

Computer Tomographic Evaluation of Digestive Tract non-Hodgkin Lymphomas

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Abstract

Computer Tomographic (CT) study is crucial for defining distribution, characteristics and staging of primary gastrointestinal lymphomas. The presence of multifocal sites, the wall thickening with diffuse infiltration of the affected gastrointestinal (GI) segment in association with regional adenopathies, permit the orientation of the CT diagnosis for primary GI lymphomas. The gold standard for diagnosis remains, in all cases of digestive tract non-Hodgkin lymphomas (NHL), the histological examination, which allows a tissue diagnosis, performed preferably by transmural biopsy.

Key words

Digestive tract non-Hodgkin lymphomas - computer tomography - diagnosis

Introduction

The gastrointestinal (GI) tract is the most common site involved in cases of extranodal lymphoma (1,2). Up to 5% of all GI tumors are lymphomas, usually unifocal (2, 3). Primary GI lymphomas account for 4–20% of all non-Hodgkin lymphoma (NHL) cases (2, 3). In these cases, lymph node involvement is restricted solely to the local drainage area (4). The liver or spleen are usually not involved while the white cell count is normal (5). Primary GI lymphomas must be recognized, characterized, and staged accurately, since, in some areas of the bowel, prognosis and therapy vary substantially when compared with those for other malignancies, especially carcinoma (3). Multiple sites are found in a context of direct nodal extension (6). Symptoms are nonspecific and may be present for years before

a diagnosis is established (7). Radiologic studies, particularly barium studies of the bowel and computer tomography (CT) may be the crucial and the only noninvasive modalities to use for the evaluation of GI lymphoma (4). We hereby summarize the CT characteristics of GI NHLs.

Clinical findings

Symptoms are nonspecific. Epigastric pain, weight loss, and anorexia may be present. When lymphoma involves the stomach, outlet obstruction with nausea and vomiting is uncommon. Bleeding occurs in 10-50% of patients. An abdominal mass may be present in up to 30-35% of patients. Bowel perforation, may occur in 25% of patients. Complicating bowel intussusception is found in 10-15% of patients (7).

Imaging techniques

At present, CT is the principal method used in staging NHL (4). CT scans must be made after oral administration of water or oral positive contrast: 750-1000 ml, in association, in selected cases, with intravenous administration of nonionic iodinated contrast material. Stomach and intestinal bowel distension with water or positive oral contrast (Gastrografin) helps in the evaluation of wall thickness and may show distortion of normal fold patterns. Retrograde opacification with Gastrografin of the rectum and colon is used to better evaluate the wall thickness. CT is crucial to demonstrate the extraluminal extent of tumor that is underestimated with barium studies and endoscopic examinations.

Anatomical distribution and staging of initial localizations

Non-Hodgkin lymphomas may involve the oropharynx, the stomach, in association with esophageal distal mass, the small intestine, the colon, and the rectum (8-23).

Accurate staging of primary GI lymphomas is important for the planning of appropriate therapy and for predicting prognosis (24,25). The staging of GI-NHL according to a modified Ann Arbor staging classification (Table I) is given in Table I (Rohatiner et al) (5).

Table I Staging of gastrointestinal non-Hodgkin's lymphoma (5)

Stage	Criteria
I	Tumor confined to the gastrointestinal (GI) tract
II	Single primary site or multiple non-contiguous lesions Tumor extending in abdomen from primary GI site Nodal involvement
III	- Local (paragastric/paraintestinal)
II2	- Distant (mesenteric, paraaortic, paracaval, pelvic, inguinal)
III	Penetration of serosa to involve adjacent organs or tissues
IV	Disseminated extranodal involvement, or a GI tract lesion with supradiaphragmatic nodal involvement

CT findings in GI-NHL

Pharyngeal lymphomas arise from the lymphoid tissue of Waldeyer's ring. NHLs comprise 10-15% of all malignant tumors in the pharynx (15). Usually pharyngeal lymphoma

occurs in the palatine fossae, nasopharynx, and at the base of the tongue. Pharyngeal lymphomas may be impossible to differentiate from pharyngeal carcinomas on the basis of imaging criteria (15). The tumoral mass may be located in the oro- and/or nasopharynx. Generally, CT features are represented by a bulky mass (Fig.1) in association with cervical lymph node enlargement.

The esophagus is the rarest site of GI involvement by NHL, accounting for less than 1% of cases. Rarely, primary esophageal lymphoma occurs in patients who have no extraesophageal disease. According to the literature, NHL of the esophagus appears in patients with generalized lymphoma by direct invasion of the esophagus by lymphomatous nodes in the mediastinum, by contiguous spread of lymphoma from the gastric fundus, or by synchronous development of lymphoma in the esophageal wall.

The involvement of the esophagus may be produced by the extension of the affected lymph nodes or by contiguous spread from the gastric fundus (Fig.2). CT features are: (a) diffuse nodularity; (b) single intramural mass.

The stomach is the most frequent site of lymphomatous involvement of the GI tract. The CT patterns of gastric involvement are: (a) diffuse infiltration involving greater than 50% of the length of the stomach (Fig.3); (b) segmental infiltration (Fig.4), and (c) localized polypoid form. Tumor infiltration is usually homogeneous, although low attenuation regions may be seen in large tumors. Diffuse

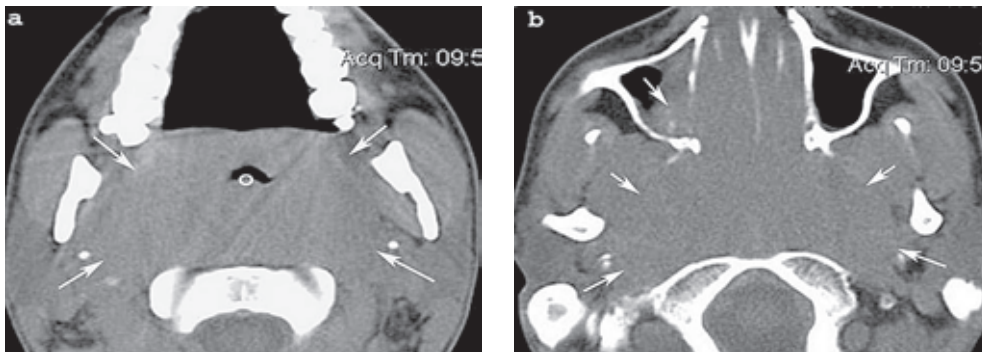


Fig.1.a CT without contrast. Huge mass involving the oropharynx (o) and the parapharyngeal and prevertebral spaces (white arrows); **b.** the mass extends to the nasopharynx (white arrows) and the right maxillary sinus (arrowhead). Histology: diffuse large B cell lymphoma.

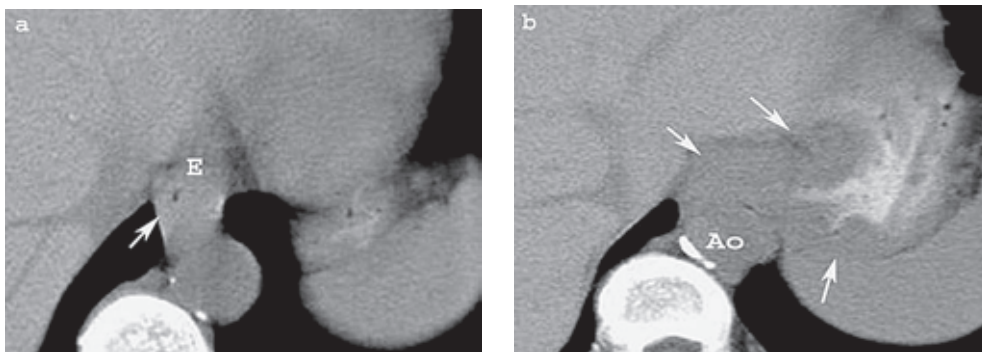


Fig.2.a CT after positive oral contrast. Circumferential thickening of the distal esophageal (E) walls (white arrow); **b.** extension of the lesion at the esogastric junction and gastric fornix (white arrows). Histology: large B cell lymphoma.

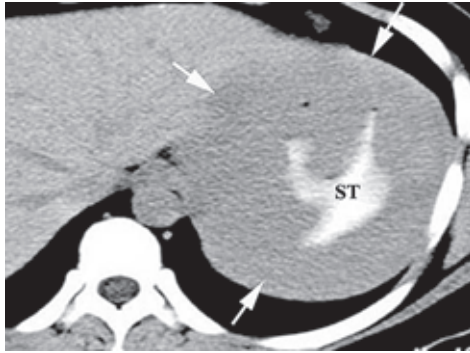


Fig.3 CT after positive oral contrast. Diffuse and circumferential thickening of the gastric walls (white arrows). Histology: diffuse small cleaved lymphoma.

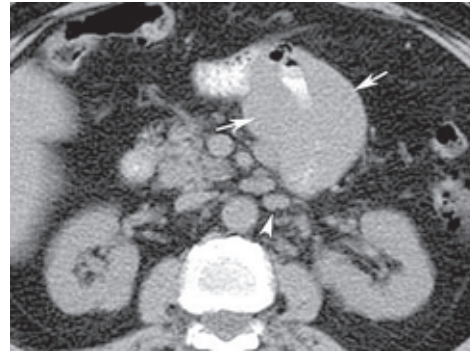


Fig.5 CT with positive oral contrast. Jejunal mass (circumferential thickening of the walls - white arrows); satellite adenopathies (arrowhead). Histology: diffuse large B cell lymphoma.

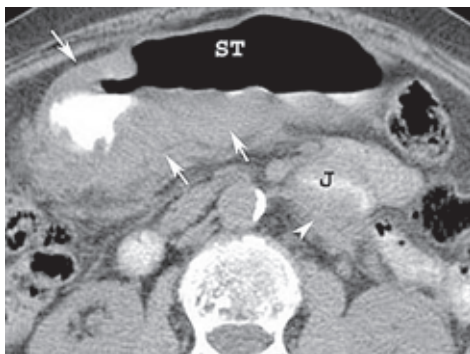


Fig.4 CT after positive oral contrast. Segmental tumoral infiltration (white arrows) of the horizontal part of the stomach (ST); thickening of proximal part of the jejunum (arrowhead). Histology: diffuse large B cell lymphoma.

infiltration involving more than 50% of the length of the stomach and segmental infiltration are the most common CT aspects found in gastric NHL. Most patients with gastric lymphoma have associated adenopathies. Differential diagnosis of gastric lymphoma includes adenocarcinoma and benign inflammatory diseases such as gastritis and peptic ulcer. It is not possible to differentiate gastric lymphoma from adenocarcinoma based on the CT appearance of the stomach alone. The most reliable

differential feature is the presence and distribution of extra-alimentary tract adenopathy.

One of the key points in the differential diagnosis between gastric lymphoma and adenocarcinoma is that in lymphoma, the nodes are usually bulkier and extend beneath the renal hilum.

The small bowel is the second most frequent site of GI tract involvement by lymphoma (15). Lymphomas constitute approximately one-half of all primary malignant small bowel tumors (4). According to the literature, the ileum is the most common site and the duodenum the least frequent (4). In contrast, in our patients the jejunum was the most frequent part of the small bowel involved by NHL. Multifocal sites of involvement are not uncommon (20). The typical CT appearances are: (a) aneurysmal, (b) constrictive (Fig.5), and (c) nodular. The most common CT appearances are the constrictive and the nodular types of small bowel lymphomas. Differential diagnosis includes carcinoma, Crohn's disease and metastatic disease. Carcinoma of the small bowel is generally more focal, stenotic, and produces less wall thickening. Metastatic melanoma in the small bowel can present with all the findings of lymphoma and clinical history may be necessary to differentiate the two. The bowel wall thickening in Crohn's disease patients is not as great as in those with lymphoma, but these two entities may be confused because many of these patients have associated

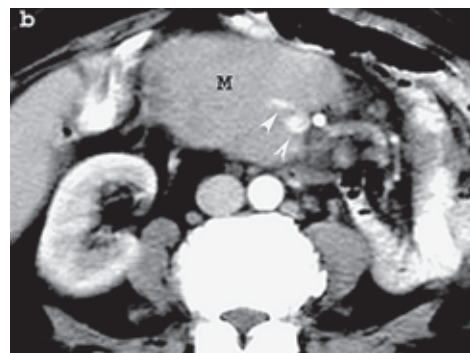
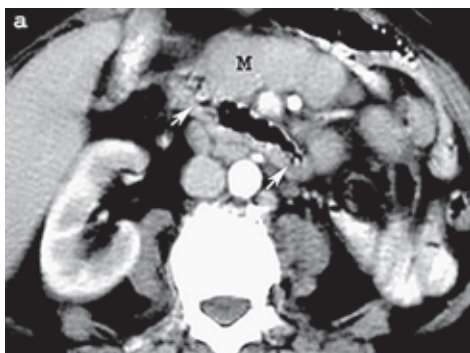


Fig.6 CT with oral contrast and intravenous nonionic iodinated contrast. (a) Mesenteric mass (M); discrete thickening of the proximal part of the small bowel (white arrows) with small adjacent adenopathies. (b) Mesenteric mass (M) involving the mesenteric vessels (arrows). Histology: diffuse small lymphocytic lymphoma.

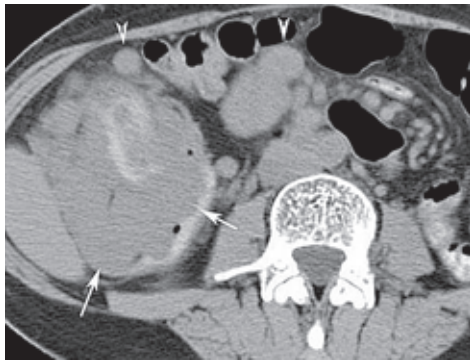


Fig.7 CT with positive oral contrast. Tumoral mass of the cecum (white arrows); satellites and intramesenteric adenopathies (arrowhead). Histology: large B cell lymphoma.

mesenteric adeno-pathy, although adenopathy in Crohn's disease tends not to be as bulky as in NHL.

Mesenteric involvement. NHL involves the small bowel by direct extension (Fig.6) or indirectly by displacement due to mass effect. Mesenteric involvement may be manifested by any of the four general patterns of mesenteric disease: rounded masses (Fig.7), ill-defined masses, cake-like masses, and stellate mesentery. The rounded mass appearance is the most common.

Primary colonic lymphoma is uncommon. It may occur in patients with AIDS. The cecum and rectum are the most common sites of NHL involvement (21-23). Polypoid and stenotic types are the most frequent forms of large bowel NHL (4). The CT appearance is similar to that of a primary adenocarcinoma of the colon (Fig.7). The diffuse form is variable, with infiltration of variable lengths of colon or rectum (Fig.8). Diffuse infiltration is often associated with abdominal adenopathy or extensive bowel infiltration by the tumor. CT diagnosis is nonspecific, and barium studies and endoscopic biopsies are required for histologic confirmation.

Pitfalls

There are two potential sources of false-positive results. The most common are those cases in which the wall of an underfilled loop is misinterpreted as pathologically thickened. This can be avoided by scanning the patient with 750-1000 ml of positive contrast oral medium (Gastrografin), further distending the lumen. The second source of false-positive cases is represented by the thick wall due to inflammatory or other neoplastic disease. False-negative examinations may occur in those patients in whom only the mucosa is affected.

Conclusions

Gastrointestinal NLH is a lymphoproliferative neoplasm that must be identified accurately and staged properly for appropriate patient care. CT study is essential for defining tumor distribution, characteristics and staging. Presence of multifocal sites, wall thickening with diffuse infiltration

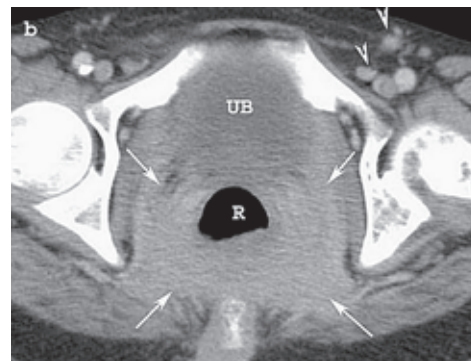
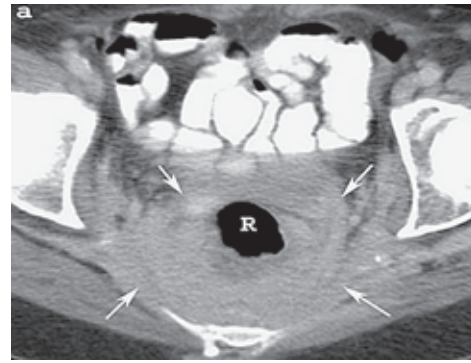


Fig.8 CT with oral contrast and intravenous nonionic iodinated contrast (a,b). Huge peri/ and rectal tumoral mass (white arrows) extending into the ischioanal fossa. Histology: diffuse large B cell lymphoma.

of the affected GI segment in association with regional adenopathies, allows CT diagnosis of primary GI lymphomas. The gold standard for diagnosis remains, in all patients with digestive tract NHL, the histological examination, which permits a tissue diagnosis, preferably performed by transmural biopsy.

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