EDITORIAL

Volume 25 Number 1, January 2026

The Enduring Enigma of Spinal Tuberculosis in Modern Diagnostic Era and The Critical Role of Magnetic Resonance Imaging

Tuberculosis (TB), a disease of antiquity, is endemic in Malaysia and remains a public health problem despite advances in medical care. The ongoing burden is immense; in Malaysia it reached a four-decade high in 2022 with incidence rates of 113 cases per 100,000 population.[1] Of the patients with TB, about 30% have extrapulmonary involvement and among all extrapulmonary manifestations, about 10% are spinal TB.[2] Historically known as Pott's disease, spinal TB remains the most common and the most dangerous forms of skeletal TB.[2] Despite its antiquity and well-documented pathology, spinal TB persists as an enduring enigma in the modern diagnostic landscape, particularly due to persistent challenges in achieving a timely diagnosis and the devastating neurological consequences of delayed treatment.

The primary concern regarding spinal TB is the profound morbidity and mortality associated with delayed identification and management. Failure to recognize and treat the infection at an early stage often leads to severe complications and debilitating neurological deficits such as paraparesis or paraplegia. The clinical presentation of Pott's disease is often characterized by a profound lack of specificity and an indolent course, which is the cornerstone of its diagnostic enigma. Patients frequently present with non-specific symptoms such as back pain.[2] Constitutional symptoms like malaise, night sweats, and weight loss can also be present, but these are highly variable. The lack of classic, distinguishing features means that the median time from symptom onset to definitive diagnosis remains protracted, ranging between four and six months in many studies, a significant delay that directly correlates with a worse prognosis.[2]

The road to a definitive diagnosis for spinal TB is fraught with challenges, beginning with the ambiguity of the clinical picture and extending into the difficulty of pathogen confirmation. Abnormal laboratory results such as white cell count, erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) is commonly seen. However, these are merely indicators of inflammation and are not specific to tuberculosis. Tuberculin skin test (Mantoux Test) is a test indicating prior exposure or infection and its value declines in endemic areas. In recent years, the GeneXpert MTB assay is used for diagnosis, however the cost of the test remains high and may also not be available in all hospitals in Malaysia.[1] Biopsy plays a valuable role in the diagnosis of spinal TB. However, culturing the organism, *Mycobacterium tuberculosis*, from biopsy specimen is slow and can be negative due to low organism load. The main challenge of biopsy is to obtain adequate tissue sample for complete testing (culture, histopathology and tuberculous polymerase chain reaction-PCR). In many suspected cases, no organism can be cultured despite multiple attempts. Indeed, a review from the National Tuberculosis Centre found that bacteriological or histopathological confirmation was achieved in only 29.0% of spinal TB cases, highlighting a major bottleneck in definitive diagnosis.[3] This means clinicians must often rely on presumptive diagnosis based on a combination of clinical presentation, laboratory and radiological findings.

In the current modern diagnostic era, Magnetic Resonance Imaging (MRI) has emerged as the imaging modality of choice for the diagnosis, assessment of extent, and follow-up of spinal TB.[4] MRI is highly sensitive for the early detection of the disease and is unmatched in its ability to visualize soft tissue involvement, as well as critical neural compression. MRI facilitates early detection and provides crucial morphological information that aids in differentiation from a spectrum of other spinal pathologies, which it often mimics. These include pyogenic spondylodiscitis, metastatic lesions, multiple myeloma, lymphoma and

various degenerative disorders. Key imaging features of tuberculous spondylitis (Pott's disease) include multilevel involvement and skip lesions, late preservation of the disc spaces, presence of paraspinal or psoas abscesses and anterior vertebral corner destruction causing progressive kyphotic deformity. The ability of MRI to provide such detailed anatomical and pathological information is essential, particularly in cases presenting with neurological deficits (paraplegia/paraparesis), where the need for urgent surgical intervention to decompress the spinal cord is critical.

While the clinical utility of MRI is undeniable, its role is intrinsically linked to the availability of resources. MRI is a high-cost imaging with limited resources. There is a substantial growth in the volume of MRI examinations performed across various specialty in recent years in Malaysia. One of the biggest burdens affecting MRI service in a resource-limited region is long waiting time for the patients. Based on an online survey, the current state of insufficient resources and increasing demand for MRI services in hospitals in Southeast Asia including Malaysia is recognised.[5] Almost all respondent hospitals stated the lack of MRI equipment and the need for more MRI systems and provision of advanced MRI protocols. Some of these hospitals also indicate the need for MRI system upgrade, to increase government funding and to remove red tape with procurement processes to avoid delays especially with repairing and purchasing parts of existing MRI scanner. This study emphasizes that while MRI is the preferred modality, access can be a significant barrier.[5] The establishment of advanced and affordable MRI diagnostic facilities is vital to reinforce tuberculosis control strategies.

Spinal TB remains a persistent and complex challenge, a poignant reminder of an old disease resisting full control of physicians in the modern era. The key to mitigating the morbidity lies in aggressive and timely diagnosis. The optimal diagnostic strategy for spinal TB is therefore a seamless synergy between high clinical suspicion, followed by the use of MRI to establish the extent and nature of the infection. And finally, molecular and microbiological methods (often guided by imaging) to confirm the pathogen and initiate the necessary anti-tubercular drug regimen needed. MRI is instrumental in this process and the benefits of this advanced technology must be made accessible. The call for advanced and affordable diagnostic facilities across all endemic regions must be heeded.[5] Only through a sustained, synergistic approach integrating robust clinical awareness with state-of-the-art imaging and pathogen-specific testing can the enduring enigma of spinal TB be finally resolved, thus ensuring favourable outcomes and improving the quality of life for the affected patient population.

REFERENCES

1. Fadzil FA, Ramli SR, Neoh HM. Tuberculosis in Malaysia: Disease timeline, epidemiology, control initiative and outlook. Malays J Pathol 2025; 47(1): 13-23
2. Glassman I, Nguyen KH, Giess J, Alcantara C, Booth M, Venketaraman V. Pathogenesis, Diagnostic Challenges and Risk Factors of Potts's Disease. Clin. Prac. 2023; 13: 155-165 at DOI: 10.3390/clinpract13010014
3. Jalleh RD, Kuppusamy I, Mahayiddin AA, Yaacob MF, Yusuf NA, Mokhtar A. Spinal tuberculosis: A five-year review of cases at the National Tuberculosis Centre. Med. J. Malaysia 1991; 46: 256–260
4. Bor DS, Sharpe RE, Bode EK, Hunt K, Gozansky WS. Increasing Patient Access to MRI Examinations in an Integrated Multispecialty Practice. RadioGraphics 2021; 41:E1-E8 DOI: 10.1148/rg.2021200082
5. Mohan R, Ho ELM, Khong PK. MRI landscape in Southeast Asia. Ann Acad Singap Online First 2025; available at https://doi.org/10.47102/annals-acadmedsg.2025116

Assoc. Prof. Dr Radhiana Hassan
Consultant Radiologist
Department of Radiology
Kulliyyah of Medicine
IIUM Kuantan Campus