LEVEL OF SPINAL INVOLVEMENT IN PATIENTS OPERATED FOR SPINAL TUBERCULOSIS

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ABSTRACT

Objective: *To determine the frequency of different levels of spinal involvement in patients operated for spinal tuberculosis.*

Methodology: *This observational study was conducted in the Department of Neurosurgery Lady Reading Hospital Peshawar from January 2008 to December 2010. In this study medical record of all patients operated for spinal tuberculosis were analyzed. The frequency of different spinal levels involved was determined. Patients were divided into five groups based on the involvement of different vertebral level i.e. cervical, upper dorsal, lower dorsal lumbar and sacral. Data stratified regarding age, sex and locality. Results were analyzed and presented in the form of tables, bar and pie charts by using SPSS software version 11 for analysis.*

Results: *A total of 81 patients with spinal tuberculosis were operated during this period. Their age ranged from 13 to 65 years. Patients presented with male to female ratio of 1.25 to 1. Per-operatively majority of the patients (i.e., 49.38%) had involvement of lower dorsal spine (D7 to D12), while 19.75% had involved cervical vertebrae, 22.22% involved upper dorsal spine that is from D1 to D6 while only 8% had lumbar vertebrae involved. Most of the patients had multilevel involvement, which is 70.37%.*

Conclusion: *This study shows that most of the patients with spinal tuberculosis involve lower dorsal spine while lumbar area in very little and no sacral area involvement. We found that most of the time it was multiple level involvement rather than single vertebrae.*

Key Words: *Spinal tuberculosis, Spinal Level, cord compression, frequency.*

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INTRODUCTION

Tuberculosis (TB) is a common problem in developing countries[1]. Although it is on decline but still present in developed countries due to immigrants from underdeveloped countries and the prevalence of HIV in these countries. Spinal TB is the most common and dangerous form of skeletal tuberculosis because of its capacity to cause bone destruction, deformity, and paraplegia[2]. It was initially described by Sir Percivel Pott as painful kyphotic deformity of the spine associated with paraplegia in 1782[3]. The disease spread to the spine from primary focus either directly or through blood i.e. intercostal arteries and batson's plexus[3,4]. Destruction of vertebra starts in cancellous bone and then spread to involve another vertebrae. Usually one motion segment is involved[5]. Treatment is either medical or surgical, while surgical treatment of patients with spinal tuberculosis is considered in cases of severe spinal instability or progressive neurological symptoms with evidence of cord compression or deformation[6]. The different levels are Cervical, Upper Dorsal, Lower Dorsal, Lumbar and sacral based on different spinal vertebrae, i.e., C1-C7, T1-T6, T7-T12, L1-L5 and S1-S5 respectively. The frequency of different levels involved depends on proximity to the primary focus, number of

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vertebrae and diameter of the canal and bone texture[7]. Different level of spine has different approaches during surgical procedure for spinal tuberculosis and this form the bases of our study. This study was thus conducted to determine the frequency of different levels of spinal involvement in patients operated for spinal tuberculosis.

METHODOLOGY

This observational study was conducted at the department of Neurosurgery Lady Reading Hospital Peshawar from January 2009 to December 2010. Data was collected from the record of operations. In this study we report a series of 81 cases operated in our unit during three years for spinal tuberculosis. Frequencies of different levels involved have been calculated.

All patients who had undergone surgery for spinal tuberculosis which was confirmed by histopathology were included in this study. Patient with any other accompanying pathology in the spine like malignancy was excluded from the studied. An informed consent was taken from the patients preoperatively for surgery explaining the prognosis.

All the above mentioned information were collected on a predesigned Performa. Data was entered, stored and analyzed in SPSS version 11. The mean and standard deviation for continuous variables and the frequency and percent for categorical variables were calculated. Data is presented in the form of tables, bar charts and pie charts.

RESULTS

Total of 81 patients was operated during the specified period. Patients were in age range from 13 to 65 years with mean age 30 years. (Figure 1) . There were 68% (55 patients) male, while female were 32% (26 patients) {Figure 2}.

Figure 1: Age Distribution

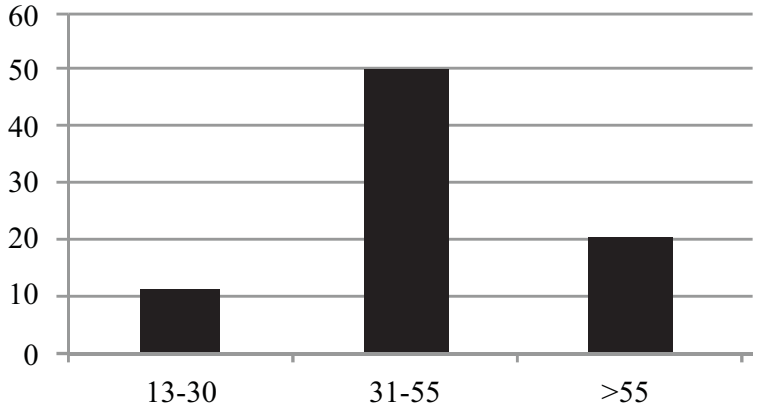

Figure 2: Gender Distribution

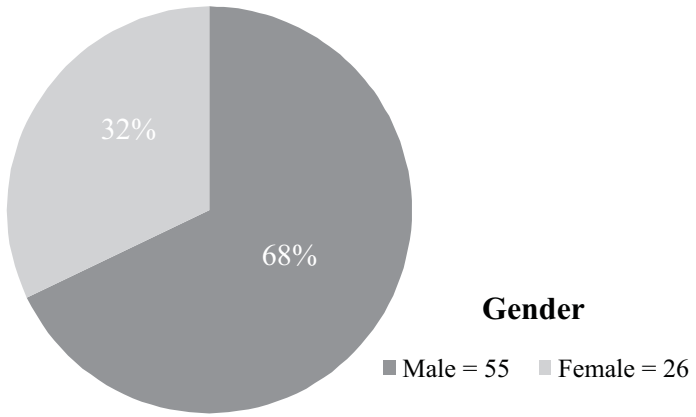

Figure 3: Geographical Distribution

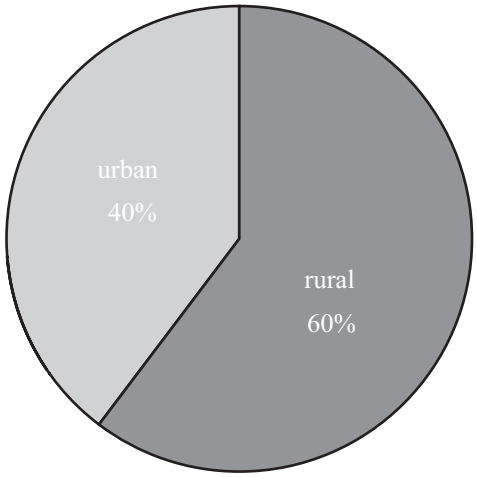

Table 1: Level of Involvement

Level of Involvement	Number of Patients	Percentage
Cervical	16	19.8%
Upper thoracic	18	22.2%
Lower thoracic	40	49.4%
Lumber	7	8.6%
Sacral	0	0%
Total	**81**	**100%**

Sixty percent of the patients were from the rural areas of the province (Figure 3). In 58 patients thoracic segments were involved either alone or in combination with lumbar and cervical segments, which makes about 72% of the whole. Out of these, 40 patients (69%) had involvement of the lower half, while 18 patients (31%) had upper half. Cervical vertebrae were involved in 16 patients making 20% of the whole while lumbar in only 7 cases (8%) {Table 1}.

DISCUSSION

Tuberculosis is a common problem and spinal tuberculosis is one of the most important forms of tuberculosis[8]. Dorsal spine is the most common area involved in spinal TB. In our study it is 72% which is consistent with Rezai et al[9] in which it is 70%. Although there is slight difference in percentage with other studies like Narlawar et al and Adel et al but still in these studies the dominant area of involvement is dorsal spine[10, 11]. Thoracic spine dominantly involved because of its proximity to primary focus which most of the time is lungs[12,13], increase number of vertebrae, narrow spinal canal and bone texture at this level[14]. In our study the lower half of thoracic spine was specifically involved more and that is because of its association with transitional zone. Twenty percent of patients in our study had cervical spine involvement which is slightly higher than lumbar spine involvement. This is different from other international studies and the difference seems to be because of less number of cases in our study as compared to others[9,10]. The hypothesized mode of spread is either direct extension of infection or

through blood[15]. Intercostal vessels and batson's plexus are considered to be involved in the spread of disease. This gives the possible explanation of no sacral involvement in our study.

In our study we determined the frequency of different levels only in those cases where surgery was required. This gives another explanation for the dominant involvement of upper spine i.e. surgery is performed for neural deficit, spinal instability and cord compression which is more evident in dorsal spine because of narrow canal and more neural elements. In lumbar spine the space in the canal is more as compared to dorsal and cervical spine therefore more displacement is required for neural elements to compress[16-20] and therefore less number of cases requires surgery. This also shows that why the cervical spine involvement is more in spite of lumbar in our study as compared to other studies. Sacral region not only is away from primary focus but also has very little chance of instability and neural element compression, therefore in our study there is no involvement of this level.

CONCLUSION

From our study it can be concluded that the dominant site of involvement by TB in the spine is thoracic spine. This is followed by cervical and then lumbar. The results are only for those cases that required surgery.

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CONTRIBUTORS

MA & HMK conceived the idea and planned the study. KK, MU, RH & ZUR did the data collection and analyzed the study. All the authors contributed significantly to the research that resulted in the submitted manuscript.