ORIGINAL ARTICLE

Diagnostic Accuracy of Magnetic Resonance Imaging Findings in Diagnosing Spinal Tuberculosis Taking Histopathology as Gold Standard

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ABSTRACT

Aim: To determine the accuracy of magnetic resonance imaging (MRI) for assessment and diagnosis of spinal TB in suspected patients.

Methods: This validation study included 80 suspected cases of spinal TB (Positive Tuberculin skin test (PPD), ESR>100) having age 18 to 65 years, who were referred for MRI evaluation. The study was conducted the radiology department of Ibne -Sienna hospital from January 2020 to September-2020. Initially in all patients, MRI evaluation was done. After that biopsy specimens were took under US guidance and sent for histopathology evaluation.

Results: Mean age of study cases was 50 45.1±9.6 years. Majority, 50(62.5%) patients were men and 30(37.5%) were women. Out of 80 suspected patients, spinal TB was diagnosed in 67 cases on MRI, while on histopathology spinal TB was diagnosed in 64 cases. In remaining 13 patients, 2 patients were diagnosed on spinal TB on histopathology. The sensitivity of MRI was 97.0%, specificity 78.6%, PPV 95.5% and NPV 84.6%.

Conclusion: Accuracy of MRI for diagnosing spinal TB is quite high. So MRI should be used as first-line imaging modality in these patients and histopathology should be advised in those patients having strong suspicion of other underlying diseases in these patients.

Keywords: Magnetic resonance imaging (MRI), Spinal Tuberculosis.

INTRODUCTION

Tuberculosis (TB) is a well-known world epidemic, affecting over 1/3rd of global population. Annually, over 8.7 million new TB cases are reported every year.[1]The rate of TB is spreading in parallel to the HIV infection. After HIV, TB is the second most highly spreading infectious disease with high worldwide mortality. Extra-pulmonary TB is also a common manifestation and up-to 10 to 30% cases are affected with spinal region (spinal TB)[2,3].

Patients with spinal TB usually present with back pain which in long term can cause neurologic disability.[4] So timely and correct diagnosis is very important to prevent these complications and spinal deformity.[5]MRI is the commonest used modality for assessment of the spinal cord diseases, it has higher sensitivity than plain X-rays and specificity than computed tomography (CT)[6,7]. MRI has several advantageous in comparison to other imaging techniques, like it is non-invasive, can be repeated in short time intervals and has the ability to scan whole spinal cord in single session[8]. However, the MRI is not 100% accurate and many physicians prefer histopathology examination for the diagnosis of spinal TB. In this study we determined the accuracy of MRI in diagnosis of spinal TB in comparison to histopathology findings.

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METHODS

This validation study included 80 suspected cases of spinal TB (Positive Tuberculin skin test (PPD), ESR>100) having age 18 to 65 years, who were referred for MRI evaluation. Patient having contra-indication to MRI (such as those having ocular implants, permanent pacemaker, or defibrillator) were excluded. The study was conducted the radiology department of Ibne Sienna hospital from January 2020 to September 2020. Relevant consent was taken regarding the study.

All patients underwent MRI under the supervision of consultant radiologist and diagnosis of spinal tuberculosis was made by consultant radiologist as per operational definitions. After MRI, biopsy specimens were taken under ultrasonography guidance and were sent for histopathologic evaluation. The specimens were stained with Ziehl Neelsen's staining for detection of acid fast bacilli in the specimen.

Data analysis was done by using SPSS v23. 2×2 contingency table was used to calculate sensitivity and specificity, positive predictive value, and negative predictive value of MRI for diagnosis of spinal tuberculosis.

RESULTS

Mean age of study cases was 50 45.1±9.6 years. Majority, 50(62.5%) patients were men and 30(37.5%) were women.

Out of 80, 55(68.7%) patients had back pain only, and 25(31.3%) patients had para-paresis or radiculopathy. 9(11.3%) patients had previous history of TB.

Out of 80 suspected patients, spinal TB was diagnosed in 67 cases on MRI, while on histopathology spinal TB was diagnosed in 64 cases. In remaining 13 patients, 2 patients were diagnosed on spinal TB on histopathology. The sensitivity of MRI was 97%, specificity 78.6%, PPV 95.5% and NPV 84.6%.

DISCUSSION

MRI has made a significant improvement in diagnosis of spinal injuries and infections. It is non-invasive and provides instant diagnosis of underlying deformity and diseases.[9]Moreover, it contains higher sensitivity and overall accuracy making it the first-line investigation modality for prompt diagnosis of spinal cord infections.[10, 11]

Spinal infections are recognized as the presence of particular infection causing agents including either only a single spine segment such as vertebrae, or a disk, epidural cavity and spinal soft tissues[12].

This study was aimed to determine either MRI has a sufficient accuracy for diagnosis of spinal TB or it lacks the ability to do it. We found that MRI is a highly reliable non-invasive imaging approach with sensitivity of 97%, specificity 78.6%.

A study conducted by Kanna et al. concluded that MRI findings are 59.74% sensitive and 91.67% specific for diagnosing spinal tuberculosis taking histopathological findings as gold standard[13].

While Sexena et al. reported much higher sensitivity and specificity of MRI. They reported that MRI is 97.9% sensitive, and 81.1% specific for diagnosis of spinal tuberculosis taking histopathology as gold standard[14].

Another study lead by Ahmad et al. containing 147 patients of suspected spinal TB, reported spinal TB in 89 patients using MRI, while on histopathology only 82 patients had positive results, and in remaining 58 patients who were negative on MRI, 9 patients had spinal TB on histopathology, giving the sensitivity of MRI 92.13%, specificity 84.48%, PPV 90.11% and NPV 87.50%[15].

Currently MRI is only the imaging modality for decision making in suspected spinal TB patients. it provides sufficiently accurate information to the physicians that can aid in decision making for further invasive diagnostic testing and starting an appropriate treatment in these patients.

CONCLUSION

Accuracy of MRI for diagnosing spinal TB is quite high. So MRI should be used as first-line imaging modality in these patients and histopathology should be advised in those patients having strong suspicion of other underlying diseases in these patients.

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