

Musculoskeletal tuberculosis in Bradford: Incidence, treatment and outcomes in an ethnically diverse population

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Background

Tuberculosis (TB) is one of the biggest communicable causes of mortality worldwide. Incidence rates continue to fall globally (and in England) year on year since 2011.

This study aims to examine the local incidence, demographic trends and management outcomes of musculoskeletal TB (MSK TB). Previous studies from this department in 1974 and 2007 highlight the high proportion of MSK TB in the immigrant population of this diverse, growing city. The clinical landscape has changed significantly since either of these studies. The authors aim to examine the relative incidence of MSK TB and outcomes of treatment within the local population over the preceding decade, compared to the recent falling incidence both locally and nationally.

Methods

MSK TB was defined as: radiographic evidence of an extra-pulmonary bone or soft tissue focus, with one or more of the following: biopsy demonstrating positive culture for *Mycobacterium tuberculosis* or positive histological evidence, radiographic features typical of TB, or clinical features of concern. Factors of clinical concern include: recent travel to high burden countries (within last 2 years), identification through contact tracing and clinical symptoms/signs of TB, such as: persistent cough, night sweats or weight loss.

Data from the Bradford Hospitals TB database and Office for National Statistics (ONS) was collated and analysed over a 12 year period. Individual care records, outcomes, pathology results and imaging reports were reviewed for all cases. Treatment course and outcome was recorded for all cases.

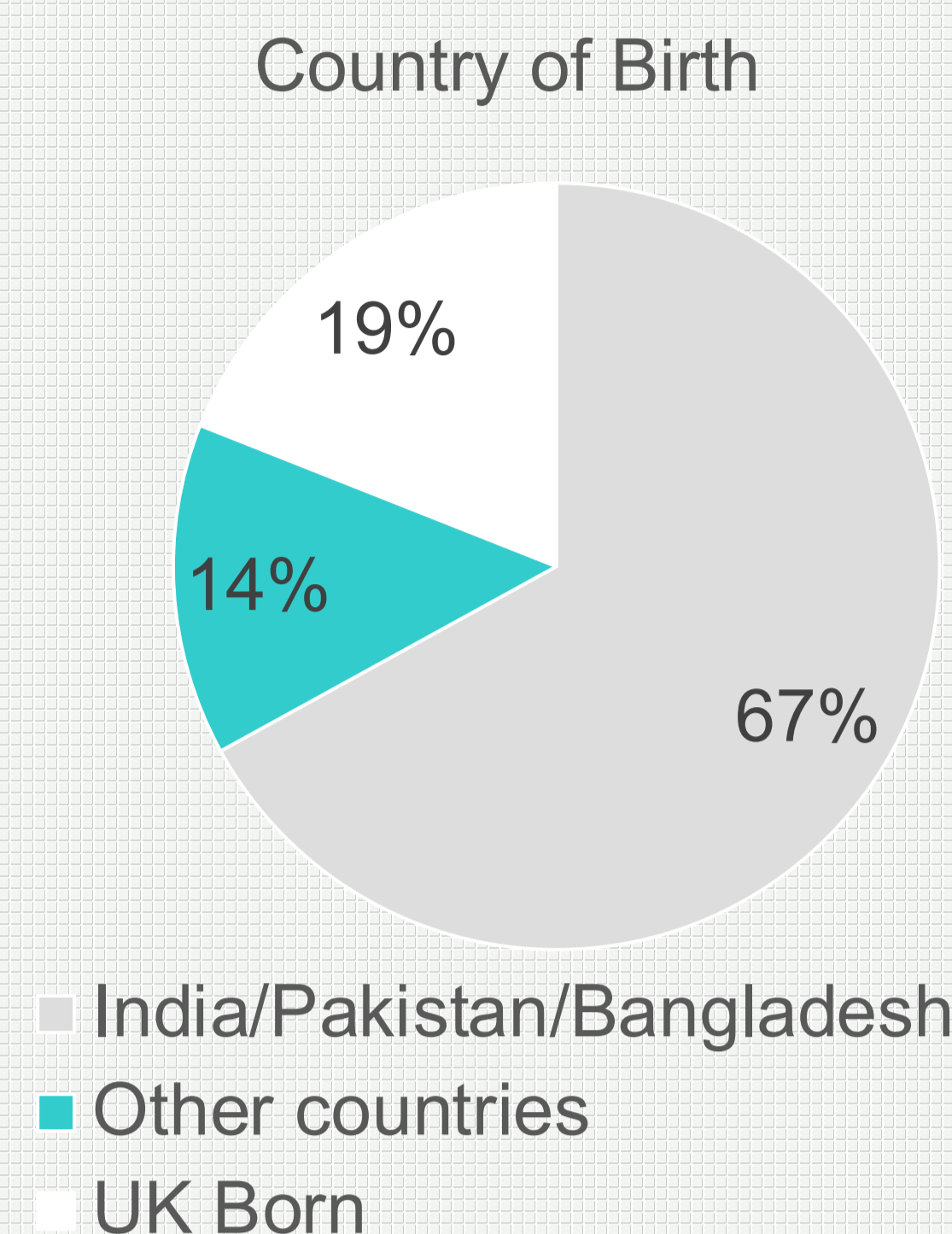
Results

Over 12.6 consecutive years, between January of 2005 and July of 2017, 109 cases of MSK TB were diagnosed and treated in Bradford Teaching Hospitals, see *Table below*.

Year	Total TB diagnoses	MSK TB	% MSK TB	Incidence MSK TB (per 100,000)
2005	146	7	4.79	1.31
2006	152	6	3.95	1.12
2007	148	8	5.41	1.50
2008	149	8	5.37	1.50
2009	196	18	9.18	3.37
2010	154	7	4.55	1.31
2011	153	16	10.46	2.99
2012	158	9	5.70	1.68
2013	139	8	5.76	1.50
2014	91	5	5.49	0.94
2015	97	6	6.19	1.12
2016	82	8	9.76	1.50

Mean patient age in the dataset was 41.2 years. Observed sex ratio (male:female) was 62:47.

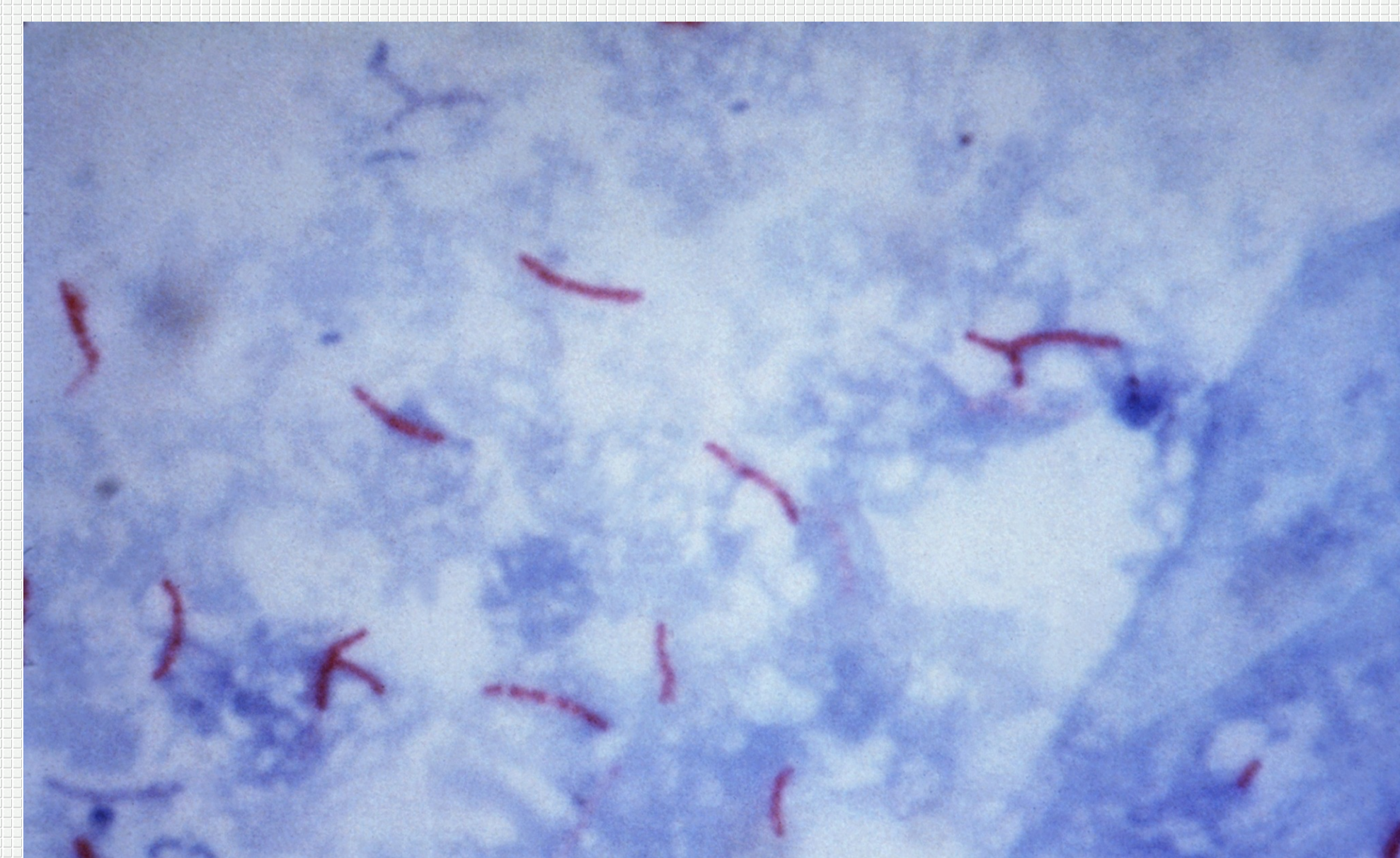
Nationality/immigration status and ethnic background are routinely recorded at first clinical review for purposes of risk stratification, contact tracing and disease surveillance.



81.7% of all MSK TB diagnoses in the study period were born outside the UK, and 67% of the cohort originated from one of the following the three countries which are designated by WHO as high burden. As such, 67% of new MSK TB diagnoses came from an ethnic background that accounted for only 25% of the local population

Microbiology

91 patients had positive cultures for *Mycobacterium tuberculosis* documented (83.5%), the remaining 17 were treated empirically following imaging and positive histological diagnosis ($n=1$) or clinical diagnosis as described previously.



(Ziel-Neelsen staining demonstrating AFB Bacilli indicative of TB)

MSK Sites

The commonest site for manifestation of MSK TB in our cohort was the thoracolumbar spine. 70 of the patients had some element of spinal involvement.

Treatment- Medical

The standard treatment regime involved 6 months of combination therapy: commencing with Rifampicin, Isoniazid, Pyrazinamide and Ethambutol. After 2 months (unless resistance/non-response to treatment was evident), the regime was typically reduced to combination of Rifampicin and Isoniazid alone. This regime extended to a minimum of 12 months duration for cases with spinal involvement. Pharmacological regimes were reviewed according to laboratory sensitivities when available. In cases of Isoniazid resistance, Isoniazid was substituted for Levofloxacin and the initial phase of treatment (using Rifampicin and Ethambutol) extended to 4 months.

Treatment - Surgical

In the case of spinal infection. 12 cases of spinal TB required surgery on a spinal focus, 10 of these involved formal decompression with, or without instrumentation. Post-operative follow-up data was available for 9 cases. Of these, 3 had no significant neurological deficit pre-operatively (altered sensation/hyperalgesia only). The remaining 6 cases had documented pre-operative significant motor weakness or signs of myelopathy. Only 1 case of these 6 failed to display significant post-operative improvement following cervical decompression.

TB infection at other MSK sites required surgery in 37 patients- predominantly incision and drainage of a collection or for open biopsy.

Treatment difficulties

Drug resistance and multi-drug resistant strains remain an enormous challenge in the treatment of TB globally. Our study yielded a small number of MDR TB cases ($n=3$), and of cases displaying specific resistance to Isoniazid ($n=3$). The presence of resistance remains a concern in our local population. Features of Isoniazid resistance were seen in 2.7% of cases in our dataset. This would appear to be similar to previous reports of drug resistance in TB seen locally.

Treatment Outcomes

WHO targets establish a minimum of 85% completion of treatment within 12 months of therapy commencing, and reported national data still fail to achieve this. Treatment completion rate was reported as 84.4% for cases notified in 2016.

94.5% of the study group successfully completed their treatment regime. As such, our local performance against WHO targets can be seen to be strong.

Discussion and Conclusion

Once again, the data from our unit show a preponderance of MSK TB within the immigrant population compared to the UK-born population, especially within the cohort of the immigrant population originating from the Indian Subcontinent.

Although annual TB incidence in the region continues to fall, Bradford remains one of the areas in the country worst affected by the disease in general.

Regarding MSK TB, Involvement typically includes a spinal focus. Medical treatment is the mainstay of care with course lengths between 6 to 12 months.

Our unit has reported good outcomes despite difficulties with patient compliance and follow up.