



RADIOLOGICAL SPECTRUM OF LYMPHOMA EVALUATION BY CT SCAN

Radiodiagnosis

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ABSTRACT

Objectives:- The objective of this study was to evaluate the role of CT scan in evaluation of lymphoma with emphasis on localization, diagnosis and characterization of lymphoma, to study common and uncommon appearances of lymphoma.

Materials and methods:- The present prospective study is carried out at department of radiology, Guru Gobind Singh Hospital and M P Shah Medical College, Jamnagar. Total 100 patients including with suspicious and clinically diagnosed case of lymphoma examined with plain scanning or contrast CT as per requirement.

Results:- Lymphadenopathy was the commonest presentation in both the types of lymphomas. In thoracic lymphoma, mediastinal lymphnodes involvement is more common than parenchymal involvement. Gastrointestinal tract (GIT) is the most common extranodal site for non-Hodgkin's lymphoma (NHL). Most common part of involved was Stomach. Among solid organ involvement, spleen was most commonly involved extranodal solid organ in lymphoma.

Conclusions:- CT is able to detect findings like lymphadenopathy, solid organ involvement like liver, spleen, kidney, testes; GIT, lung parenchymal and CNS involvement etc. Computed tomography (CT) allows detailed evaluation of the mediastinum, chest wall, pulmonary parenchyma, and pleura or pericardium.

KEYWORDS

Lymphoma, Hodgkin's, Non hodgkin's, Nodal, CT

Introduction

Lymphoma is group of blood cell tumours that develop from lymphatic cells. lymphoma can be restricted to the lymphatic system or can arise as extranodal disease. The two main categories of -lymphomas are: Hodgkin lymphomas (HL), Non-Hodgkin lymphomas (NHL).^{1,2} About 90% of lymphomas are non-Hodgkin lymphomas. These diseases vary widely in their etiology, clinical and radiologic presentation, histopathological features and clinical course.³ The imaging modalities used for evaluation of lymphoma includes conventional radiography, USG, CT, MR, functional imaging, PET CT and radionuclide scanning. Out of these CT enables accurate measurement of both tumour extent and volume. It is used to define the full extent of disease. CT of the abdomen and pelvis has also been shown to be of great value in the staging and follow-up of lymphoma.^{4,5}

Materials and Methods

The present study of 100 patients between time period of august 2018 to august 2020 is carried out at department of radiology, Guru Gobind Singh Hospital and M P Shah Medical College, Jamnagar.

INCLUSION CRITERIA:

1. Patients consenting for the Study.
2. All suspicious case of lymphoma undergoing CT Scan as a pre-treatment workup.
3. Already diagnosed cases of lymphoma which need further radiological investigation for better tissue characterization and extension

EXCLUSION CRITERIA:

1. Patient not willing to provide oral/written consent
2. Patients presenting to radiology department having pathology other than lymphoma.
3. Patients having contra-indication for CT Scan examination.

- history of allergic reaction to contrast media/ claustrophobia.

Imaging technique:

Description of tool: 16 Slice Computed Tomography (CT) machine GE Health

All patients were in routine fasting states and were examined with plain scanning at first and then contrast CT as per requirement. For contrast patients were given 1000-1500 mL of diluted iodinated contrast medium (10 g/L meglumine diatrizoate)

IMAGING IN LYMPHOMA

Nodal disease: Nodal disease can be solitary or more commonly multiple. Solitary mass type of nodal lymphoma includes singular enlarged LN and fusion of multiple enlarged LN. Multiple-nodular type of lymphoma, the most frequently seen, can be characterized by enlarged LN with regional distribution. Enlarged LN can be fused together and form a huge mass and can be seen on CT as uniform density lesions with mild homogenous enhancement.^{6,7}

Extranodal involvement: The imaging characteristics of extranodal lymphomatous involvement are classified here according to the site of involvement in(a) The solid abdominal organs or (b) The hollow organs of the gastrointestinal tract.

Solid organ involvement: In general lymphomatous involvement of the solid organs may occur as a focal, multifocal or diffuse disease process. In focal and multifocal disease, discrete solid nodules are present; in diffuse disease, there is uniform infiltration of the involved site.

- **Unifocal (solitary) or multifocal (multiple) nodules** are round, well defined and homogeneous. Enhancement after the administration of intravenous contrast material tends to be mild and uniform.
- **In diffuse form,** The most common finding is organomegaly. Organ contour usually is normal or only minimally abnormal.

Observations and Results

Table 1: Site Of Lymph Node Involvement In Lymphoma

Location	Non-Hodgkin's lymphoma N=83	Hodgkin's lymphoma N=17
Cervical	40	15
Supraclavicular	10	10
Mediastinal	25	10
Axillary	16	3
Intra-abdominal / Mesenteric	8	2
Retroperitoneal	14	-
Inguinal	26	2
Pelvic and	1	-
Multiple sites	8	4

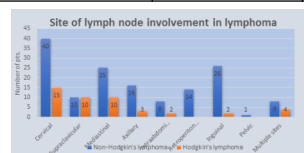
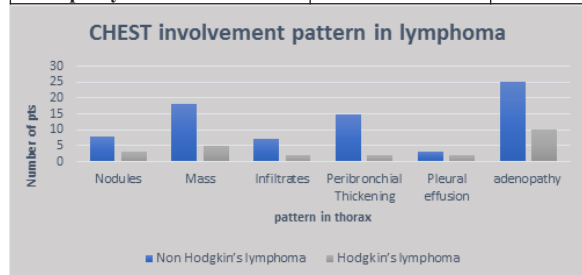
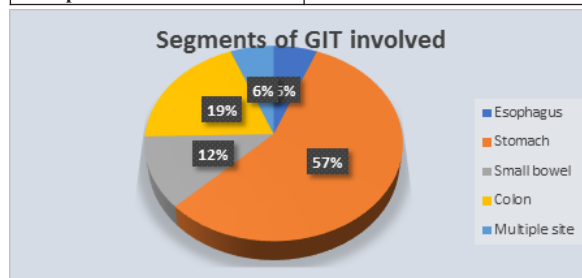


Table 2: Chest Involvement Pattern In Lymphoma

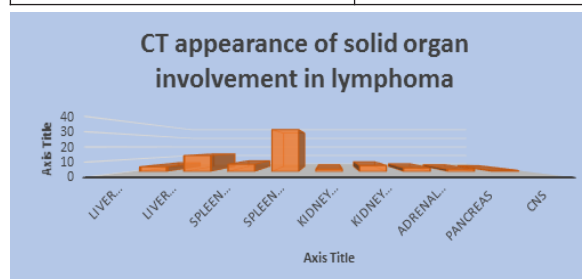
Pattern of findings:	Non-Hodgkin's lymphoma	Hodgkin's lymphoma
Nodules	8	3
Mass	18	5
Infiltrates	7	2
Peri bronchial Thickening	15	2
Pleural effusion	3	2
adenopathy	25	10

**Table 3: Segment Of Git Involved In Lymphoma**

Segment of GIT	Number of cases
Esophagus	4
Stomach	38
Small bowel	8
Colon	13
Multiple site	4

**Table 4: Ct Appearance Of Solid Organ Involvement In Lymphoma**

	Pattern of involvement	No of patients involved
Liver	Diffuse	4
	Nodular	13
Spleen	Diffuse	6
	Nodular	34
Kidney	Diffuse	2
	Nodular	5
Adrenal glands		3
Pancreas		2
CNS		1



Results and Discussion

- In our study, non-Hodgkin lymphoma (83%) is more common than Hodgkin lymphoma (13%). These figures are more or less similar to study done by a Smith et al.⁸
- In our study, Solitary mass type involvements of lymph nodes were most common in Hodgkin lymphoma (in 10 out of 17 patients) while multiple-nodular type was most common in non-Hodgkin lymphoma (in 61 out of 83 patients). Findings of our study correlates well with Yu RS et al.⁷ who retrospectively analysed CT findings in 52 cases of lymphoma.
- Hodgkin lymphoma has relatively more mediastinal lymph node

involvement than Non-Hodgkin lymphoma. Among Abdominal lymph node involvement, Hodgkin has more propensity towards Retro peritoneum nodes. Whereas, non-Hodgkin has more propensity for Mesenteric node involvement. In our study, the most frequent sites involved were cervical lymph nodes, mediastinal lymph nodes, inguinal lymph nodes, supraclavicular and axillary lymph nodes. Out of these involvement of cervical lymph nodes, mediastinal lymph nodes, inguinal lymph nodes were more common than others. Findings of our study correlated well with study done by Laurent, Camille et al.⁹

- In thoracic lymphoma, mediastinal lymph nodes involvement is more common than parenchymal involvement. In Parenchymal involvement, Mass appearance was the most frequent form of involvement in both types of lymphoma. Our study correlated well with retrospective study done by Elaine R. Lewis et al.¹⁰ including 31 patients with non-Hodgkin Lymphoma (NHL) or Hodgkin Lymphoma.
- GIT abnormality was detected by CT scan in 67 patients out of 100 patients of lymphoma. Most common part involved was Stomach (56.7%) while multiple sites involvement was relatively very rare (6%) and 2nd most common part involved was colon. Findings of our study correlates well with prospective study done by BABU SURESH et al.¹¹ who evaluated that stomach was the most common site involved (52.4%) followed by the colon (23.8%).
- Most common Pattern of Intestinal wall involvement was Trans mural thickness involvement (Segmental involvement (40.6%) followed by Circumferential involvement (37.5%). Aneurysmal and bulky mass like involvement were least common. Findings of our study correlate more or less with study done by AJ Megibow et al.¹²
- Among solid organ involvement, Spleen was most commonly involved (38%) extra nodal solid organ in lymphoma. 17 % patients had liver and 7 % patients had renal involvement. Nodular involvement is most common finding in above mentioned solid organ involvement followed by diffuse involvement. Involvement of adrenal gland, pancreas and CNS were 3%, 2% and 1% respectively. Findings of our study correlates well with study done by Adonis manzella.⁶

Conclusions

The extent of lymphadenopathy was also much better appreciated on CT. There are various patterns of involvement of solid organs like liver, kidney and spleen in which cases CT allows better and accurate detection of it. CT is able to detect GIT involvement with illustration of various patterns of bowel involvement. CT continues to remain the imaging study of choice for the staging and follow-up of cases of lymphoma. Since every organ system can be involved by this disease process and with a variety of appearances, with help of CT, we can do systematic analysis to determine the true extent of disease.

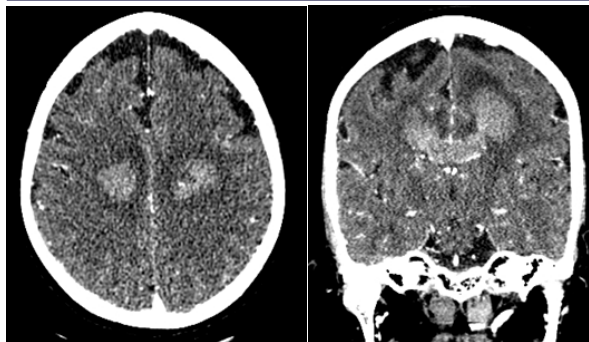
Figures

(Case no. 1)



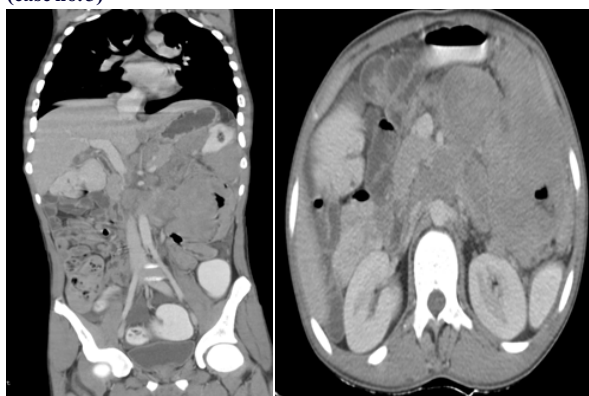
- Multiple Intra-abdominal enlarged homogeneously enhancing lymph nodes are noted – p/o Intra-abdominal Lymphoma. (case no. 2)**

REGION	LEVELS
Intra-abdominal	Peripancreatic, periportal, splenic hilar, aorto caval level, para caval, pre caval, bilateral para-aortic, mesentery, sub-diaphragmatic regions



- CECT brain shows ill-defined homogeneously enhancing lesions involving body of corpus callosum and extending into periventricular and subcortical white matter of bilateral parietal lobes with significant surrounding edema and similar characteristic lesion involving subcortical white matter of right frontal lobe - CNS lymphoma.

(case no. 3)



- CECT abdomen shows homogeneously enhancing soft tissue density lesion involving proximal jejunal bowel loops with marked asymmetrical wall thickening and loss of mural stratification (aneurysmal dilation) with enhancing lymph node in left hypochondrium and multiple enlarged homogeneously enhancing conglomerated lymph nodes in abdomen - Non Hodgkin's lymphoma.

(case no. 4)



- Large heterogeneously enhancing mass lesion with internal non-enhancing necrotic areas involving superior and anterior mediastinum complete encasement of major branches of arch of aorta, bilateral brachiocephalic vein and superior vena cava, partial encasement of arch of aorta and left pulmonary artery - Non Hodgkin's lymphoma.

Source of Support
None

Conflict of Interest
None

REFERENCE

1. Swerdlow SH, et al. WHO classification of tumors of hematopoietic and lymphoid tissues. In: World Health Organization Classification of Tumors. Lyon, France: IARC. In press.
2. Olweny CL. Cotswold's modification of the Ann Arbor staging system for Hodgkin's disease. *Journal of clinical oncology: official journal of the American Society of Clinical Oncology*. 1990 Sep; 8(9):1598.
3. A. Younes (ed.), Handbook of Lymphoma I, DOI 10.1007/978-3-319-08467-1_2
4. Rostock RA, Siegelman SS, Lenhard RE, Wharam MD, Order SE. Thoracic CT scanning for mediastinal Hodgkin's disease: results and therapeutic implications. *Int J Radiat Oncol Biol Phys* 1983;9: 1451-1456.
5. Weber AL, Rahemtullah A, Ferry JA. Hodgkin and non-Hodgkin lymphoma of the head and neck: clinical, pathologic and imaging evaluation. *Neuroimaging Clin N Am* 2003; 13:371-392.
6. Adonis Manzella, Paulo Borba-Filho, Giuseppe D'Ippolito, and Marcella Farias Abdominal Manifestations of Lymphoma: Spectrum of Imaging Features, 2013.
7. Yu RS, Zhang WM, Liu YQ. CT diagnosis of 52 patients with lymphoma in abdominal lymph nodes. *World Journal of Gastroenterology*, 01 Dec 2006, 12(48):7869-7873.
8. A Smith, S Crouch, S Lax, J Li, D Painter, D Howell, R Patmore, A Jack and E Roman. Lymphoma incidence, survival and prevalence 2004-2014: sub-type analyses from the UK's Hematological Malignancy Research Network.
9. Laurent, Camille et al. "Prevalence of Common Non-Hodgkin Lymphomas and Subtypes of Hodgkin Lymphoma by Nodal Site of Involvement: A Systematic Retrospective Review of 938 Cases." *Medicine* vol. 94,25 (2015): e987
10. Elaine A. Lewis I Cynthia I. Caskey 1/2 Elliot K. Fishman 1: Lymphoma of the Lung: CT Findings in 31 patients. *AJR* 156:711-714, April 1991.
11. Suresh B, Asati V, Lakshmaiah KC, Babu G, Lokanatha D, Jacob LA, Lokesh KN, Rudresh AH, Rajeev LK, Smitha S, Anand A, Patidar R, Premalata CS. Primary gastrointestinal diffuse large B-cell lymphoma: A prospective study from South India. *South Asian J Cancer*. 2019 Jan-Mar;8(1):57-59.
12. AJ Megibow, EJ Balthazar, DP Naidich, and MA Bosniak, Computed tomography of gastrointestinal lymphoma, *American Journal of Roentgenology* 1983 141:3, 541-547.