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# PERITONEAL LYMPHOMATOSIS IN LYMPHOMA: MDCT FINDINGS.

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**ABSTRACT** **Background:** Peritoneal lymphomatosis is defined as the spread of lymphoma to the peritoneum, a rare occurrence, which is usually associated with high-grade lymphomas such as diffuse large B cell lymphoma. Our purpose was to examine and better define the CT imaging findings of peritoneal, omental, and mesenteric involvement in lymphoma. **Material and Methods:** A total of 13 patients diagnosed with lymphoma were studied retrospectively using MDCT abdomen and were reevaluated for the presence of peritoneal involvement, ascites, omental mass, organomegaly, retroperitoneal lymphadenopathy, bowel wall thickening and other associated findings. **Results:** There were 10 males and 3 females. Mean age was 42 years (range 15–67). Diffuse smooth peritoneal thickening with homogenous contrast enhancement observed in 11 out of 13 patients. Mesenteric involvement was found to be positive in 7 patients. Bowel wall involvement was also a common occurrence and observed in 8 patients. The presence of omental mass was also common and observed in 7 patients. Ascitis was seen in 10 patients in the form of mild (n =4), moderate (n = 4) and massive (n = 2). Retroperitoneal lymphadenopathy, the hallmark imaging finding of lymphomas with abdominal involvement, was seen in only 6 patients. Hepatosplenomegaly was observed in 6 patients. Pleural and pericardial effusion was seen in 4 patients. **Conclusion:** The appearance of peritoneal lymphomatosis may overlap with that of sarcomatosis and other types of cancer, but bulky masses or thickened soft tissue are contributory findings to lymphoma diagnosis.

**KEYWORDS :** Peritoneal lymphomatosis, Ascitis, Lymphoma

**Introduction:-**

Most neoplasms that spread to the peritoneal cavity are considered metastatic secondary cancers. Epithelial (carcinomatosis), mesenchymal (sarcomatosis), and lymphoid (lymphomatosis) malignant cell lines are all potential causes of peritoneal malignancy [1]. It is well recognised that numerous types of cancer may spread to the mesentery and peritoneum as a neoplastic process [2]. It's a warning sign of extensive expansion, but the prognosis isn't great. Malignant neoplasms of the peritoneum are very common, and secondary tumours outnumber primary neoplasia by an enormous margin [3]. Ovarian, bowel, and stomach cancers are the most common types of malignancies affecting the peritoneum and omentum[4,5]. Lymphoma is not a common underlying cause of peritoneal and omental illness, but a precise diagnosis is crucial since it may be treated without surgery, unlike other primary and secondary peritoneal malignant neoplasias. Malignant lymphomas develop from lymphocytes, histiocytes, and their progenitor cells. Lymphomas vary greatly in their clinical presentation and their underlying pathology; nonetheless, they are often divided into two separate clinic-pathological groups: Hodgkin's lymphoma (HL) [6,7] and non-lymphoma Hodgkin's (NHL) [8]. About 40 percent of lymphomas spread beyond the lymph nodes and may affect any organ [9]. High-grade lymphomas, such as diffuse large B cell lymphoma (DLBCL), are often linked with peritoneal lymphomatosis (PL), which is defined as the spread of lymphoma to the peritoneum [10]. Lymphomas may travel to the peritoneum, although it is not known how they do so since the peritoneal surface is made up of a fibro-fatty matrix without any lymphoid tissue. Direct extension from the transverse mesocolon, the gastrocolic ligament, or the visceral peritoneal surface is a proposed mechanism for this distribution [11]. Given that peritoneal lymphomatosis is often non-surgically managed and responds well to chemotherapy, prompt and accurate diagnosis is crucial[12,13].

However, peritoneal lymphomatosis is sometimes misdiagnosed as peritoneal carcinomatosis (PC) on imaging studies. PC is a prevalent disease linked with disseminated malignancies, such as gastrointestinal and gynaecological malignancies. In both the diagnostic process and the identification of probable problems, imaging plays a crucial role.

Our purpose in writing this work was to examine and better define the CT imaging findings of peritoneal, omental, and mesenteric involvement in lymphoma.

**Material and methods.**

A total of 13 patients were included in a retrospective study done at Postgraduate department of Radiodiagnosis and imaging ,Government Medical college Srinagar.

Patients with peritoneal and/or mesenteric lymphoma involvement diagnosed between January 2020 and February 2022 was retrieved from our database and were reevaluated by attending radiologist. Of the patients, 10 were male and 3 were female with an age range of 15–67years.

**Inclusion criteria:** Patients with histopathological proven lymphoma through biopsy, bone marrow aspiration/cytology.

**Exclusion criteria:** Patients with peritoneal disease other than lymphoma.

Patients with unavailability of proper records.

**Equipment:**
CT Machine: 256 slice Dual Energy Somatom Siemens at Superspeciality Hospital GMC Srinagar.

**Technique:**
All imaging studies were performed with nonionic IV contrast media. The slice thickness was 1mm and images were acquired after 30-35s and 70-100s of standard delay after IV contrast injection of 100 ml of iodinated contrast medium (300 mg/dl) by a power injector at rate of 4ml/sec.

**Methodology:**
The images of each patient were evaluated for peritoneal thickening, bowel wall thickening , retroperitoneal lymphadenopathy, omental and mesenteric mass, solid organ involvement and the presence of liver or spleen enlargement. Peritoneal thickening, whether smooth or nodular and homogenous contrast enhancement were considered to be positive for peritoneal involvement. Bowel thickening was taken as diffuse homogenously enhancing wall thickening with aneurysmal dilatation . Mesentric/Omental involvement was taken as bulky soft tissue lesions causing encasement of mesenteric vessels. Retroperitoneal lymphadenopathy was recorded positive when a lymph node having short axis over 10 mm was detected. Other imaging findings included ascitis, periportal involvement, pleural–pericardial effusion.

**Results :**
There were 10 males and 3 females with peritoneal and/or mesenteric and omental lymphomatous involvement. Mean age was 42 years (range 15–67). The diagnosis of lymphoma and subtyping were done with histiopathological examinations. The diagnosis was obtained from tru-cut biopsy (USG OR CT guided), bone marrow aspirations or fine needle aspiration of abdominal lesions.

All patients had Non-Hogdkin type Lymphomas (NHL) with varying subtypes, mainly of diffuse B-cell lymphoma. Diffuse smooth peritoneal thickening with homogenous contrast enhancement (Figure 1,2) was the most common finding and observed in 11 out of 13 patients. Mesenteric involvement was found to be positive in 7 patients in form of soft tissue lesions in mesentry with encasement of mesenteric vessels (Figure 3,4), however normal luminal contrast opacification was seen. Bowel wall involvement was also a common occurrence and observed in 8 patients. The location of the involved segments was as follows: Jejunum (n = 2), ileum(n = 6). Involved bowel segments showed diffuse wall thickening upto 2-3 centimeters with homogenous contrast enhancement with cases of aneurysmal dilatation in involved segments (Figure 6,7). The presence of omental mass was also common and observed in 7 patients (Figure 8). Ascites was seen in 10 patients in the form of mild (n =4), moderate (n = 4) and massive (n = 2) (Figure 1,2). No loculation/septation in ascitic fluid was seen in any of the patients. Retroperitoneal lymphadenopathy, the hallmark imaging finding of lymphomas with abdominal involvement, was seen in only 6 patients (Figure 3,4,5). Their most common location was paraaortic and periportal. Hepatosplenomegaly was observed in 6 patients. Pleural and pericardial effusion was seen in 4 patients. (Table 1)

**Table 1**

| MDCT FINDINGS IN LYPMHOMA PATIENTS. | Number of patients (out of 13) |
|---|---|
| Peritoneal involvement in form diffuse peritoneal thickening | 11(84%) |
| Mesenteric and omental mass. | 7(53%) |
| Bowel wall thickening with aneurysmal dilatation | 8(61%) |
| Bulky Retroperitoneal lymphadenopathy | 6(46%) |
| Hepato-splenomegaly | 6(46%) |
| Ascites | 10(76%) |
| Pleural pericardial effusion | 4(30%) |

**Figure 3,4,5:** Contrast Enhanced Coronal, Axial, Sagittal Sections showing bulky conglomerate retroperitoneal LAP with encasement of Aorta and its major branches with no luminal compromise and associated mesenteric mass and omental nodularity(red arrow). Patient was HPE document DLBCL.

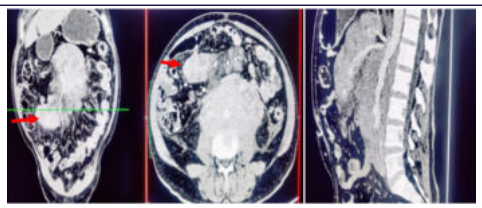


**Figure 1, 2;** Axial Contrast Enhanced CT images showing smooth homogenous peritoneal thickening with Ascitis.

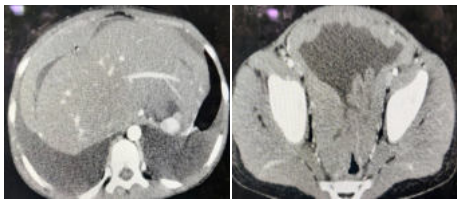


**Figure6,7;** Contrast enhanced Axial CT showing diffuse bowel wall thickening with aneurysmal dilatation and associated smooth peritoneal thickening and asicitis.

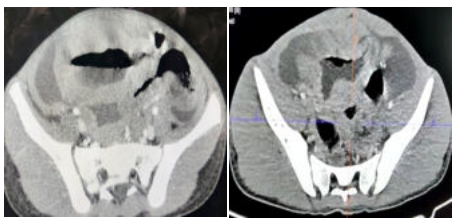
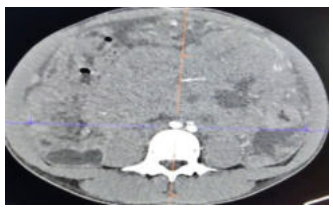


**Figure 8;** Axial Contrast CT showing homogenous enhancing bulky omental mass. The patient was HPE diagnosed Follicular lymphoma.



**Discussion:**
Lymphoma is a frequent cancer with well-established imaging features. Lymphadenopathy may occur alone or in groups. Rarely do lymphomas cause widespread infiltration of the peritoneum, and even more rarely do patients report initially with symptoms related to the peritoneum [12].

With ascitis present, MDCT has a significant likelihood of detecting peritoneal thickening and subcentimeter omental/mesenteric nodules [3].

In our investigation, ascites, omental, and mesenteric masses with organomegaly were the next most prevalent imaging findings after diffuse peritoneal thickening and homogeneous contrast enhancement. Additionally, solid organ involvement, retroperitoneal lymphadenopathy, and small intestinal involvement were often seen. Previous research by D. Karaosmanoglu et al. [13] is congruent with our results. Our results show that peritoneal thickening, particularly in the form of a smooth sheet, is highly indicative of lymphomatosis or peritoneal involvement in the majority of patients. Ascitis was also the most common observation in individuals with peritoneal thickening, which is consistent with earlier research. Consistent with our results, Lynch et al. [2] found that peritoneal lymphomatosis is characterised by a heavier burden of lymphadenopathy, as seen by a greater number of affected nodes and bigger related nodules.

Omental and mesenteric involvement was also often seen in our study, which is in line with research by D. Karaosmanoglu et al. [13]. It was discovered that linear-streaky infiltrative lesions were less prevalent than their bulky, homogenously enhancing mass lesion equivalent. In the same way as lymphoma's bulky retroperitoneal lymadenopathy (sandwich sign) displaces neighbouring bowel loops without infiltration and encasement of mesenteric arteries, these lesions were observed to do the same [14]. Except for one case in whom the abdominal aorta was drapped by a retroperitoneal mass lesion, we

found that mesenteric and omental involvement was always linked with peritoneal involvement.

The involvement of the small bowel (n=8) was also seen in patients with peritoneal and omental lymphomatosis, which was detected by MDCT. The ileum and jejunum were the most often affected sections of the small intestine, respectively. Long segment diffuse bowel wall thickening (single maximum wall thickness > 10mm) with homogeneous enhancement was seen in the majority of patients. Aneurysmal dilatation of the affected segment was seen in 5 of 8 individuals. The majority of patients with peritoneal lymphomatosis and small bowel involvement did not exhibit clinical signs and symptoms of small or large intestine obstruction, which was consistent with studies by J.Norfray et al[15] and Z.V. Maizlin et al[16].

Our research also revealed that ascitis is one of the most frequent medical conditions. The ascitic condition exhibited no loculated or septated features. Most individuals only had mild to moderate ascites. Consistent with a previous research by Hamrick et al.,[4] the presence of ascites that is neither loculated nor septated may provide further diagnostic information. Tuberculosis with abdominal and peritoneal signs may be a significant differential diagnosis (considering their overlapping clinical stigmata). Common in TB patients, septations and loculations may be seen on CT scans [4].

Lymphoma patients often have a distinctive, bulky lymphadenopathy called conglomerate lymphadenopathy. To wit: Amita et al.[14]. It wasn't a major discovery by any means in our research. This result, when combined with others in the omentum and peritoneum, strengthens the case for lymphoma as the underlying diagnosis.

Similarly to the work of D. Karaosmanoglu et al. [13], we found that hepatosplenomegaly (n=6) was present. There was often extensive lymphadenopathy in the retroperitoneum and around the periportal areas of these individuals.

The limitation of our study was that, it was retrospective and had a small sample size.

**Conclusion:-**

Since peritoneal and omental lymphomatosis are not typical lymphoma locations, we concluded that it was important to evaluate the relevance of MDCT in these cases. We discovered that the appearance of peritoneal lymphomatosis may be similar to that of carcinomatosis and sarcomatosis; however, large homogenous peritoneal masses or smooth peritoneal soft tissue thickening, diffuse lymphadenopathy, and imaging features of variable bowel or extranodal involvement are all contributory findings supporting the lymphoma diagnosis.

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