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ORIGINAL RESEARCH

Multidetector Computed Tomography Evaluation of Lymphoma in Patients Attending Tertiary Care Centre

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ABSTRACT

Background: Lymphomas, originating from lymphoreticular tissues, are heterogeneous malignancies categorized into Hodgkin's disease (HD) and Non-Hodgkin's lymphoma (NHL). Multidetector Computed Tomography (MDCT) is crucial for assessing lymphadenopathy and detecting lymphomatous involvement in abdominal organs. MDCT provides comprehensive cross-sectional imaging, essential for disease staging, radiation therapy planning, and monitoring therapeutic response. **Methodology:** A cross-sectional study was conducted over two years (October 2018 - October 2020) at Osmania Medical College and MEHDI NAWAZ JUNG Cancer Hospital. The study included 60 patients suspected of having lymphoma, with exclusion criteria including contrast allergy and pregnancy. Patients underwent MDCT scanning using both 64-slice and 128-slice CT scanners. Parameters included oral and intravenous contrast administration to enhance imaging clarity. **Results:** Of the 60 patients, 25% had Hodgkin's lymphoma and 75% had Non-Hodgkin's lymphoma. The majority of NHL cases were in the 40-60 year age group, whereas Hodgkin's lymphoma was more prevalent in younger individuals (0-10 years). Males were more frequently affected (72%) compared to females (28%). A significant proportion (70%) of cases were immune-suppressed. Hodgkin's lymphoma predominantly involved cervical, axillary, and mediastinal lymph nodes, while Non-Hodgkin's lymphoma was more likely to involve the liver and spleen. **Discussion:** MDCT proved effective in detecting and staging lymphoma, differentiating between Hodgkin's and Non-Hodgkin's types based on lymph node involvement and extranodal spread. It is a vital tool for planning treatment and monitoring disease progression, with the ability to detect synchronous malignancies. MDCT also aids in distinguishing lymphoma from other malignancies, like gastric carcinoma, by providing detailed imaging and 3D reconstructions. **Conclusion:** MDCT is a preferred modality for the comprehensive assessment of lymphoma, aiding in accurate staging, treatment planning, and follow-up. Its ability to visualize the extent and characteristics of lymphoma lesions contributes to effective management and prognosis evaluation

Keywords: Communicable Diseases, Family Adoption Programme, Rural Population

INTRODUCTION

Lymphomas are malignant tumors of lymphoreticular origin Clinically and pathologically, lymphomas are quite heterogenous. However, two distinct clinic pathologic groups are routinely distinguished; Hodgkin's disease (HD)and Non-Hodgkin's lymphoma (NHL). Multidetector Computed tomography is a more accurate method to assess lymphadenopathy in addition lymphomatous involvement of other abdominal viscera including liver, spleen, gastrointestinal tract, genitourinary system can be detected earlier. It presents a cross-sectional picture of the abdomen which can be used in planning of radiation therapy ports, nodal biopsy. So MDCT define the full extent of disease, forms an essential component of staging procedure. Administration of oral contrast prior to MDCT scan allows good visualization of the bowel loops and separates them from retroperitoneal and mesenteric nodes as well as vessels. Intravenous administration of water soluble non-ionic contrast permits visualization of vascular structures which is essential

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to separate vessels from lymph nodes. Different patterns of enhancement helps in detection of lymphomatous deposits in the various abdominal organs. MDCT is also the most acceptable and used modality for follow-up of patients with Lymphoma. It helps in monitoring patients response to therapy, progress & relapse. MDCT scanning is promising technique in the evaluation of synchronous double malignancies.

METHODOLOGY

A cross sectional study was conducted over a two-year period using cases referred to Department of radiodiagnosis, Osmania medical College/hospital & MEHDI NAWAZ JUNG, CANCER hospital for CT scan for suspected cases of lymphoma. During the period of oct 2018-2020

Inclusion criteria: Both sexes of all ages
Patients with clinically suspected lymphoma

Exclusion criteria: Patients with contrast allergy and pregnancy
Complete history was taken. Other laboratory and haematological tests were observed. All patients were evaluated with Multidetector Computed Tomography 64 SLICE [SIEMENS] @ MNJ hospital& 128 SLICE [HITACHI] MODEL-SCENARIA] in osmania general hospital.
Technical parameters are as follows
Field of view - 500 mm,
Length-1500 mm.
Detector configuration (in mm) – 16 x 1.5 mm
Pitch factor - 0.5-1.4
Gantry rotation time – 0.3-1.0sec
Reconstructed slice thickness – 5.0 mm
Increment- 5.0 mm
Tube current (in eff. mAs) –120mAs (80-140), kV-120
Contrast material: nonionic ,omnipaque,
Volume – 2 ml/kg
Abd,chest -80ml
Neck, brain-50ml
Concentration– 350 mg /ml
Injection rate – 4.5 ml/s

Technique

Prior to the procedure, all patients are instructed to be fasting for 4 hrs. 800 ml of oral contrast is given to the patient over 45 minutes before the scan, with another 200 ml just before taking the patient on for scanning. Contiguous 1 mm thick plain scans with an interval of 1 mm are performed for the liver, followed by post contrast scan of 1mm thickness at an interval of 1 mm,

RESULTS

Out of 60 cases under study,

Table 1: based on type of lymphoma

	No of cases	Percentage
Hodgkins lymphoma	15	25%
Non hodgkins lymphoma	45	75%

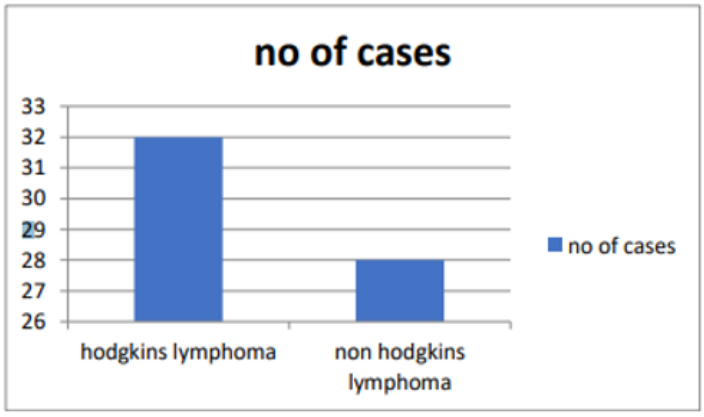

Figure 1

25% were of hodgkin's lymphoma & 45% cases of non hodgkins

Table 2: AGE DISTRIBUTION

Age in yrs	Hodgkins lymphoma	Non hodgkins lymphoma	Total
0-10	7	5	12
11-20	2	2	4
21-30	1	5	6
31-40	1	5	6
41-50	0	10	10
51-60	1	9	10

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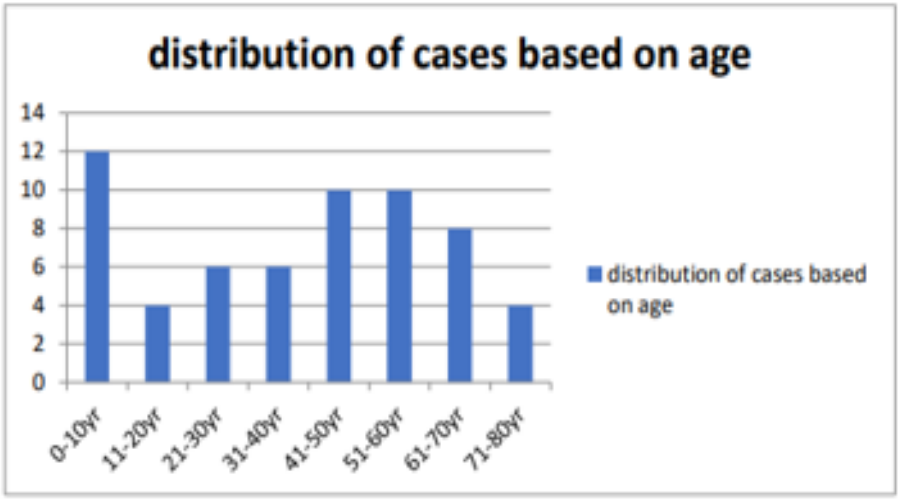
61-70	2	6	8
71-80	1	3	4

Majority of cases of non hodgkin'slymphoma,were belonging to the age group of 40-60yrs and hodgkins lymphoma was predominantly seen in the younger age group.



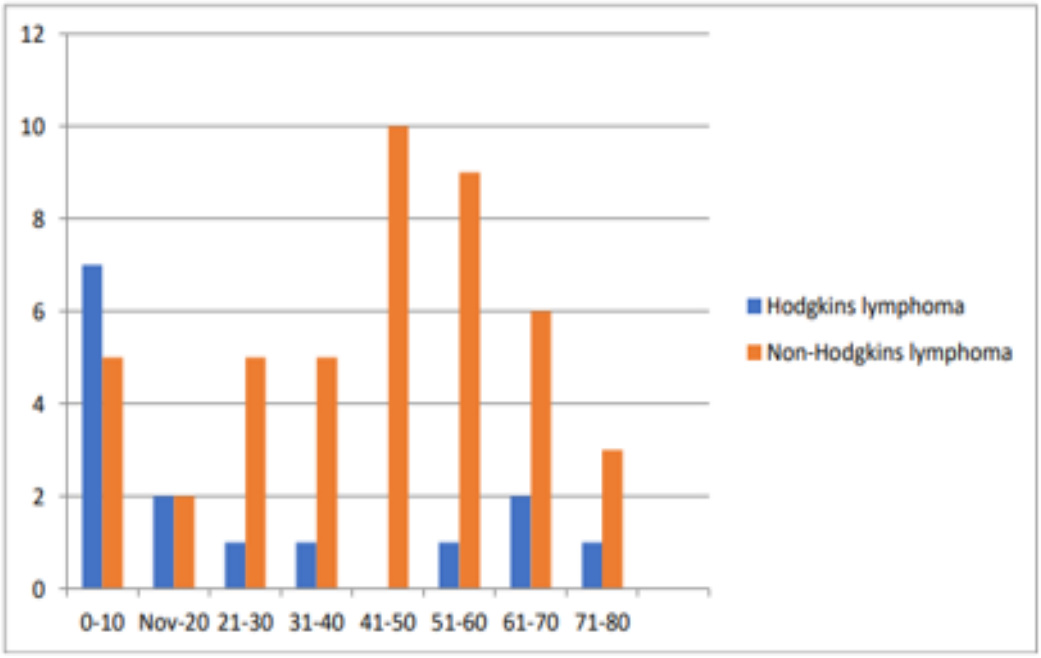


Figure 2

Table 3: GENDER DISTRIBUTION

Gender	Total no of Patients	Hodgkins lymphoma	Non hodgkins lymphoma
MALE	43	10	33
FEMALE	17	5	12

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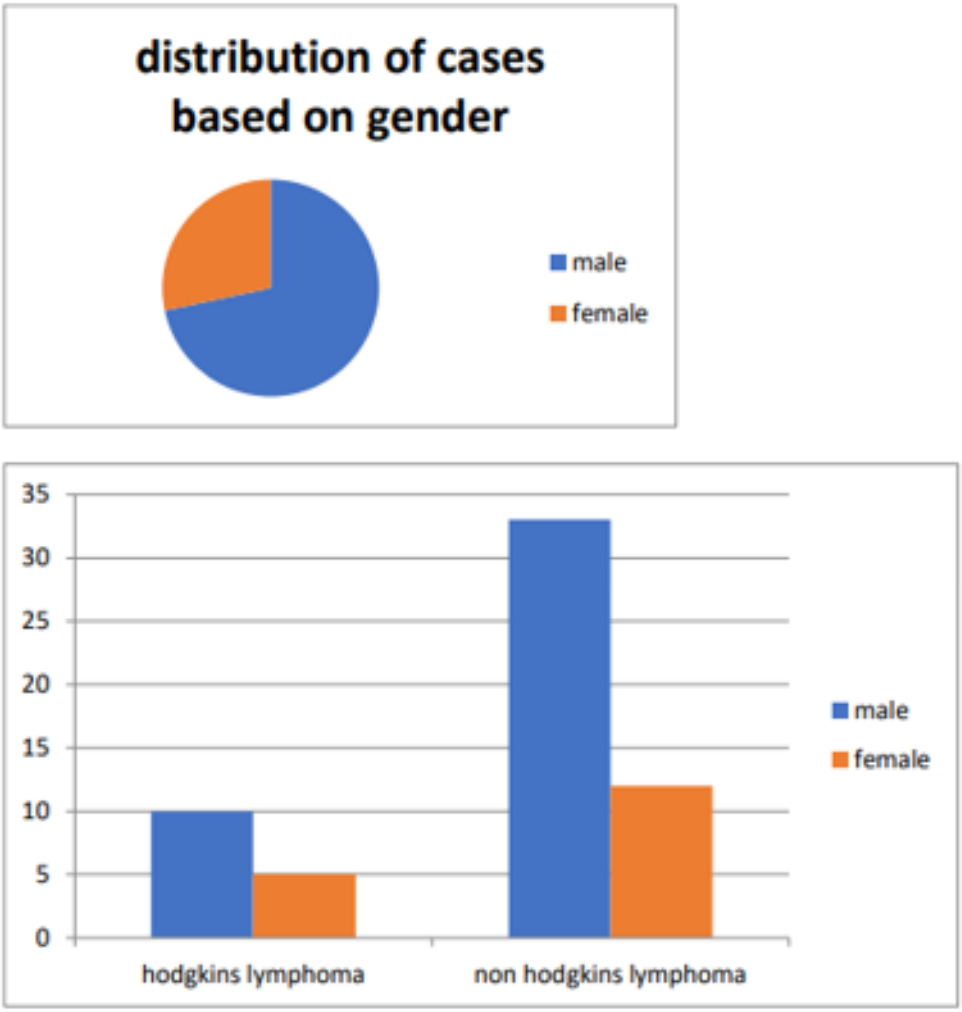

Figure 3

In our study, LYMPHOMA was more common among males, constituting out of 60 patients males (72%), followed by females constituting (28%).

Table 4: BASED ON HIV/HbSAg status

	No.of cases	%
IMMUNE	42	70%
HIV/HbSAg+	18	30%

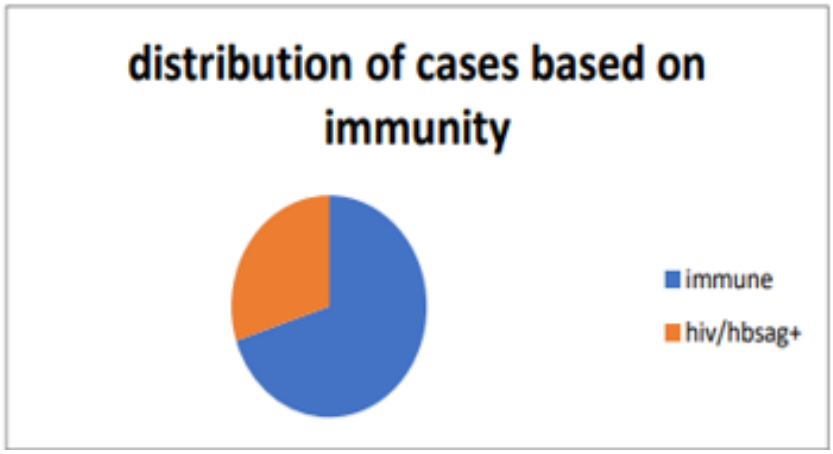

Figure 4

Lymphoma is common in immunosuppressed individuals in comparison with normal individuals

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Table 5: Based on group of lymph nodes involved

Group of lymph nodes	Hodgkins lymphoma	%
Cervical	12	80
Axillary	6	40
Mediastinal	5	33
Intraperitoneal	6	40
Retroperitoneal	7	46
Iliac	4	26
Inguinal	9	60

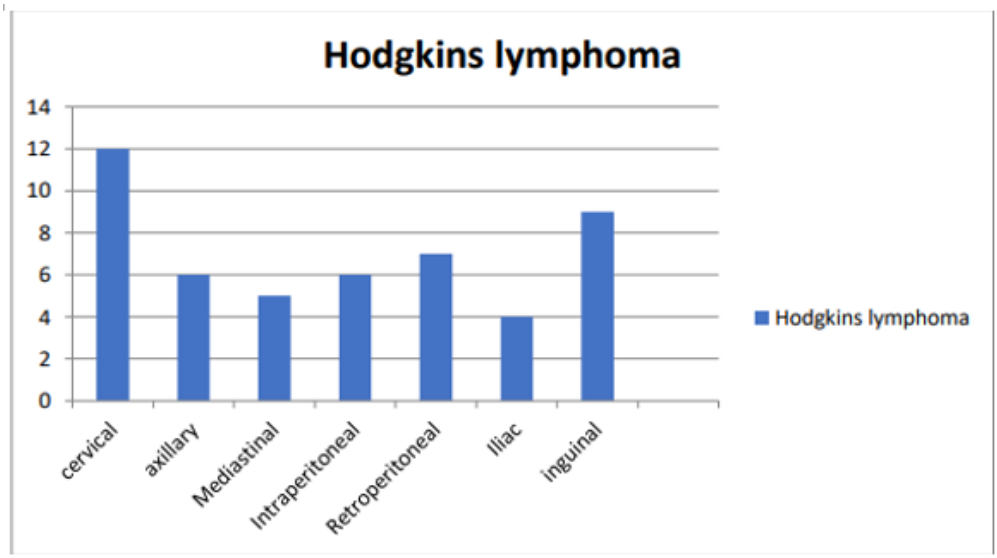

Figure 5

Hodgkin's lymphoma involved more commonly lymph nodes in neck ,axillary& mediastinal region

Table 6: Group of Lymphnodes

Group of Lymphnodes	Non hodgkins lymphoma	%
Cervical	26	
Axillary	17	
Mediastinal	10	
Intraoeritoneal	17	
Retroperitoneal	21	
Lilac	11	
inguinal	13	

Hepato-splenic involvement in lymphoma

	HD	NHL
Hepatomegaly	4	10
Spelenomegaly	3	7

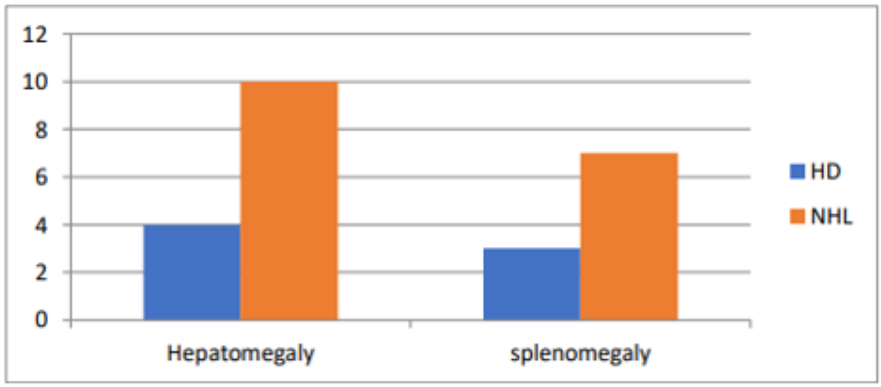

Figure 6

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DISCUSSION

Out of 60 cases under study, 25% were of hodgins lymphoma & 45% cases of non hodgkins Lymphoma,
Non-Hodgkin lymphomas (NHLs) account for 90% of all lymphomas [2], while Hodgkin disease comprises the remaining 10%.[1]
Almost all primary extranodal lymphomas are NHL & 25%–40% of all NHLs are primarily extranodal[2] Diffuse large B-cell lymphoma (DLBCL) is the most common NHL subtype,[2] NHL represents approximately 85% of all lymphomas, LYMPHOMA was more common among males, constituting out of 60 patients males (72%) , followed by females constituting (28%). According to study done by {Adel El-Badraeyapril 2017} , 44% were women & 55% men , and study by naghamnabilomar 2016, 54% male ,46% females The incidence of lymphoma is 1.5 times higher in men according to study by Yawei ZHANG
Our study population ranged from 4yr-78yrs, with mean age -41 yrs majority of cases of non hodgkinslymphoma,were belonging to the age group of 40-60yrs , and hodgkins lymphoma was predominantly in the younger age group 0-10yrs,[1,2]
Usuallyhodgkins lymphoma has bimodal age distribution predominantly affects 15-34 yrs and second peak >55yrs
And non hodgkins lymphoma more common with increased age around 60yrs [1,2]70% of cases included in our study were immune suppressed & according to study done by {KL GROGG ,RF MILLER }incidence of lymphoma in hiv infected patients greatly exceeds that of general population Hodgkins lymphoma involved more commonly lymphnodes in neck ,axillary & mediastinal region[1]HEPATOSPLENIC involvement was seen in the form of hepatomegaly and splenomegaly, Hepatomegaly was seen in 26% of hodgkins& 23% of non hodgkins lymphoma Splenomegaly was seen in 20% of hodgkins and 134% on non hodgkins Hepatomegaly was more common in nonhodgkins lymphoma ,Study by {JJ BIEMER 1984 } found liver involvement more common in non hodgkins lymphoma & if present it represented a non specific reactive phenomenon A study by {ARIC C.HALL 2015} states spleen as most common site of lymphoma dissemination, & several lymphoma subtypes may present with isolated splenomegalyExtranodal involvement [sites other than lymph nodes, spleen,thymus,pharyngeal lymphatic ring] is less common in hodgkins lymphoma The spleen is considered lymphatic extension of disease & is involved in nearly 10-40% of cases in the form of splenomegaly. A CT scan is effective for detecting splenic involvement, with values close to 90%, Liver-secondary involvement can occur nearly 50% in NHL & 20% in HD .. In our study also hepatomegaly was common in non hodgkins lymphoma primary lymphomas of the liver are rare (< 1% of extranodal lymphomas). They are mainly large B-cell NHLs. The other types described (immunoblastic, lymphoblastic, Burkitt's, MALT lymphomas) Extranodal lymphomas, particularly in cases of NHL, can involve any organ. While secondary extension from disseminated form is the most frequent, isolated primary lesions, although rare, are possible.
Other organs involved ileum,stomach[25,27,30],sigmoid colon,rectum ,mesorectum involvement was seen in one case[25,27]Kidney& urinary bladder involvement in the form of deposit was seen in 2 cases , Pulmonary involvement in the form of pleural effusion /consolidation were seen in few cases[10]Ovary involvement was seen in one case[14,16]
Ascites, was found in 5 cases.
all these extra nodal involvement were non hodgkinslymphoma[6] 2 cases had nasopharyngeal involvement [7]
Vertebral body deposits noted in 1 case

ILLUSTRATIONS

Case 1

60 yr old male c/o abdominal distension since 1 yr,constipation& pain abdomen since 2months

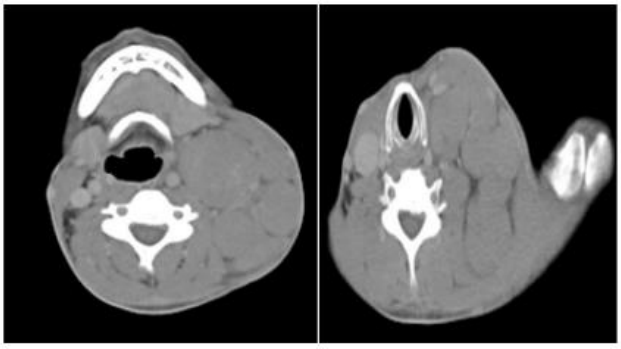

Figure 7

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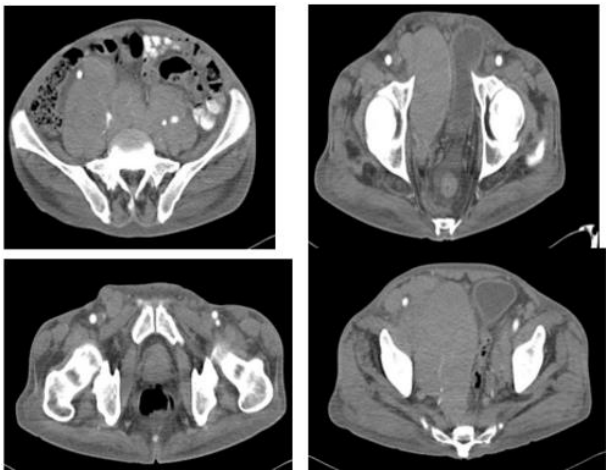

Figure 8

Large mild heterogenously enhancing confluent nodes with few areas of necrosis in paraaortic ,aortocaval b/l external & internal iliac region causes encasement of aorta,SMA,renalvessels,iliac vessels largest m/s 12.4*9.5cm in left paraaortic region S/o lymph nodal mass causing lateral displacement of bladder & rectum towards left side of pelvis .displacing bowel loop peripherally & superiorly mild ascites Multiple enlarged mesorectal nodes & rt inguinal lymph nodes b/l hydrocele Lymphoma stage 3

Case 2

A 26 yr old male with c/o swelling in neck since 2 months Pain abdomen since 15 days

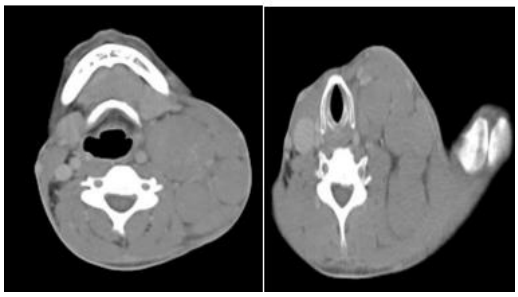

Figure 9

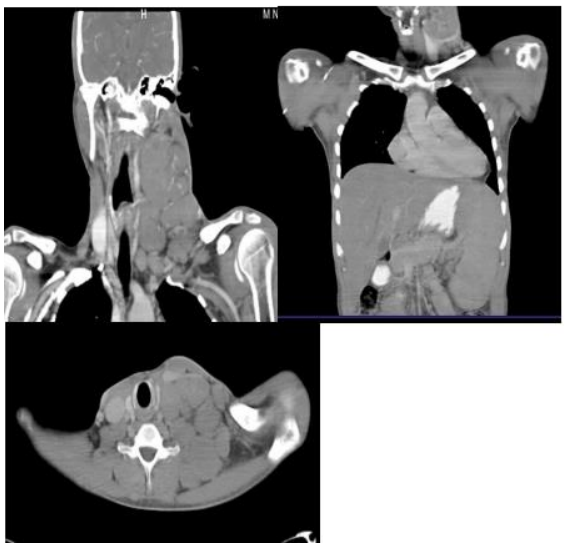

Figure 10

Multiple well defined enlarged soft tissue density nodal mass with subtle enhancement noted in left level 2,3,4 & supraclavicular Levels largest m/s 4.8*4.5cm in left level 2. Nodal mass is causing medial displacement of left carotid vessels & compression of left internal jugular vein with few subcentimetric cervical lymph nodes on rt side s/o lymphoma stage-1

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Case 3

A 50 yr old male c/o left flank pain since 15 days,blood in urine since15 days

Figure 11

illdefined homogenously enhancing mass lesion with retroperitoneal infiltration invading the left paravertebral gutter and the left kidney stage4 lymphoma

Case 4

A 14yr old male with c/o pain abdomen and swelling in left side of neck since 1 month

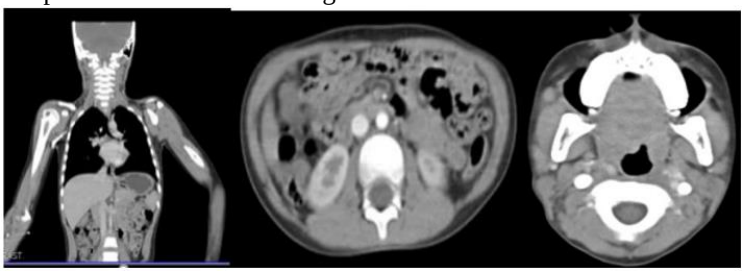

Figure 12

A 14yr old male with c/o pain abdomen and swelling in left side of neck since 1 month k/c/o Hodgkin's lymphoma Small paraaortic mesenteric &left sided cervical lymphadenopathy Stage-3

Case 5

A 45 yr old male with c/o swelling in neck since 3 months

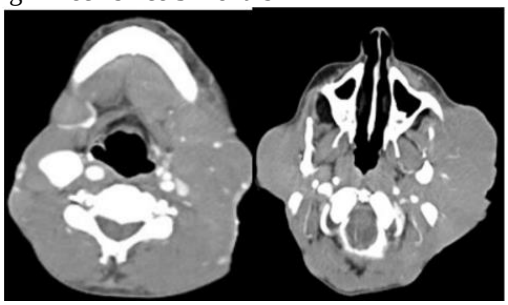

Figure 13

Figure 14

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Ill-defined heterogeneously lobulated STD lesion noted in both sides of neck ,involving parotids extending superiorly in the soft tissue of left temporal region Lymphoma-Stage-2

Case 6

55 yr old male with c/o pain abdomen since 1yr backache since 2 months

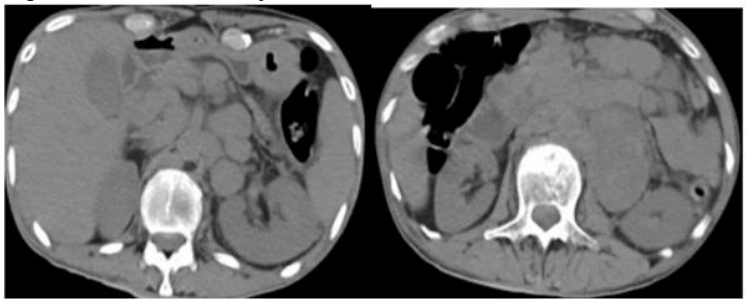

Figure 15

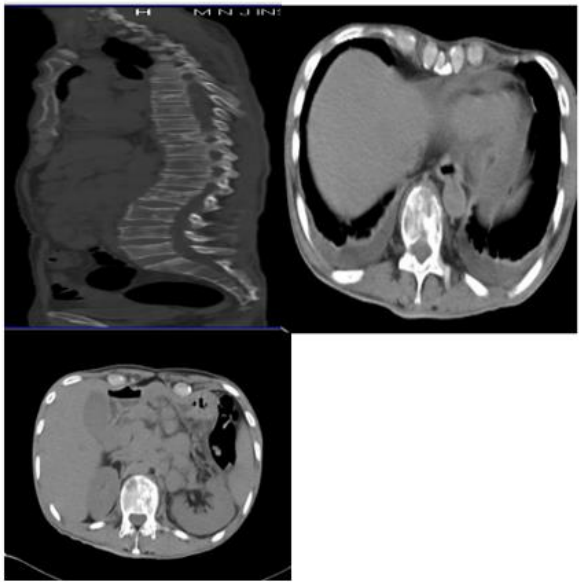

Figure 16

multiple enlarged peri gastric, Peripancreatic,peripheral, paraaortic,aortocaval,& multiple mesenteric nodes largest m/s 5.9*5.7*4.5cm in left upper paraaortic region Abutting superior pole of left kidney, Multiple lytic lesions in vertebral bodies s/o metastatis wedge compression #D7,D10,L2,L5 b/l mild pleural effusion stage 4-lymphoma

Case 7

A 24 yr immune compromised male with pain abdomen since 6months

Figure 17

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e/o enlarged b/l cervical lymph nodes & splenorenal, paraaortic & peripancreatic lymph nodes mild splenomegaly-lymphoma stage 3

CONCLUSION

From the observations from present study, it can be concluded that CT is the study of choice for detection & staging of lymphoma

CT enables accurate measurement of both tumor extent and volume and provides information that can be used to plan an appropriate therapeutic regimen as well as follow patient response to therapy.

It is used to

a) define the full extent of disease to allow accurate staging,
b) assist in treatment planning (ie, determine the site of nodal biopsy,create radiation therapy portals, and select the chemotherapy protocol),
c) evaluate the response to therapy, and
d) monitor patient progress and possible relapse
e) in the evaluation of synchronous double malignancies.

The stomach is the most frequent site of extranodal lymphomas. mainly MALT lymphomas followed by diffuse large B-cell NHL.

Ileum-B cell, jejunum-T cell, large intestine-Bcell lymphoma, MDCT helps in depicting site,size,depth of invasion even the minimal wall thickening helping in early diagnosis ,staging , progression ,follow up of gastric lymphoma, MDCT allow differentiation between low grade and high grade lymphoma which is fundamental for the correct treatment of the patients MDCT finding provides clear distinction between high-and low-grade lymphomas regarding the degree and extent of wall thickness, degree of wall enhancement, outer margin, the presence or absence of wall ulcers and associated lymph nodes enlargement. Mass formation, severe wall thickening, or deep ulcer were reliable findings of high-grade lymphoma.

MDCT helps in identifying lymphoma vs carcinoma lymphomas typically involve multiple segments of the stomach,Unlike carcinomas .Adenopathy is seen with both lymphoma and adenocarcinoma, but if it extends below the renal hila, or the lymph nodes are bulky, lymphoma is more likely

Preservation of the perigastric fat planes at MDCT is more likely to be seen in lymphoma than in adenocarcinoma, particularly in the presence of a bulky tumor

Three-dimensional (3D) reformatted images allowed quick visualization of all parts of gastrointestinal tract and encasement of related vessels. A tortuous vessel or complex mass can be visualized in its entirety with 3D imaging. The quality of virtual gastroscopy improved with use of thinner collimation. 3D images can help clinicians plan optimal treatment strategies by offering a global view of the stomach with the exact localization of the tumor and accurate tumor staging

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