Sp 26: In a patient showing good clinical response, is MRI evidence of delayed or non-healing an indication for surgery?

Naresh-Babu J , Joaquim Andrei Fernandes, Nene Abhay, Taha Muzahem

Recommendation:

Based on available data. Persistent MRI abnormalities alone should not be an indication for surgery if the patient demonstrates clinical improvement, including pain relief, weight gain, ESR normalization, and neurological stability. MRI findings must be interpreted cautiously to avoid unnecessary interventions. Delayed healing on MRI (e.g., persistent bone marrow edema, endplate erosions) may not indicate active disease**,** but rather ongoing remodelling. Decision-making should prioritize clinical response over isolated MRI findings**.** MRI enhancement alone does not confirm active infection and is commonly found during radiological follow-up.

Level of Evidence: Moderate

Delegate Vote:

Rationale:

Spinal tuberculosis (TB) remains a complex disease with a variable healing timeline, making treatment decisions challenging. While MRI is a valuable tool for monitoring disease progression, persistent MRI abnormalities such as marrow edema, contrast enhancement, and residual soft tissue involvement often create uncertainty about whether to continue ATT, stop therapy, or proceed with surgery. The fundamental issue is that MRI findings do not always correlate with clinical healing, which can lead to unnecessary prolongation of ATT or unwarranted surgical intervention.

Jain et al[1] have demonstrated that MRI-confirmed healing progresses gradually, with only 35% of patients achieving MRI-confirmed healing by 8 months of ATT. By 12 months, 47% show resolution of MRI abnormalities, increasing to 68% at 18 months and 95% by 24 months.

According to Mittal et al[2], persistent MRI enhancement does not necessarily indicate active disease. In cases where FDG-PET/CT was performed, PET/CT confirmed no active disease in all cases where MRI still showed abnormalities, reinforcing the idea that MRI overestimates residual disease activity.

Surgical intervention should not be based solely on MRI findings. Surgery was required only in patients with neurological deterioration despite ATT, spinal instability or worsening kyphotic deformity, and persistent abscesses with active PET/CT uptake. None of the studies recommended surgery solely based on MRI abnormalities without clinical deterioration. MRI often shows delayed healing, which does not correlate with ongoing infection, and prolonging ATT unnecessarily can contribute to drug toxicity and noncompliance. PET/CT provides a more accurate assessment of true healing and can guide ATT discontinuation[3].

Jain et al[1] evaluated 51 spinal TB patients using MRI to determine healing, finding that only 35% achieved MRI-confirmed healing at 8 months, supporting the need for extended ATT beyond this period. Their study concluded that MRI should be used for monitoring but that clinical parameters should precede imaging findings in determining ATT duration. Similarly, Mittal et al[2] compared MRI with FDG-PET/CT to assess healing, demonstrating that 28 patients who exhibited persistent MRI enhancement after 12 months had no active disease on

PET/CT. None of these patients relapsed after stopping ATT, proving that MRI often overestimates residual disease and that PET/CT is more reliable for confirming healing.

Singh et al[3] examined serial MRI findings in spinal TB patients and confirmed that MRI abnormalities persisted even after clinical improvement, delaying ATT discontinuation. The study recommended a combined clinical, hematological, and imaging-based approach to treatment decisions, reserving surgery for progressive neurological deficits, instability, or unresolved abscesses rather than persistent MRI abnormalities alone.

The reviewed studies emphasize that persistent MRI abnormalities alone should not dictate surgical decisions or prolong ATT unnecessarily. Clinical response should guide treatment decisions, with surgery reserved for worsening neurology, instability, or PET/CT-confirmed active disease.

References:

1. Jain AK, Srivastava A, Saini NS, Dhammi IK, Sreenivasan R, Kumar S. Efficacy of extended DOTS category I chemotherapy in spinal tuberculosis based on MRI-based healed status. Indian J Orthop. 2012 Nov;46(6):633-9. doi: 10.4103/0019-5413.104191.
2. Mittal S, Jain AK, Chakraborti KL, Aggarwal AN, Upreti L, Bhayana H. Evaluation of Healed Status in Tuberculosis of Spine by Fluorodeoxyglucose-positron Emission Tomography/Computed Tomography and Contrast Magnetic Resonance Imaging. Indian J Orthop. 2019 Jan-Feb;53(1):160-168. doi: 10.4103/ortho.IJOrtho_224_18.
3. Singh R, Magu NK, Rohilla RK. Clinicoradiologic Profile of Involvement and Healing in Tuberculosis of the Spine. Ann Med Health Sci Res. 2016 Sep-Oct;6(5):311-327. doi: 10.4103/amhsr.amhsr_188_15.