Original Research Article

A study of various MRI findings in patients with extra-pulmonary tuberculosis at tertiary health care centre

Akhil Patil[1*], Syed Moinullah[2], Rudresh S Halawar[3]

[1]Assistant Professor, [3]Associate Professor, Department of Radiology, Sri Nijalingappa Medical College and HSK hospital, Bagalkot, INDIA.
[2]Assistant Professor, Sri Siddhartha Medical College, Tumkur, INDIA.
Email: moin.bmc@gmail.com

Abstract

Background: In the era before the human immunodeficiency virus (HIV) pandemic, and in studies involving immunocompetent adults, it has been observed that EPTB constituted about 15 to 20 per cent of all cases of TB **Aims and Objectives:** To Study of various MRI findings in patients with extra-pulmonary tuberculosis at tertiary health care centre**. Methodology:** This was a cross-sectional study was carried out in suspected EPTB from October 2013 to August 2015. The study was carried out prospectively in the Department of Radiodiagnosis of Sassoon General Hospital, Pune. This study includes MRI and CT studies of 202 cases of patients with EPTB. All cases from Sassoon General Hospital, Pune referred for MRI and CT who are clinically diagnosed to have extrapulmonary tuberculosis and with supporting evidence from radiographs, USG or lab tests. Magnetic Resonance Imaging (MRI): Machine: 1.5 Tesla GE – Signa Hdxt MRI machine was used for the study. **Result:** MRI findings in lymph nodal tuberculosis were Homogeneous enhancement-13.4%, Peripherally enhancing (necrotic)-16.3%, Fibrocalcified-5.0%. MRI findings in pleural tuberculosis Thickening -13.8%, Pleural effusion-16.3%Empyema-3.5%, Calcifications-2.5% MRI findings in hepatic tuberculosis were Miliary type-2.5%, Nodular type in 2.0%. MRI findings inperitoneal tuberculosis were Ascites in 1.5%, Peritoneal thickening with enhancement in 0.5%, Mesenteric thickening in 1.5% MRI findings of Ileocaecal tuberculosis Wall thickening in 1%, Contrast enhancement in 1%,Active wall inflammation-0.5%, Fibrotic wall changes in 0.5%.MRI findings in adrenal tuberculosis in Bilateral involvement -0.5%, Calcification in 0.5%. MRI findings in renal tuberculosis Calyceal deformity1.5%, P.N. with cavitation, 1.5%, Pelvic stricture-1.0%, Cortical scar-1.5%Calcifications-1.0%, MRI findings in ureteric tuberculosis Dilatation with mural thickening in 0.5%, Stricture in 0.5%. MRI findings in bladder tuberculosis Wall thickening in 2.5%, Reduced bladder size in 3%. MRI findings in intracranial tuberculosis in Meningeal enhancement6.9%, Non calcified tuberculoma in 3.5%, Calcified tuberculoma in 2.5%, Cerebritis and abscess in 0.5%, Basal exudates in 4.5%, Vasculitic infarcts in1.0%, Encephalopathy in 0.5%, Miliary in 1.5%. MRI findings in spinal cord tuberculosis Meningitis in 0.5%, Tuberculomas in 1.0%.MRI findings in Pott's spine were Vertebral body destruction -4.5%, Discitis/disc destruction-5.9%, Subligamentous spread-5.9%, Paraspinal mass/abscess-3.5%, Epidural/spinal canal extension-1.5%,Soft tissue calcifications-0.5%.MRI findings in tubercular osteomyelitis were Intraosseous involvement, 0.5%, Marrow changes-0.5%,Sequestrum-0.5%.Pericardial thickening-1.5%, Effusion -1.5%, IVC dilatation-1.0%. **Conclusion:** This relatively safe investigations with the typical presentationsvery crucial in the early diagnosis of various extrapulmonary tuberculosis and subsequent management to prevent further complications of it.

Key Words: MRI, Extra-pulmonary tuberculosis (EPTB), MRI features of EPT.

[*]**Address for Correspondence:**
Dr. Syed Moinullah, Door No 3948, MF Manzil, 3rd main, 5th cross, vinobhanagar, Tumkur 572101, INDIA.
Email: moin.bmc@gmail.com
Received Date: 20/09/2017 Revised Date: 23/10/2017 Accepted Date: 26/11/2017
DOI:

Access this article online

Quick Response Code:

Website: www.medpulse.in

Accessed Date: 29 November 2017

In the era before the human immunodeficiency virus (HIV) pandemic, and in studies involving immunocompetent adults, it has been observed that EPTB constituted about 15 to 20 per cent of all cases of TB (Fig.1a)[1,2, 3,4,5]. In HIV-positive patients, EPTB accounts for more than 50 per cent of all cases of TB[8-12]. The diagnosis of EPTB, especially. The diagnosis of EPTB, especially involving deeply located inaccessible areas is very difficult. Sparse literature is available regarding the

How to cite this article: Akhil Patil, Syed Moinullah, Rudresh S Halawar. A study of various MRI findings in patients with extra-pulmonary tuberculosis at tertiary health care centre. *MedPulse – International Medical Journal.* November 2017; 4(11): 1019-1022. http://www.medpulse.in

relative contributions of pulmonary and extrapulmonary disease to the total number of tuberculosis cases from India as reliable epidemiological data are lacking[3]. Considering the stigma associated with and the reluctance to perform invasive procedures especially in HIV-positive patients in the Indian setting, even notified estimates of EPTB under the Revised National Tuberculosis Control Programme (RNTCP) are often based on presumptive diagnosis and are an overestimate of the problem[6].The risk of tuberculosis increases as immunosuppression progresses[7,8,13,14]. The most common extrapulmonary site in HIV-positive individuals is the lymph node. However, neurological, pleural, pericardial, abdominal involvement has been described and virtually every site in the body can be involved in HIV-positive patients[1,2,8,13,14]. In studies reported from India, EPTB constituted 45 to 56 per cent of all the cases of tuberculosis in persons with AIDS[15,16]

MATERIAL AND METHODS

This was a cross-sectional study was carried out in suspected EPTB from October 2013 to August 2015. The study was carried out prospectively in the Department of Radiodiagnosis of Sassoon General Hospital, Pune. This study includes MRI and CT studies of 202 cases of patients with EPTB. All cases from Sassoon General Hospital, Pune referred for MRI and CT who are clinically diagnosed to have extrapulmonary tuberculosis and with supporting evidence from radiographs, USG or lab tests. Patients unwilling to give consent, Those who had clinical evidence but did not have any imaging features suggestive of extrapulmonary tuberculosis, All patients having cardiac pacemakers, prosthetic heart valves, cochlear implants or any metallic implants in case of MRI, Pregnant patients in case of CT, All patients having history of adverse reaction to contrast agents used, Claustrophobic patients in case of MRI were excluded from the study Risk Factors **:** Adverse drug reaction due to contrast agent (gadobenate disodium) used in MRI, Adverse drug reaction due to contrast agent (iopamidol) used in CT, All procedures will be explained to the patients and only after their written consent, investigations will be carried out.(MRI): Machine: 1.5 Tesla GE – Signa Hdxt MRI machine was used for the study.

RESULT

Table 1: MRI findings in lymph nodal tuberculosis (n=202).

	MRI Findings	
	N	%
Homogeneous enhancement	27	13.4
Peripherally enhancing (necrotic)	33	16.3
Fibrocalcified	10	5.0

MRI findings in lymph nodal tuberculosis were Homogeneous enhancement-13.4%, Peripherally enhancing (necrotic)-16.3%, Fibrocalcified-5.0%.

Table 2: MRI findings in pleural tuberculosis (n=202)

	MRI Findings	
	N	%
Thickening	28	13.8
Pleural effusion	33	16.3
Empyema	7	3.5
Calcifications	5	2.5

MRI findings in pleural tuberculosis Thickening -13.8%, Pleural effusion-16.3% Empyema-3.5%, Calcifications-2.5%

Table 3: MRI findings in hepatic tuberculosis (n=202)

	MRI Findings	
	N	%
Miliary type	5	2.5
Nodular type	3	2.0

MRI findings in hepatic tuberculosis were Miliary type-2.5%, Nodular type in 2.0%.

Table 4: MRI findings inperitoneal tuberculosis (n=202)

	MRI Findings	
	N	%
Ascites	3	1.5
Peritoneal thickening with enhancement	1	0.5
Mesenteric thickening	3	1.5

MRI findings inperitoneal tuberculosis were Ascites in 1.5%, Peritoneal thickening with enhancement in 0.5%, Mesenteric thickening in 1.5%

Table 5: MRI findings Ileocaecal tuberculosis (n=202).

	MRI Findings	
	N	%
Wall thickening	2	1.0
Contrast enhancement	2	1.0
Active wall inflammation	1	0.5
Fibrotic wall changes	1	0.5

MRI findings of Ileocaecal tuberculosis Wall thickening in 1%, Contrast enhancement in 1%,Active wall inflammation-0.5%, Fibrotic wall changes in 0.5%.

Table 6: MRI findings in adrenal tuberculosis (n=202).

	MRI Findings	
	N	%
Bilateral involvement	1	0.5
Calcification	1	0.5

MRI findings in adrenal tuberculosis in Bilateral involvement -0.5%, Calcification in 0.5%.

Table 7: MRI findings in renal tuberculosis (n=202).

	MRI Findings	
	N	%
Calyceal deformity	3	1.5
P.N. with cavitation	3	1.5
Pelvic stricture	2	1.0
Cortical scar	3	1.5
Calcifications	2	1.0

MRI findings in renal tuberculosis. Calyceal deformity 1.5%. P.N. with cavitation 1.5%. Pelvic stricture 1.0% Cortical scar 1.5%. Calcifications 1.0%

Table 8: MRI findings in ureteric tuberculosis (n=202).

	MRI Findings	
	N	%
Dilatation with mural thickening	1	0.5
Stricure	1	0.5

MRI findings in ureteric tuberculosis Dilatation with mural thickening in 0.5%, Stricture in 0.5%.

Table 9: MRI findings in bladder tuberculosis (n=202)

	MRI Findings	
	N	%
Wall thickening	5	2.5
Reduced bladder size	6	3

MRI findings in bladder tuberculosis Wall thickening in 2.5%, Reduced bladder size in 3%.

Table 10: MRI findings in intracranial tuberculosis (n=202)

	MRI Findings	
	N	%
Meningeal enhancement	14	6.9
Non calcified tuberculoma	7	3.5
Calcified tuberculoma	5	2.5
Cerebritis and abscess	1	0.5
Basal exudates	9	4.5
Vasculitic infarcts	2	1.0
Encephalopathy	1	0.5
Miliary	3	1.5

MRI findings in intracranial tuberculosisin Meningeal enhancement 6.9%, Non calcified tuberculoma in 3.5%, Calcified tuberculoma in 2.5%, Cerebritis and abscess in 0.5%, Basal exudates in 4.5%, Vasculitic infarcts in1.0%, Encephalopathy in 0.5%, Miliary in 1.5%.

Table 11: MRI findings in spinal cord tuberculosis (n=202).

	MRI Findings	
	N	%
Meningitis	1	0.5
Tuberculomas	2	1.0

MRI findings in spinal cord tuberculosis Meningitis in 0.5%, Tuberculomas in 1.0%.

Table 12: MRI findings in Pott's spine (n=202)

	MRI Findings	
	N	%
Vertebral body destruction	9	4.5
Discitis/disc destruction	12	5.9
Subligamentous spread	12	5.9
Paraspinal mass/abscess	7	3.5
Epidural/spinal canal extension	3	1.5
Soft tissue calcifications	1	0.5

MRI findings in Pott's spine were Vertebral body destruction -4.5%, Discitis/disc destruction-5.9%, Subligamentous spread-5.9%, Paraspinal mass/abscess -3.5%, Epidural/spinal canal extension-1.5%, Soft tissue calcifications-0.5%.

Table 13: MRI findings in tubercular osteomyelitis (n=202).

	MRI Findings	
	N	%
Intraosseous involvement	1	0.5
Marrow changes	1	0.5
Sequestrum	1	0.5

MRI findings in tubercular osteomyelitis were Intraosseous involvement 0.5%, Marrow changes-0.5%, Sequestrum-0.5%.

Table 14: MRI findings in pericardial tuberculosis (n=202)

Parameters	MRI Findings	
	N	%
Pericardial thickening	3	1.5
Effusion	3	1.5
IVC dilatation	2	1.0

Pericardial thickening-1.5%, Effusion -1.5%, IVC dilatation-1.0%.

DISCUSSION

Tuberculosis can involve almost every organ and system of the body. EPTB, by definition, is the isolated occurrence of TB at body sites other than the lungs, such as pleura, lymph nodes, abdomen, genito-urinary tract, skin, joints, bones, tubercular meningitis, tuberculoma of the brain, etc.[17,18] The possibility of EPTB be included in the differential diagnosis of any infectious process in the body.[19] In our study we have seen MRI findings in lymph nodal tuberculosis were Homogeneous enhancement-13.4%, Peripherally enhancing (necrotic)-16.3%, Fibrocalcified-5.0%. MRI findings in pleural tuberculosis Thickening -13.8%, Pleural effusion-16.3%Empyema-3.5%, Calcifications-2.5% MRI findings in hepatic tuberculosis were Miliary type-2.5%, Nodular type in 2.0%. MRI findings inperitoneal tuberculosis were Ascites in 1.5%, Peritoneal thickening with enhancement in 0.5%, Mesenteric thickening in 1.5% MRI findings of Ileocaecal tuberculosis Wall thickening in 1%, Contrast enhancement in 1%,Active wall inflammation-0.5%, Fibrotic wall changes in 0.5%.MRI findings in adrenal tuberculosis in Bilateral involvement -0.5%, Calcification in 0.5%. MRI findings in renal tuberculosis Calyceal deformity 1.5%, P.N. with cavitation, 1.5%, Pelvic stricture-1.0%, Cortical scar-1.5% Calcifications-1.0%, MRI findings in ureteric tuberculosis Dilatation with mural thickening in 0.5%, Stricture in 0.5%. MRI findings in bladder tuberculosis Wall thickening in 2.5%, Reduced bladder size in 3%. MRI findings in intracranial tuberculosis in Meningeal enhancement6.9%, Non calcified tuberculoma in 3.5%, Calcified tuberculoma in 2.5%, Cerebritis and abscess in 0.5%, Basal exudates in 4.5%, Vasculitic infarcts in1.0%, Encephalopathy in 0.5%, Miliary in 1.5%. MRI findings in spinal cord tuberculosis Meningitis in 0.5%, Tuberculomas in

1.0%.MRI findings in Pott's spine were Vertebral body destruction -4.5%, Discitis/disc destruction-5.9%, Subligamentous spread-5.9%, Paraspinal mass/abscess-3.5%, Epidural/spinal canal extension-1.5%,Soft tissue calcifications-0.5%. MRI findings in tubercular osteomyelitis were Intraosseous involvement, 0.5%, Marrow changes-0.5%,Sequestrum-0.5%. Pericardial thickening-1.5%, Effusion -1.5%, IVC dilatation-1.0%.

CONCLUSION

This relatively safe investigations with the typical presentations very crucial in the early diagnosis of various extrapulmonary tuberculosis and subsequent management to prevent further complications of it.

REFERENCES

1. Fanning A. Tuberculosis: 6. Extrapulmonary disease. CMAJ 1999; 160: 1597-603.
2. Report from the Medical Research Council Tuberculosis and Chest Diseases Unit. National survey of tuberculosis notifications in England and Wales in 1983: characteristics of disease. Tubercle 1987; 68 : 19-32.
3. Mohan A, Sharma SK. Epidemiology. In: Sharma SK, Mohan A, editors. Tuberculosis. New Delhi: Jaypee Brothers Medical Publishers; 2001 p.14-29.
4. Raviglione MC, Narain JP, Kochi A. HIV-associated tuberculosis in developing countries: clinical features, diagnosis and treatment. Bull World Health Organ 1992; 70: 515-25.
5. Poprawski D, Pitisuttitum P, Tansuphasawadikul S. Clinical presentations and outcomes of TB among HIV-positive patients. Southeast Asian J Trop Med Public Health 2000; 31 (Suppl 1) : 140-2.
6. AIIMS-WHO Meeting on the Involvement of Medical Schools in T and STI/HIV Control. Report of an Informal Consultation on 28-30 November 2001 and Follow-up meeting on 29 April 2002. New Delhi: All India Institute of Medical Sciences - World Health Organization (SEARO); 2002.
7. Iscman MD. Tuberculosis in relation to human immunodeficiency virus and acquired immunodeficiency syndrome. In: Iseman MD, editor. A clinician's guide to tuberculosis. Philadelphia: Lippincott Williams and Wilkins; 2000 p. 199-252.
8. Raviglione MC, Narain JP, Kochi A. HIV-associated tuberculosis in developing countries: clinical features, diagnosis and treatment. Bull World Health Organ 1992; 70: 515-25.
9. Theuer CP, Hopewell PC, Elias D, Schecter GF, Rutherford GW, Chaisson RE. Human immunodeficiency virus infection in tuberculosis patients. J Infect Dis 1990; 162: 8-12.
10. Haas DW, Des Prez RM. Tuberculosis and acquired immunodeficiency syndrome: a historical perspective on recent developments. Am J Med 1994; 96: 439-50.
11. Shafer RW, Kim DS, Weiss JP, Quale JM. Extrapulmonary tuberculosis in patients with human immunodeficiency virus infection. Medicine (Baltimore) 1991; 70 : 384-97.
12. Antonucci G, Girardi E, Armignacco O, Salmaso S, Ippolito G. Tuberculosis in HIV-infected subjects in Italy: a multicentre study. The GruppoItaliano di Studio Tubercolosi e AIDS. AIDS 1992; 6: 1007-13.
13. Jones BE, Young SMM, Antoniskis D, Davidson PT, Kramer F, Barnes PF. Relationship of the manifestations of tuberculosis to CD4 cell counts in patients with human immunodeficiency virus infection. Am Rev Respir Dis 1993; 148: 1292-7.
14. Barnes PF, Barrows SA. Tuberculosis in the 1990s. Ann Intern Med 1993; 119: 400-10.
15. Sharma SK, Mohan A, Gupta R, Kumar A, Gupta AK, Singhal VK, et al. Clinical presentation of tuberculosis in patients with AIDS: an Indian experience. Indian J Chest Dis Allied Sci 1997; 39: 213-20.
16. Kumar P, Sharma N, Sharma NC, Patnaik S. Clinical profile of tuberculosis in patients with HIV Infection/ AIDS. Indian J Chest Dis Allied Sci 2002; 44: 159-63.
17. World Health Organization (WHO). Treatment of Tuberculosis. Guidelines for National Programmes, 3rd ed. WHO/CDS/TB 2003.313. Geneva, Switzerland: WHO, 2003.
18. Central TB Division (CTD). Managing the Revised National TB Control Programme in your area. A training course. Modules 1-4. New Delhi: CTD, 1998
19. Farer LS, Lowell AM, Meador MP. Extra pulmonary tuberculosis in the United States. Am J Epidemiol 1979; 109: 205-17.

Source of Support: None Declared
Conflict of Interest: None Declared