

# The spectrum of osteoarticular tuberculosis in Brunei Darussalam

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## ABSTRACT

**Introduction:** Tuberculosis (TB) is a public health problem worldwide including Brunei Darussalam. Osteoarticular involvement is common. The purpose of this study was to review the demographics, clinical features and treatment outcome of patients with osteoarticular tuberculosis (OATB) in Brunei Darussalam. **Material and Methods:** Patients receiving treatment for OATB between 2003 and 2008 were identified from the National Tuberculosis Coordinating Centre (NTCC) registry. Data was recorded on pre-designed proforma. **Results:** Twenty-one patients (10 male: 11 female) were identified with a mean age of 49 years (range 19 to 75). Nineteen were Bruneian citizens. The most common presenting symptoms were pain at affected site (n = 15), focal neurological deficit and loss of appetite (n = 7). Two patients gave a positive family history of TB and three had radiological evidence of pulmonary TB. Radiograph of the involved part was positive in nine cases while advanced imaging studies (computed tomography scan and magnetic resonance imaging) were required in 15 instances. The results of positive confirmatory tests were obtained from: smear (n = 10), culture (n = 3) and biopsy (n = 8). In five cases treatment had to be started without any of the confirmatory tests. The spine was the most common site of involvement (n = 12) with five non-spinal and four cases with combined lesions. Surgical intervention was required in six cases. All patients completed the treatment successfully. **Conclusions:** OATB is not uncommon in Brunei Darussalam and can present diagnostic problems. A high index of suspicion, early confirmation of diagnosis and complete monitored treatment is necessary for successful management of these cases.

**Keywords:** Epidemiology, osteoarticular tuberculosis, tuberculosis

## INTRODUCTION

In 1993, the World Health Organisation (WHO) declared tuberculosis (TB) to be a global emergency. It is estimated that about

one third of world's population is infected with *Mycobacterium tuberculosis*. Approximately nine million new cases are diagnosed and nearly two million deaths occur annually as a result of TB.<sup>1</sup> For the year 2006, the estimated number of TB cases (per 1,000) and rates (per 100,000 population) by WHO region were highest in Southeast Asia at 3,100

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and 180 respectively.<sup>1</sup>

Osteoarticular TB (OATB) accounts for only one to two percent of all cases of TB in the western world while in the non-industrialised countries it accounts for 10 to 15% of all TB notifications.<sup>2, 3</sup> The diagnosis of extra-pulmonary TB (EPTB) including that of OATB is challenging as it can mimic other disease conditions and this is known to cause delay in diagnosis.<sup>4-8</sup>

The aim of this study was to review the demographics, clinical features and treatment outcome of patients with OATB in Brunei Darussalam.

## MATERIALS AND METHODS

All patients who were diagnosed and treated for TB are referred to and followed up at the National Tuberculosis Coordinating Centre (NTCC) based in Kampong Kiarong located in the capital, Bandar Seri Begawan. Separate files are maintained for such patients at the NTCC.

Patients with a diagnosis of OATB, treated at the NTCC between 2003 and 2008 were identified from the records. Data about the demographics, clinical features, nationality, diagnosis and response to treatment was recorded from the files.

After the diagnosis of TB, all the patients were treated by a standard protocol for anti-TB medications. All patients were started on quadruple regime of Rifampicin (10 mg/kg/day), Isoniazid (5 mg/kg/day), Pyrazinamide (25 mg/kg/day), and Ethambutol (15 mg/kg/day) for the first two months followed by Rifampicin and Isoniazid for additional four months. Pyridoxine (vitamin B6, 25 mg daily) was given to prevent peripheral neuropathy secondary to Isoniazid.

## RESULTS

There were altogether 21 patients diagnosed and treated for OATB with a mean age of 49 ± 17.7 years old (range 19 to 75). The demographics of the study sample are presented in Table 1.

**Table 1: Demography of patients with osteoarticular tuberculosis (n = 21).**

Parameters	n (%)
Genders	
Male: Female	10 (48): 11 (52)
Ethnicity	
Malay: Chinese permanent resident: Indonesian	19 (90): 1 (5): 1 (5)
Previous tuberculosis contacts	
Positive: Negative: Unknown	2 (20): 8 (38): 11 (42)
Co-morbid conditions	
Diabetes mellitus	5 (24)
End stage renal disease	1 (5)
Past pulmonary TB infection	
Positive	3 (14)
Negative	4 (19)
Unknown	14 (67)

The main presenting complaints are shown in Table 2. None of the patients tested positive for the Human Immunodeficiency virus (HIV).

The distribution of cases of TB including EPTB and OATB in Brunei Darussalam during the study period is shown in Table 3.

Chest radiograph was available on all subjects and showed changes suggestive of TB in 24% of cases. Radiograph of the part was positive in nine of 11 cases where it was available (Fig. 1). Computed tomography (CT) scan and magnetic resonance imaging (MRI) were required in 15 cases to confirm the extent of disease and obtain sample for confirmation of the diagnosis (Fig. 2a and 2b).

The spine was the most common site affected in 12 cases while non-spinal sites were affected in five. Multiple sites involvements were noted in four patients. The distribution of lesion according to individual sites is shown in Table 4.

In ten cases, the diagnoses were confirmed by presence of acid fast bacilli (AFB) in the smear from aspirate from the affected

**Table 2: Clinical presentations.**

Symptoms	n (%)
Pain at affected site	15 (71)
Focal neurology	7 (33)
Loss of appetite	7 (33)
Swelling at affected site	5 (24)
Fever	2(10)

site. AFB culture was positive in three, two of which were smear positive. Histopathology confirmations were obtained in only eight cases (three of these were smear positive and one was culture positive). In five patients, no confirmatory evidence of TB could be obtained. Overall, confirmation of the TB could be obtained only in 71.4% of cases.

In addition to the anti-TB chemotherapy, surgical intervention was required either for confirmation of diagnosis or as a part of treatment in six cases. Two patients each underwent spinal decompression and drainage of psoas abscess. Curettage and synovial biopsy was needed in one patient each.

The outcome of treatment as assessed by clinical, haematological and radiological parameters was noted as cured in all

**Table 3: Distribution of EPTB and OATB in Brunei Darussalam (2004 to 2008).**

Year	PTB	EPTB	OATB	OATB/EPTB (%)
2004	153	36	4	11.1
2005	135	28	1	3.5
2006	166	36	4	11.1
2007	158	52	4	7.6
2008	176	44	6	13.6

PTB: Pulmonary tuberculosis,  
 EPTB: Extra-pulmonary tuberculosis,  
 OATB: Osteoarticular tuberculosis  
**Note:** Data for 2003 were not available



**Fig 1: Lateral radiograph of the spine showing tuberculosis affecting L1-L2 .**

cases. There was no mortality while on treatment. One patient initially defaulted with his treatment but later successfully completed treatment under supervision.

## DISCUSSION

Our study showed that OATB made up between 3.5 to 13.6% of all cases of EPTB in Brunei Darussalam. Pain was the most common presenting symptom and the spine was the most common affected site. All the patients were assessed as cured at the end of anti-TB chemotherapy.

A review of studies from different parts of the world has shown that the proportion of EPTB involvement varies between ten to 51%.<sup>6, 9</sup> OATB makes up eight to 15 % of cases of EPTB.<sup>2, 5-7, 9-11</sup>

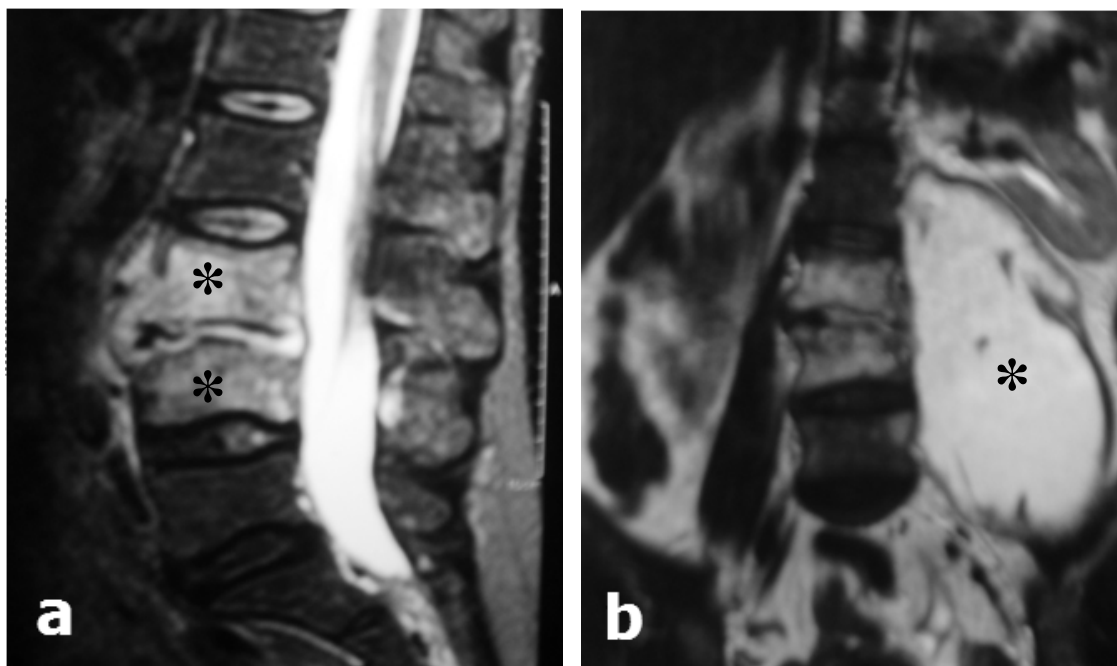
There is resurgence of TB worldwide and this is attributed to a rise in immuno-

suppressed patients (secondary to the HIV epidemic), multi-drug resistant strains, ageing populations, increased healthcare worker exposure and population migration.<sup>12,13</sup> In Brunei Darussalam, all expatriate workers have to undergo health screening that include chest radiography and Mantoux testing for TB. It is therefore not surprising that only one case in the present series was a foreigner while the rest were Bruneians. The association between resurgence of TB and HIV infection is well recognised. HIV-associated TB (HIV-TB) account for up to 15% of total cases of TB worldwide and 23% of global HIV/AIDS mortality.<sup>14</sup> None of the patients in the present study tested positive for HIV infection.

Delay in the diagnosis of EPTB, particularly OATB has been highlighted by a number of authors. The symptoms of OATB are non-specific and can mimic other disease conditions. Depending on the prevalence of TB, clinicians may have a low index of suspicion and not consider this diagnosis.<sup>5-7, 15</sup> A lack of experience with TB on the part of the physicians due to its decreasing incidence in some parts has also been implicated.<sup>16</sup> In some cases, inconclusive histology or negative culture results lead the clinician to consi-

**Table 4: Distribution of lesions.**

Site of involvements	n (%)
Thoracic spine	11 (52.4)
Lumbo-sacral spine	5 (23.8)
Cervical spine	2 (9.5)
Knee	2 (9.5)
Rib	1 (4.8)
Elbow	1 (4.8)
Sternum	1 (4.8)
Sacroiliac joint	1 (4.8)



**Fig 2: Magnetic resonance imaging: a) Sagittal T2 weighted image showing features of tuberculosis at L3-L4 (asterisks) and b) Coronal T2 weighted image showing left psoas abscess (asterisk).**

der other diagnoses.<sup>6</sup> Coexistence of PTB can help in the early diagnosis but concomitant PTB is present in less than 30% of cases of EPTB.<sup>4, 6-8, 10, 17</sup> Two widely quoted large scale studies of bone and joint TB as well as other studies of OATB has shown that the spine is the most common site affected in about 50% of cases. Other sites in decreasing order include pelvis, hip, femur, knee and tibia. Multiple site involvement is seen in about three percent of cases.<sup>5, 8, 10, 13, 18-20</sup> Only one study reported lower involvement of the spine (31%) compared to peripheral monoarthritis (50%) and Talbot *et al* found upper extremity to be affected more than the lower extremity.<sup>4, 10</sup>

The average age of patients in most studies of OATB has been reported to be between 33 to 60 years.<sup>4, 5, 7, 8, 10, 19, 20</sup> It is interesting to note that a few studies from Europe which had a mixed sample of native

immigrant population have reported a higher average age of 51 to 70 years for native population.<sup>5, 10, 19</sup>

Consistent with the present study, pain is the main presenting symptom in patients with OATB, followed by functional disability or focal neurological deficit. Similarly constitutional symptom of loss of appetite or fever is reported by only a small percentage of patients.<sup>7, 8, 19-21</sup> Loss of appetite reported by patients in the present study was at presentation and none has coexistent gastrointestinal TB. We noted that 28.5% of patients had associated co-morbid conditions, while 24% of patients had co-morbid conditions in the study reported by Yoon *et al*.<sup>7</sup>

Advanced imaging studies like CT scan and MRI are needed in a large number of cases to either assess the extent of the disease or obtain sample for confirmation of the

diagnosis.<sup>8, 19</sup> In the present study 71% of patients underwent such studies. The diagnosis of OATB is made on the basis of a positive smear or culture for *Mycobacterium tuberculosis* from synovial fluid, joint tissue or paravertebral abscess or by histological findings of caseating granulomas in biopsied tissues. In spite of availability of a number of tests, confirmatory evidence of TB is available in less than two-third of cases.<sup>7, 8, 19</sup> We could not find any confirmatory evidence in about 30% of cases in this study.

In the present study, 28.5% of patients underwent surgery. Surgery is required in a large number of cases of OATB ranging from 30 to 85%.<sup>8, 10, 19</sup> All the patients in the study reported by Bukharie *et al* were treated by chemotherapy alone.<sup>20</sup> The slightly lower rate of surgery in the present series could be due to differing surgical practice in Brunei Darussalam compared to other centers. Using differing outcome measures, most studies have reported a satisfactory outcome of treatment in OATB ranging from 73 to 97% compared to a 100% cure rate of the present study.<sup>8, 10, 19, 20</sup>

There are several limitations to our study which is largely attributed to the retrospective nature which is inherently associated with many limitations, such as missing data particularly with regards to family history of TB. Although managing all cases of TB in a single centre at NTCC can be beneficial in terms of patient tracking and auditing, it also meant that we were unable to assess the possible delay in diagnosis, referral to NTCC and implementation of treatment which will have an effect on clinical outcome.

In conclusion, OATB is not uncommon in Brunei Darussalam. With a high index of suspicion, early confirmation of diagnosis can be made and with closely monitored treatment, all cases were successfully treated without complications.

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