



## ROLE OF MRI IN CHARACTERIZATION OF MEDIASTINAL LESIONS WITH ITS HISTOPATHOLOGICAL CORRELATION

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### ABSTRACT

**AIMS&OBJECTIVES:** To study the role, assess reliability and compare the findings of MRI & Histopathology in mediastinal lesions.

**METHODS:** Total 62 patients of all age group with strong clinical suspicion of mediastinal lesions were included. MRI & Histopathology was performed in all patients and findings were analyzed.

**RESULTS:** Sensitivity of MRI in detection of mediastinal lesions was 97.5%, specificity was 83.3%, with positive predictive value of 95.5% and negative predictive value was 90.9%. Posterior mediastinum (40.3%) was the most commonly involved compartment in our study. Pott's spine was the most common posterior mediastinal lesion in our study 14.5%. In anterior mediastinum, lymphoma was the most common lesion 14.5%.

**CONCLUSION:** mediastinal MRI has outstanding results in early detection and characterization of mediastinal lesions especially, the extension and invasion of lesions and provides good preoperative assessment of lesions.

**KEYWORDS :** (MRI) Magnetic Resonance Imaging, mediastinum, Lymphoma, Pott's Spine

### INTRODUCTION:

Mediastinum is the central compartment of the thoracic cavity surrounded by loose connective tissue that contains a group of vital vascular and nonvascular structures and organs viz. heart, great vessels, Oesophagus, trachea, thymus, thoracic duct, lymph nodes and nerves.<sup>1</sup>

Diseases of the mediastinum comprise a spectrum of entities ranging from tumors (benign to extremely malignant), cysts, vascular anomalies, lymph node masses and mediastinal fibrosis and also they can cause life threatening complications by involving these viscera, vessels & nerves that are located in mediastinum. Therefore, early detection of mediastinal lesions is essential for appropriate case management.

One of the earliest imaging modality to evaluate mediastinal pathologies is plain radiograph (Frontal and Lateral views) by which we can characterize, localize the lesion. CT scan is the next investigation for further characterization and defining the extent of the lesion. However it requires use of ionizing radiation and also involves the use of intravenous contrast agents which carry a risk of inducement of acute renal dysfunction and idiosyncratic contrast material reactions.

Magnetic resonance (MR) imaging is a comprehensive modality for assessing the morphology and characteristics of mediastinal lesions. It has high spatial resolution and multiplanar capability, thereby providing better appearance and additional information about the location and extent of the lesion. It uses no ionizing radiation, and can be used even in patient with deranged renal function<sup>2</sup>.

### AIMS AND OBJECTIVES:

The major aim of the present study was to study the spectrum of MRI findings in patients with mediastinal lesions and to characterize and differentiate various mediastinal lesions on MRI with histopathological correlation.

### MATERIALS & METHODS:

62 Patients with strong clinical suspicion of mediastinal lesions were evaluated prospectively in the Department Of Radiodiagnosis in MGM medical college & M.Y. hospital, Indore from April 2018 to August 2019 after ethical & scientific committee clearance. MRI evaluation of mediastinum using 3Tesla MRI scanner was performed after obtaining informed and written consent. T1, T2, DWI, Fat Sat and contrast images were studied to describe the morphology of lesions. The findings of MRI and histopathology were compared. Data was depicted in the form of tables and charts.

### RESULTS & DISCUSSION:

In our study 33.9% of the patients in our study belonged to age group of 45 to 60 years with the mean age was 52.3 years. Out of 62 patients, 41(66.1%) patients were males and 21(33.9%) were females with male to female ratio of 1.9:1. Our study is in concordance with the study of Riti Aggarwal *et al*<sup>3</sup> in 2016. In their study they reported male to female ratio of mediastinal lesions was 1.7:1.

Majority of patients were symptomatic at presentation which is in comparison to Singh *et al*<sup>4</sup> in 2013 and Dubashi *et al*<sup>5</sup> in 2009 and the most common presenting complaint was cough seen in 72.6% followed by breathlessness 51.6%, fever and chest pain were less common complaints. Similar findings were seen in study of Tingting Liu *et al* in 2017<sup>6</sup>.

In our study, most commonly involved compartment was posterior mediastinum 25(40.3%) followed by multi-compartmental lesions 16 (25.8%), anterior mediastinum 12(19.4%), middle mediastinum 5(8.1%) and superior mediastinum 4(6.5%)[Table 1]. Posterior mediastinum was more common due to involvement of inflammatory lesions in our study. However if we do not consider multi-compartmental lesions separately than the most commonly involved compartment was anterior mediastinum 27(43.5%) followed by posterior mediastinum 25(40.3%), middle mediastinum 17(27.4%) and superior mediastinum 11(17.7%). Results are comparable with other studies as well Adegboye *et al* in

2003<sup>7</sup> and Riti Aggarwal *et al* in 2016.

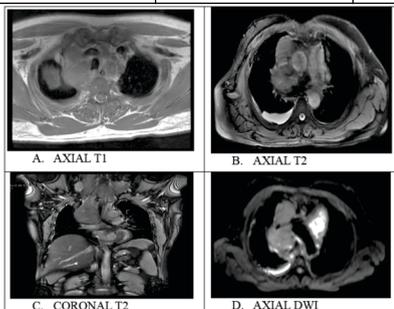
In the anterior mediastinum, most common lesions was lymphoma 4(6.5%) followed by thymoma 2(3.2%), thymic cyst 2(3.2%), thymic hyperplasia 2(3.2%), Morgagni hernia 1(1.6%) and pericardial cyst 1(1.6%). In middle mediastinum, most common lesion was bronchogenic cyst 3(4.8%) followed by aortic aneurysm 2(3.2%). In posterior mediastinum, the most common was Pott's spine 9(14.5%) followed by neurogenic tumors 5(8.0%), spinal metastasis 2(3.2%), Ca esophagus 2(3.2%), retropharyngeal abscess 2(3.2%), GCT 1(1.6%), neurenteric cyst 1(1.6%), esophageal duplication cyst 1(1.6%) and hiatal hernia 2 (3.2%). Our study is in concordance to study by Tingting Liu *et al* in 2017.

Out of 16(25.8%) multi-compartmental lesions in our study, the most common was lymphoma 5(8.1%) followed by Ca lung MLN 4(6.5%), neuroblastoma 1(1.6%), invasive thymoma 2(3.2%), teratoma 3(4.8%), and thymic carcinoma 1(1.6%).

In our study, neoplastic lesions were most common 58.1% (36) mediastinal lesions followed by inflammatory lesions 17.7% (11), cystic lesions 12.9% (8) and others 11.3% (7). Lymphoma was the most common neoplastic lesion seen in 14.5% cases which in comparison to studies done by Adegboye *et al* in 2003 and Vaziriet *al*<sup>8</sup> in 2009. Bronchogenic cyst was the most common cystic lesion of mediastinum (3/8). Pott's spine was the most common inflammatory lesion seen in 14.5% cases. Similar findings were seen a study by Riti Aggarwal *et al* in 2016.

**TABLE 1: DISTRIBUTION OF MEDIASTINAL LESIONS**

LESIONS	Superior mediastinum	Anterior mediastinum	Middle mediastinum	Posterior mediastinum	Multi-compartmental	TOTAL
Ca thyroid	2	0	0	0	0	2
Thymic carcinoma	1	0	0	0	1	2
Thymic cyst	0	2	0	0	0	2
Thymoma	0	2	0	0	0	2
Invasive thymoma	0	0	0	0	2	2
Thymic hyperplasia	0	2	0	0	0	2
Pericardial cyst	0	1	0	0	0	1
Morgagni hernia	0	1	0	0	0	1
Lymphoma	0	4	0	0	5	9
Teratoma	1	0	0	0	3	4
Bronchogenic cyst	0	0	3	0	0	3
Aortic aneurysm	0	0	2	0	0	2
Ca lung MLN	0	0	0	0	4	4
Neurogenic tumors	0	0	0	5	1	6
Pott's spine	0	0	0	9	0	9
Retropharyngeal abscess	0	0	0	2	0	2
Eso duplication cyst	0	0	0	1	0	1
Ca esophagus	0	0	0	2	0	2
GCT	0	0	0	1	0	1
Hiatal hernia	0	0	0	2	0	2
Neurenteric cyst	0	0	0	1	0	1
Spinal metastasis	0	0	0	2	0	2
<b>TOTAL</b>	<b>4</b>	<b>12</b>	<b>5</b>	<b>25</b>	<b>16</b>	<b>62</b>



**FIGURE 1: LYMPHOMA Axial T1WI (A) T2WI (B) and coronal T2WI (C) shows heterogeneous hypointense mass on T1 and hyperintense on T2 encasing the mediastinal great vessels extending in anterior and middle mediastinum and DWI (D) demonstrates restriction of diffusion.**

Histopathology of 6 cases was not done which include 2 cases of aortic aneurysm, 2 cases of hiatal hernia and 2 cases of cystic lesions of mediastinum. On histopathology neoplastic lesions were 38 (61.2%), inflammatory lesions were 9 (14.5%), cystic lesions were 6 (9.6%) and other lesions were 3 (4.8%). The sensitivity, specificity, PPV and NPV of MRI along with DWI and contrast in predicting mediastinal lesions was 97.2%, 93.3%, 95.5%, and 90.9% respectively. Studies by Razek AA *et al*<sup>9</sup> in 2009, Youssriah Yahia Sabri *et al*<sup>10</sup> in 2017 also

found similar results.

**TABLE 2 STATISTICAL ANALYSIS OF MRI IN MEDIASTINAL LESIONS**

Sensitivity	97.2%
Specificity	83.3%
Positive predictive value	95.5%
Negative predictive value	90.9%

**CONCLUSION:**

Mediastinal MRI has outstanding results in early detection and characterization of mediastinal lesions especially, the extension and invasion of lesions and provides good preoperative assessment of lesions for better surgical planning and management.

MRI is also a good modality for lymphoma patients also because, it can evaluate minimal invasion to adjacent structures and mediastinal vessels and can detect the metastatic lymph nodes in these patients. Thus it provides the preoperative staging and MRI is also helpful in providing post-operative follow up of these patients for monitoring the treatment response. In our study, the diagnostic value of MRI turned out to be excellent for almost all mediastinal lesions, especially it was very useful in neurogenic tumors of posterior mediastinum to see the intraspinal extension.

Hence, MRI is a very valuable non-invasive tool for the

identification, characterization and differentiation of mediastinal lesions.

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