprises of 30 patient of tuberculosis spine who have attended chest OPD or admitted to indoor of chest department during the period of Sept.2016 to august 2018.

Results

Table 1: Sex distribution

Sex	No. of cases	Percentage
Male	22	73.33%
Female	8	26.67%
Total	30	100%

The incidence of tuberculosis of spine is more among males (73.33%) than female 26.67%.

Age Distribution

Table 2: Age in years

Age in Years	Male	Female	Total	Percentage
11-20	2	1	3	10%
21-30	3	3	6	20%
31-40	5	2	7	23.33%
41-50	9	1	10	33.33%
51-60	2	1	3	10%
>60 years	1	0	1	3.33%

The incidence of pott's spine is highest in the age group between 41-50 years (33.33%)and least above 60 years of age (3.33%).

Distribution According to Religion
About 97% of cases are Hindu, Christians sharing the remaining 3% as the catchments area has majority Hindu population.

Table 3

Religion	No. of Cases	Percentage
Hindu	29	96.66%
Christian	1	3.34%
Total	30	100%

Table 4: Distribution according to area

Area	No. cases	Percentage
Urban	10	33.33%
Rural	20	66.67
Total	30	100%

Majority of patients hailed from rural area (66.67%) and 33.33% cases are from urban population, the ration being 3:1.

Table 5: Distribution according to occupation

Occupation	No. of cases	Percentage
Labourer & Cultivators	15	50%
House wives	7	23.33%
Student	2	6.66%
Employees	2	6.66%
Small Businessman	4	13.33%
Total	30	100%

The labourers and cultivators i.e. manual Workers with poor socio-economic status showed the higher incidence (50%) of involvement. Housewives constitute the next common group in order frequency.

Table 6: Level of lesion in carries spine

Site	No. of cases	Percentage
Cervical (C_1 to T_1)& Cervico-dorsal	1	3.33%
Dorsal (T_2-T_9)	5	16.66%
Dorso lumbar (T_{10}-L_1)	13	43.33%
Lumbar (L_2 – L_4)	10	33.33%
Lumbosacral (L_5 –S_5)	1	3.33%
Total	30	100%

From the present series it is seen that Dorso-lumbar vertebra (43.33%) are the commonest area of involvement. Lumbar vertebra (33.33%) is next common area of involvement. Cervical and sacral area each have 3.33% involvement. The incidence of pott's spine is less in cervical and sacral region.

Table 7: Frequency of involvement vertebra

Vertebra	Frequency of involvement	Percentage
C1	0	0
C2	0	0
C3	0	0
C4	0	
C5	1	3.33%
C6	1	3.33%
C7	0	0
T1	0	0
T2	0	0
T3	0	0
T4	2	6.66%
T5	4	13.33%
T6	1	3.33%
T6	1	3.33%
T7	1	3.33
T8	0	0
T9	2	6.66%
T10	7	23.33%
T11	7	23.33%
T12	6	20.00%
L1	5	16.66%
L2	5	16.33%
L3	10	33.33%
L4	6	20.00%
L5	1	3.33%
S	1	3.33%
Total	62	

Average number of vertebrae involves in this series is 2.06. This study showed that L3 (33.33%) vertebra is most commonly involved followed by T10, T1 & L1 vertebra (23.33%).

Table 8

Clinical Presentation	No. of cases	Percentage
Back Pain	30	100%
Bony Tenderness	30	100%
Gibbus (Bony Swelling)	15	50%
Paraparesis	7	23.33%
Paraplegia	2	6.69%
Cold abscess/Paravertebral abscess	7	23.33%
Sinus	2	6.66
Fever	18	60%
Weight loss	18	60%
Loss of appetite	14	46%
Cough	9	30%
Incontinence of Bowel	2	6.66%
Incontinence of Bladders	1	3.33%

Table 9: Hemoglobin percentage

Hb% in gms	No. of cases	Percentage
0-8gm%	5	16.66%
8-10gm%	13	43.33%
>10gm%	12	40.00%

Most of the patient have low hemoglobin level may be due to disease and malnutrition.

Table 10: ESR percentage

ESR in mm 1st hour	No. of cases	Percentage
0-20	2	6.6%
21-100	26	86.6%
>100	2	6.6%

ESR remain high during active disease.

Table 11: Mantoux test

Mantoux Test	No of cases	Percentage
Positive	24	80%
Negative	6	20%
Total	30	100%

In this study it is found that 80% of cases are mantoux positive and 20% cases of spinal tuberculosis are mantoux negative.

Table 12: Complications in carries spine

Complications	No. of cases	Percentage
Paraplegia	9	30%
Kyphosis	15	50%
Sinus	2	6.66%
Paravertebral abscess & Cold Abscess	7	23.33%

Commonest complication is kyphosis seen in 50% of cases. Paraplegia (30%) is the dreadest complication occurring in approximately one third of total cases. Cold abscess and sinus are found in 23.33% and 6.66% cases respectively.

Table 13: Incidence of Paraplegia

Incidence	No. of cases	Percentage
Paraplegia	9	30%
Non-paraplegia	21	70%

Incidence of paraplegia is 30%. Remaining 70% cases did not have any neurological deficit.

Table 14: Associated tubercular lesion in other parts of the body

Body parts	No. of cases	Percentage
Lungs	5	16.66%
Lymph nodes	2	6.66%
Pleural effusion	2	6.66%

16.66% of cases have associated with pulmonary tuberculosis. 6.66% cases of pott's spine cases are associated with pleural effusion and 6.66% cases associated lympnode involvement seen. Therefore 30% of pott's spine cases have associated tubercular lesion in other parts of the body.

Table 15: Pott's spine associated with other diseases

Diseases	No. of cases	Percentage
Diabetes mellitus	2	6.66%
Sickle Cell Disease	1	3.33%
SLE	1	3.33%

In this series out of 30 cases 2 cases were diabetic, 1 case was suffering from sickle cell disease and 1 case was a SLE Patient.

Table 16: Radiological findings in carries spine

Radiological finding	No. of cases	Percentage
Disc space narrowing	29	96.66%
Bony Destruction	30	100%
Paravertebral abscess	7	23.33%
Kyphosis	15	50%

In the analysis of radiological finding all 30 cases (100%) Some form of bone destruction seen. In 29 cases (96.66%) involvement of disc space seen. Next in order of frequency are kyphosis 50% cases and paravertebral abscess in 23.33% cases.

Table 17: Kyphosis angle

Degree of Kyphosis	Angle	No. of cases	Percentage
Mild	$10^o – 30^o$	14	46.67%
Moderate	$30^o – 60^o$	1	3.33%
Severe	$>60^o$	0	0%

Angle of kyphosis increased with increases in degree of kyphosis. Kyphotic deformity $<60^o$ has better prognosis and more than 60^o has poor prognosis. In this study 14 cases has mild kyphosis and one case have moderate kyphosis.

Discussion

The present study comprise of 30 patients of tuberculosis spine who have attended chest OPD or admitted to indoor of chest department during the period of Sept.2016 to August 2018.

In the comparison of present series to all series it is found that there is male preponderance in all series except S.Bhojraj et al[3] (2004). This reason of Orissa is less developed and population is mostly tribal, who are not health conscious and mostly the females are neglected, which probably may be the cause of low incidence in females.

Table 18: Sex distribution (Comparative Study)

Sex	Tuli Series (1965-74)	Mohapatra Series (1987)	S.Bhojraj et al (2004)	Sinan et al (2004)	Present Series
Male	52%	59%	34.84%	60%	73.33%
Female	48%	41%	66.16%	40%	26.67%

Table 19: Age distribution comparative study

	Hugh G et al (1996)	Alothman Adel et al (2001)	S.Bhojraj (2002)	Present Series
Mean Age	61 years for People, 39 years for minority	52.8 years	40 years	57.45 years

In Tuli Series [4] (1965-74) 52% of cases are below 20 years of age. In above comparison it is found that mean age of tuberculosis of spine is between 39 years and 61 years in different studies. So there is recent trend of spinal tuberculosis among elderly age group in comparison to past. In my study the mean age is 57.45 years.

Nativity and Occupation

As regard to occupation higher incidence (50%) was marked in labourers and cultivators (farmers) with poor socio-economic status in the present series because of overcrowding in their living place which predisposes to tuberculosis. This was also the view of Shanmugasumdaram [5] (1983).

In Tuli series [4] commonest region of spine affected is dorsal region (42%). In the present series the commonest region affected is Dorso lumbar region (43.33%). It is near to the result of previous study in this institution (1987) in which the commonest region of the spine involved by tuberculosis is dorsolumbar region 41.67%.

Table 20: Level of lesion comparative study

	Tuli Series (1965-74) in Percentage	John Ebnazar	Hug G Watts (1996)	Previous study in this institution 1987	Present Series
Cervical & Cervicodorsal (C1-T1)	14%	17%	25%	5.95%	3.33%
Dorsal (T2-T9)	42%	42%	50%	8.57%	16.66%
Dorsal lumbar (T10-L1)	12%	12%		41.67%	43.33%
Lumbar (L2-L4)	26%	26%	25%	22.62%	33.33%
Lumbosacral (L5-S5)	3%	3%		1.19%	3.33%

Table 21: Average of number of vertebra involved

No. of Vertebra	Study
3	Hodgson & Stock (JBJS) (1960)
3.3 to 3.6	Martin JBJS (1970
2.1	Lifeso et al (1985)
2.06	Present series

In comparing the above findings it is found that there is decrease in number of vertebra involved by tuberculosis comparing to past. In our present series the average number of vertebra involved is 2.06 which is near to the average number of vertebra involved (2.1) in the study of lifeso et al [6] (1985). It may due to pain for which the patients reports early being afraid because it hamper their daily work.

Table 22: Clinical features & complications

	Tuli Series (1965-74) in Percentage	S.S. Desai (89-91)	Alothman Adel et al 2001	Sinen et al (2004)	Present Series
Pain over affected vertebra	-	96%	84%	73.3%	100%
Kyphosis	95%	0%	17%		50%
Clod Abscess & Paravertebral abscess	20%	4%	80%	65.5%	23.33%
Sinuses	13%				6.66%
Neurological involvement	20%	29.17%	28%		30%

Table 23: Incidence of paraplegia

	Tuli Series (1965-74)	N.S. Martin (1971)	Alothman Ad el et al, 2001	Present Series
Incidence of paraplegia	20%	20%	28%	30%

In the present series all patients presents with pain in the back. In the study of 24 patients of spinal tuberculosis by S.S. Desai [7] between 1989-91. All patients except one presented with back pain. In Alothman Adel et al study 2001. Backache (84%) was the most common presenting features and in Sinen et al series pain is the presenting feature in 73.3% cases. In a study of Potts spine by Alothman Adel et al [6] (spice 2b (24) E 565 – E 570 Dec 15, 2001) 17% had kyphosis. In present series kyphosis is found in 50% of the cases and in Tuli series it is 955 case and in S.S.Desai series it is 0% cases. So there is a wide variation may be due to the time of the presentation of the patient to the physician patients coming early may not have kyphosis.

Percentages of patient presented with cold abscess and paravertebral abscess varies from 4% to 80%. The Present series the percentage of patients having cold abscess and paravertebral abscess is 23.33%, almost equal to the percentage of patients having same presentation in Tuli Series [4] i.e. 20%.

13% patients had sinus in Tuli series. In our study 6.66% patients has developed sinus. Neurological involvement is seen 28% in Alothman [6] series and 29.17% in SS Desai [7] series, in present study it is 30%. In my study 2 cases out of total 30 cases had balder and bowel involvement, in S.S.Desai series 2 cases out of total 24 cases had bowel and bladder involvement.

Incidence of paraplegia varies from 10-30% in different studies. It is 28% in Althman Abdel et al [6] series & in our present study in is 30%.

Table 24: Associated pulmonary lesion with spinal tuberculosis

Tuli series	12%
Hodgson & Stock (1960)	32%
S.S.Desai (1989-91)	8.33%
Mohaptra Series (1987)	10.09%
Present series	16.66%

The association of pulmonary tuberculosis with spinal tuberculosis varies from 8.33% to 32% in different study. Pulmonary tuberculosis associated spinal tuberculosis is 12% in Tuli series [4] and is 16.66% in the present series.

Table 25: Associated lymph node lesion with spinal tuberculosis

Tuli series	12%
S.S. Desai (1989-91)	8.33%
Present series	6.66%

Lymph node in involvement occur in 12% of the cases in Tuli series and in the present series it is 6.66% cases and it is 8.33% in the study by S.S. Desai. [7] From the above involvement it is concluded that the bone involvement occur by haematogeneous spread from other site also.

ESR

Robert Lifeso noted rise in the ESR in patients of tuberculosis of spine. Alothman [6] et al (2001) study found that there is raised ESR level in 94.5% of his cases of spinal tuberculosis. In my study 93.2% patients has raised ESR. It is done on a parameter without having any diagnostic value as a routine.

Mantoux test (comparative study)

In this study it is found that 80% of cases of spinal tuberculosis are mantoux positive and 20% cases are negative in present series. Michael Marqe [8] (1973) found 82% of patients of TB spine were mantoux positive and 18% mantoux negative. At least 20% cases of debilitated or malnourished patients who have extensive disease have a false negative skin test (Hugh G Watts et al, 1996) [9]. Therefore negative Mantoux test does not rule out the tuberculosis of spine.

Skip Lesion

In the present study skip lesion in found in 6.66% cases. Tuli [4] series average incidence of skip lesion in 7% and 5-10% cases according to Mercer.

Conclusion

Present study is based on clinic-radiological manifestation and complication of TB spine. 30 patients of pott's spine are taken up for study. It was found that tuberculosis of spine is more among male (73.33%) than females (26.67%). It is common among farmers and daily labourers. The highest incidence of disease is among people belonging to age group 41-50 years. Majority of the patients are from rural area having low socio-economic status. This is probably social stigma present in this area till date.

Dorsolumbar region (43.33%) is the most common region of the spine and L3 is the vertebra most commonly involved.

Back pain (100% and bony tenderness the most common presenting feature. Fever and weight loss occur in 60% cases. Other presenting symptoms are paravertebral abscess, cold abscess, paraperesis and paraplegia etc. Only 2 cases had incontinence of urine and 1 case had incontinence of stool.

Five cases (16.66%) had pulmonary tuberculosis associated with spinal tuberculosis. Other associated lesion with TB spine are tubercular lymphadenitis and pleural effusion 2 cases (6.66%) in each. 2 cases (6.66%) had diabetes mellitus, one had sickle cell disease and one case had SLE out of these 30 cases studied.

Diagnosis in all cases mostly made by clinical presentation and radiological examination. Other investigation helped to support the diagnosis. In all cases there was bone destruction and narrowing of disc space. Sinogram comes positive in one case.

Two cases (6.66%) of pulmonary tuberculosis associated with potts spine had sputum for AFB smear positive. In one case aspirate of paravertebral abscess was smear positive for AFB and in another one case, sinus discharge was positive for AFB in smear examination.

There is moderate degree of anemia in all cases. ESR raised in 93.20% cases. 80% of cases were tuberculin

positive. Bony destruction and joint space reduction (100%, 96.66%) respectively was common findings.

Conservative treatment was given to all patients as per RNTCP guidelines

In pre chemotherapeutic era the mortality rate was high, where as there is a dramatic improvement in post chemotherapy era.

So Patients having pain in back, fever and weight loss should be investigated in line of tuberculosis of spine, so that early diagnosis can be done and complications could be prevented.

Conflicts of Interest: None declared.

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