

Original Research Article

Bugs and bones: a study of 25 cases of infectious spondylodiscitis

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ABSTRACT

Background: Infectious spondylodiscitis (IS) is an illness that presents a diagnostic dilemma. It is often associated with significant neurological morbidity, hence early diagnosis and treatment is crucial. As only a few Indian studies have dealt with IS, our study analyses the unique clinico-epidemiological profile of this disease in India and assesses the current management trends and outcome in these patients.

Methods: A retrospective study of 25 cases of microbiologically confirmed IS in a single unit at a tertiary care hospital over an 18-month period (January 2018 to June 2019).

Results: A total of 25 cases of IS were considered with a mean age of 49 years. Among the cases of non-tubercular spondylodiscitis (NTS), the organisms isolated were methicillin-resistant *Staphylococcus aureus* (MRSA), *Brucella*, *Escherichia coli* and *Citrobacter*. The average time taken from onset of symptoms to diagnosis was 3 months in tubercular spondylodiscitis (TS) cases and 5 months in NTS cases. Neurological complications were seen in 32% of the patients. Magnetic resonance imaging (MRI) was the imaging modality used to confirm diagnosis in up to 80% of the patients. Medical and surgical management were required in 84% of the cases.

Conclusions: The clinical conundrum in IS primarily due to its atypical presentation. The higher tubercular burden of IS was also confirmed in our study and the time taken to presentation was markedly longer compared to the western data. Therefore, understanding the clinical spectrum of this disease helps overcome hurdles of recurrence and debilitating neurological morbidity.

Keywords: Infectious spondylodiscitis, Tubercular spondylodiscitis, Non-tubercular spondylodiscitis

INTRODUCTION

Infectious spondylodiscitis (IS) is a condition that presents a diagnostic dilemma and mandates prolonged treatment. It has been diagnosed with alarming frequency over the past decade. Data from a United Kingdom (UK) census shows a 150% increased incidence of IS in the past decade compared to the previous decades.¹ This could reflect the increased number of invasive spinal procedures in the recent past and the expansion in the elderly and immunocompromised population as well. As the disease can have potentially irreversible neurologic consequences,

early diagnosis and treatment becomes crucial. Despite the increased incidence and prevalence of this disease in India, the diagnosis is usually delayed in most of these cases.² Though detailed clinic-radiological evaluation is done, the diagnosis is clinched only by invasive biopsies. However, a high index of suspicion is required to subject a patient to invasive procedures to clinch the diagnosis. This study provides a comprehensive understanding of the clinical presentation of this disease which can aid in earlier diagnosis. It also highlights the importance of culture isolation of pathogens with collaborative clinic-radiological evidence to confirm diagnosis and initiate early treatment.

Aims and objectives of the study were to analyze the clinical spectrum and evaluate the diagnostic modalities in 25 cases of IS.

METHODS

A retrospective observational study of 25 cases of microbiologically confirmed IS in an Indian tertiary care hospital (Kasturba Medical College, Manipal) over an 18-month period (January 2018 to June 2019).

Inclusion criteria

Patients who were above 18 years of age, admitted in our hospital over the 18-month period with a diagnosis of IS. IS was diagnosed based on a positive disco-vertebral needle biopsy that microbiologically confirmed the infection.

Exclusion criteria

Patients with an alternate diagnosis such as spondylosis or spondylolisthesis were excluded.

Procedure

Data of all patients who satisfied the inclusion and exclusion criteria was collected from the hospital medical records department, after ethical approval. A detailed clinical history was obtained regarding the type of presentation, severity of symptoms, onset of symptoms, time of presentation, history of co-morbidities, history of alcohol/smoking and functional status. Physical examination details, lab investigations and radiological evaluation captured in the case record were also collected. Examination details included a central nervous system examination, Lab investigations included a disco-vertebral needle biopsy for all patients. Radiological evaluation included an MRI of the spine.

Statistical analysis

The data obtained was collected and the occurrence and presentation of IS was analyzed using statistical package for the social sciences (SPSS) for Windows version 22.0 (SPSS, Inc., Chicago, IL) to calculate the frequency, mean, standard deviation and Chi-square test.

RESULTS

A total of 25 cases of IS were considered with a mean age of 49 years. The cases of tubercular spondylodiscitis (TS) had an average age of 54 years compared to the non-tubercular spondylodiscitis (NTS), who were found to be younger with an average age of 45 years. Up to 68% of the study population were male and the rest 32% were female patients. Only 15% of the population that was diagnosed with TS had a history of tuberculosis. Only 4% of the total cases were human immunodeficiency virus (HIV)

positive. The demographic data of the patients is summarized in Table 1.

Table 1: Baseline demographic details of patients.

Clinical characteristics	Total n=25 (%)
Age (IS) (years)	49 years (mean)
Age TS/NTS (years)	54/45 years (mean)
Males	17 (68)
Females	8 (32)
Immunocompromised	1 (4)
History of tuberculosis	4 (15)
Time to presentation (days)	25
Backache	19 (76)
Paraparesis	8 (32)
Fever	7 (28)
Spinal tenderness	5 (20)
Spinal deformities	2 (4)
Motor weakness	12 (48)
Sensory deficit	4 (15)
Autonomic deficit	1 (4)
Elevated ESR	23 (92)

The most common presenting complaint was backache (76%) followed by paraparesis (32%) and fever (28%). An erythrocyte sedimentation rate (ESR) of >50 was noted in more than 92% of the cases. MRI was the imaging modality used to confirm diagnosis in up to 80% of the patients. A plain radiograph correlation was seen in 72% of the patients. The most common vertebral site involved was lumbar and abscesses or paravertebral collections were noted in 60% of the patients. The clinical profile of the patients is shown in Figure 1.

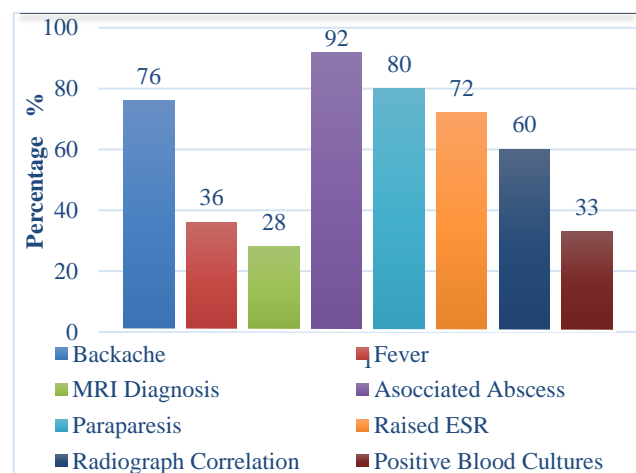


Figure 1: The clinical profile of IS.

Disco vertebral needle biopsy was done in all cases. All cases were microbiologically confirmed cases of IS. 52% of the total cases were TS and 48% were NTS. Among the cases of NTS (Figure 2), the organisms isolated were methicillin-resistant *Staphylococcus aureus* (MRSA) (33%), *Brucella* (41.6%), *Escherichia coli* (16.6%) and a

lone case of *Citrobacter* (8.3%). However, a correlating positive blood culture was seen only in 16.6% of the cases. The average time taken from onset of symptoms to diagnosis was 3 months in TS cases and 5 months in NTS case.

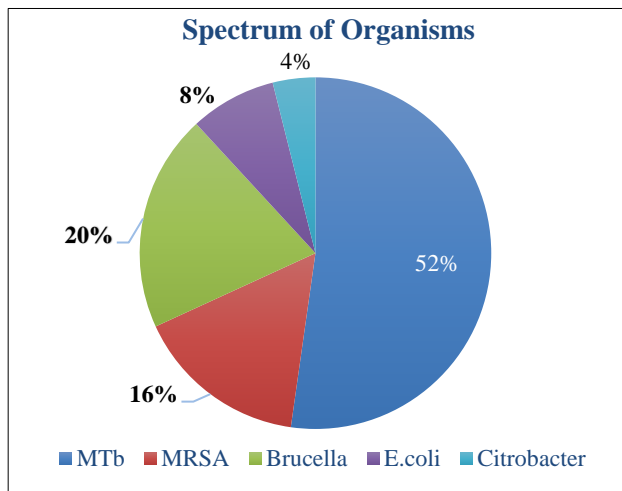


Figure 2: The spectrum of organisms isolated among the NTS cases.

Medical and surgical management were required in 84% of the cases. While only conservative management was sufficient in NTS cases with isolation of *Brucella*. 36% of the TS patients were still undergoing ATT treatment. The duration of treatment in TS was at least 18 months and in NTS at least up to 6 weeks. Some NTS cases required continuation of treatment up to 10 weeks.

No case of recurrence was noted among the study population during the 18 months of study indicating a good treatment outcome. However, 20% of the total study population were lost to follow up after initiation of treatment.

DISCUSSION

IS refers to the infection of the intervertebral disc and the adjoining vertebrae. It usually starts insidiously and follows an indolent course. Subsequently, the patients may develop severe neurological complications secondary to spinal cord/root compression.³

Though the incidence of this disease increases with age⁴, our study noted a mean age of 49 years, with a higher age mean for TS (54 years) in comparison to NTS (45 years).

IS is known to have a male preponderance with a male to female ratio of 1.5-3:1 and this ratio was noted among our study population as well (male: female-2.1:1).⁵

India accounts for the highest burden of tuberculosis worldwide.⁶ Skeletal tuberculosis occurs in 1-3% of tuberculosis patients. Spinal tuberculosis is the most common form of tuberculosis.⁷

The most common presenting symptom was back pain (100% cases). As this is a vague complaint and can be attributed to a variety of conditions, a significant delay in diagnosis could be attributed to this. Also, patients tend to seek medical attention or are referred to tertiary hospitals only on worsening of symptoms or at the onset of motor weakness. This concurred with findings in other studies on IS where the most common presentation is backache followed by fever.⁸

Our study also noted a predilection for the lumbar spine in most of our cases of IS. This could be explained by the extensive vascular anastomosis at this site that favours infectious hematogenous seeding.⁹ Mylona et al also noted this predilection in their review on infective spondylodiscitis.⁸

Among the lab investigations, a raised ESR was the most consistent finding as it was elevated in 92% of the cases. This is a known finding in IS as seen in several other studies.¹⁰

The conventional modality of imaging for IS are radiographs, as they are cost effective and easily available. However, it is noted that there is a 2-3 week lag in the initial presentation of radiographs in IS.⁸ Therefore, MRI is the imaging modality of choice for IS, as it can detect IS as early as 48 hours following the initial inoculation of the microorganism.¹¹ Up to 80% of the IS cases in our study had MRI findings suggestive of IS. There was a 72% correlation between the findings on MRI and the radiographs done. Epidural and paraspinal abscesses were noted in 60% of the total IS cases.

However, the diagnosis was clinched in all our 25 cases by a disco-vertebral needle biopsy and the causative micro-organism was also isolated in all the cases. As corresponding blood cultures were found to be positive in a mere 16.6% of the cases, the biopsy remains critical for the confirmation of the diagnosis in cases of IS.¹²

Among the micro-organisms isolated among the cases of NTS, the most commonly detected organism was MRSA followed by *Brucella* and *Escherichia coli*. This finding was consistent with the findings by Skaf et al in their review, where the commonly isolated organism in NTS is *Staphylococcus aureus*.¹³

Delayed diagnosis translates into neurological complications. The usual time from onset of symptoms to presentation in our study was 3 months in TS and 5 months in NTS. A western study noted that the mean duration of symptom at the time of diagnosis was only 48 days in NTS compared to 150 days in our study. This could be attributed to the non-specific presenting complaints of lower backache, delayed referral to tertiary hospital, lack of MRI imaging facilities and high threshold for spinal biopsy in these patients. Interestingly, the mean duration in western data from symptom onset to diagnosis is almost 6 months compared to just 3 months in our study.¹⁵ It is likely that

the high tubercular burden in India spurs early suspicion and aggressive evaluation for suspected cases of TS.

Treatment of 84% cases included both medical and surgical approach. However, IS secondary to *Brucella* required only conservative management. The duration of treatment in TS was 18 months and varied from 6 weeks to 10 months in NTS. A study done in China show surgical intervention in only 31.7% cases compared to 84% in our study population.¹⁶ Also, our study did not show any recurrence of the illness during the duration of the study period.

Limitations

As our study was only limited to 25 patients, many findings cannot be extrapolated to the larger IS population due to the restricted sample size. As our study stretched over only 18 months, there was no adequate time for follow-up. Though all of these patients visited the hospital during the course of treatment (18 months in TS), there was no time to follow them up for relapse (if any).

CONCLUSION

The clinical conundrum in IS is primarily due to its protean presentation. As there is paucity of Indian data for IS, our study describes the varied clinical profile of IS in India in comparison to the West. The higher tubercular burden of IS was also confirmed in our study and the time taken to presentation was markedly longer compared to the western data. Therefore, understanding the spectrum of clinical presentation, early diagnosis and initiating appropriate treatment helps overcome hurdles of recurrence and debilitating neurological morbidity.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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