Radiographic Findings of Primary B-Cell Lymphoma of the Stomach: Low-Grade Versus High-Grade Malignancy in Relation to the Mucosa-Associated Lymphoid Tissue Concept

OBJECTIVE. We undertook this study to assess how well double-contrast radiography and CT allow radiologists to differentiate low-grade from high-grade mucosa-associated lymphoid tissue (MALT) lymphoma of the stomach.

MATERIALS AND METHODS. We retrospectively reviewed the upper gastrointestinal radiographs and contrast-enhanced CT scans of 57 patients with pathologically proven primary gastric lymphoma (low-grade \( n = 29 \) and high-grade \( n = 28 \) MALT lymphoma).

RESULTS. On upper gastrointestinal radiography, ulceration (39%) was the most common finding in low-grade lymphoma, whereas polypoid appearance (38%) was the most common in high-grade lymphoma. In the 29 patients (33 lesions) with low-grade MALT lymphoma, upper gastrointestinal radiography revealed 13 ulcerative lesions (39%), 10 nodular lesions (30%), four infiltrative lesions (12%), two polypoid lesions (6%), and four combined lesions (12%). In the 28 patients (29 lesions) with high-grade lymphoma, upper gastrointestinal radiography revealed 11 polypoid lesions (38%), nine infiltrative lesions (31%), six ulcerative lesions (20%), one nodular lesion (3%), and two combined lesions (7%). On CT, thickening of the gastric wall in low-grade lymphoma (range, 0.3–2.5 cm; mean, 0.8 cm) was much less than that in high-grade lymphoma (range, 0.7–8.0 cm; mean, 2.5 cm). Abdominal lymphadenopathy was less frequent in low-grade lymphoma (14%) than in high-grade lymphoma (75%).

CONCLUSION. Most low-grade lymphomas show superficial spreading lesions, such as mucosal nodularity, shallow ulcer, and minimal fold thickening, on upper gastrointestinal radiography, whereas most high-grade lymphomas show mass-forming lesions or severe fold thickening.

An important advance in the understanding of extranodal lymphomas has been the description of a specific mucosa-associated lymphoid tissue (MALT) that is normally present primarily in the intestinal and bronchial mucosa [1]. MALT is also present in other organs, such as the stomach, but only after chronic inflammation [1]. Lymphomas arising in these specific areas exhibit a biologic behavior that differs from that of nodal lymphomas and are classified as low-grade or high-grade at histology [2, 3]. In the low-grade MALT lymphoma, the small neoplastic cells possess irregular nuclei (centrocytoid-like), and glandular invasion is a prominent feature [4–6]. In the high-grade MALT lymphoma, the blasts occur in clusters or sheets and often possess plasmacytic cytoplasm; glandular invasion is a rare event [4–6].

Since the classification of MALT lymphoma by Isaacson and Wright in 1988 [3], other researchers have found that patients with low-grade, as opposed to high-grade, MALT lymphoma have a favorable prognosis with a higher rate of complete remission and survival [4–7]. Moreover, the therapeutic approach is different for the two lymphomas [8, 9]. Unlike high-grade lesions, low-grade MALT lymphoma may undergo complete remission after Helicobacter pylori have been eradicated with antibiotics [8, 9]. Eradication of H. pylori with dual or triple therapy including antibiotics and a proton pump inhibitor is generally the first step in treatment of localized low-grade cases, with surgery being reserved for those patients in whom this treatment fails [5, 8]. It is important to differentiate low-grade from high-grade MALT lymphoma before adopting a therapeutic approach.

The spectrum of radiographic findings seen with gastric lymphoma in general is well-described [10, 11]. Recently, radiographic manifestations specific to low-grade
gastric MALT lymphoma have been reported [12–14]. To our knowledge, however, no report exists concerning the radiographic findings for the differentiation of low-grade from high-grade gastric MALT lymphoma. The purpose of our study was to assess the capability of upper gastrointestinal radiography and of CT to facilitate this diagnosis.

Materials and Methods

Patient Selection

A computer search of medical records allowed us to identify 129 patients with non-Hodgkin’s gastric lymphoma of the B-cell phenotype who were treated at our institutions between January 1996 and January 2001. All 129 patients had stage I or II lymphomas according to the modified Ann Arbor classification for extranodal lymphoma [15] and completely met the criteria of Dawson et al. [16] for primary gastric lymphoma. We also searched the pathology records of these patients for the subtype of gastric lymphoma and found 46 with low-grade and 83 with high-grade MALT lymphoma.

In the low-grade component, the small neoplastic cells possessed irregular nuclei (centrocytelike cells), and glandular invasion (lymphoepithelial lesion) was a prominent feature. In the high-grade component, large blastic cells occurred in clusters or sheets, and often possessed plasmacytic cytoplasm; glandular invasion was a rare event. The depth of invasion—an important criterion for early gastric carcinoma—was not used for the histologic classification of gastric MALT lymphoma. We excluded patients with the mixed type from our study population (15/83 patients with high-grade malignancy had lymphoepithelial lesions, one of the low-grade MALT components).

Upper gastrointestinal radiographs and abdominal CT scans that were adequate for analysis of the lesions were available in 57 of the 114 patients remaining after 15 were excluded. These 57 patients with primary gastric MALT lymphoma (low-grade [n = 29] and high-grade [n = 28]) constituted the study population. The histologic diagnosis of primary gastric non-Hodgkin’s lymphoma was made primarily using gastrectomy specimens (n = 47) and occasionally with (repeated) endoscopic biopsy specimens (n = 10).

This retrospective study population consisted of 29 patients with low-grade MALT lymphoma (14 men and 15 women; age range, 43–78 years; mean age, 49.3 years), and 28 patients with high-grade MALT lymphoma (12 men and 16 women; age range, 37–75 years; mean age, 46.2 years).

Examination Technique

All single- and double-contrast upper gastrointestinal examinations were performed after oral administration of 200–250 mL of 140% wt/vol barium suspension in water. Oral administration of an effervescent agent in powder form was used for adequate gastric distention. Under fluoroscopic observation, multiple spot radiographs were obtained after adequate mucosal coating.

CT examinations were performed with either helical scanners (HiSpeed CT/i, General Electric Medical Systems, Milwaukee, WI; or Somatom Plus S, Siemens, Erlangen, Germany) or a third-generation scanner (HiLight Advantage; General Electric Medical Systems). Each patient fasted for 6 hr before undergoing CT. The patients drank 400–600 mL of pure tap water or 1% solution of positive oral contrast agent (Gastrografin [meglumine diatrizoate]; Schering, Berlin, Germany) immediately before CT. No anticholinergic agents or glucagon was administered. A total of 100 mL of nonionic contrast agent (Ultravist [iohexol]; Schering) was administered IV at a rate of 2.5 mL/sec using an automatic power injector. The upper abdomen from the level of the hepatic dome to the iliac crest was scanned in the helical mode (7-mm collimation at a pitch of 1.5 and 7-mm reconstruction intervals) and in the nonhelical mode (10-mm slice thickness at 10-mm intervals).

Analysis

Four board-certified abdominal radiologists collectively performed the retrospective review of the hard-copy films of upper gastrointestinal radiography and the CT scans of the 57 patients in our study population. The reviewers had no knowledge of the endoscopic and pathologic findings but were aware of the final diagnosis of primary gastric lymphoma. Final decisions were reached by consensus. Subsequently, two of the original four reviewers correlated the radiologic findings with the endoscopic and pathologic findings.

Upper gastrointestinal radiographic findings were interpreted using an established radiologic classification system for lymphoma that characterizes gastric lesions as infiltrative, ulcerative, polyoid, nodular, or combined [10, 17]. A lesion was defined as infiltrative if there was focal or diffuse enlargement of the rugae with or without luminal narrowing, including a limits plastic appearance. Folds wider than 5 mm were considered abnormal in adults [18]. A polyoid gastric lymphoma was defined as an intraluminal mass with or without ulceration. Ulcerative lymphomas were defined as either a shallow ulcer (missed at any one of the spot radiographs, in particular, a distended one) or a deep ulcer (discretely visualized on all of the spot radiographs) with or without surrounding thickened, irregular folds. A lesion was defined as nodular if it had multiple or innumerable discrete nodules. Ulcerative, polyoid, and nodular lesions were subsequently classified as single or multiple.

Gastric abnormalities on CT were assessed as positive for MALT lymphoma when focal thickening of the gastric wall of more than 4 mm [19], focal abnormal enhancement, or both were present. The gastric lesions identified on CT were evaluated with respect to the thickness of the stomach wall and the presence of lymphadenopathy. The maximum point of gastric wall thickening was measured. If gastric abnormalities were not identified on CT, the thickness of the gastric wall was considered as 3 mm. The wall thickness measured on CT was divided into four groups according to the depth of invasion (mucosa, submucosa, muscle, and beyond serosa) on the histopathologic specimen, and the mean value of the wall thickness of each group was calculated. The presence of lymphadenopathy was determined using the size criteria established by Dorfman et al. [20]. Accordingly, short-axis nodal diameters greater than 6 mm in the retrocrural space, 7 mm in the porta hepatitis, 8 mm in the gastropathic ligament region, and 10 mm in all other sites were considered abnormal. Enlarged perigastric lymph nodes along the lesser or greater curvatures or enlarged lymph nodes located along the left gastric, common hepatic, splenic, or celiac arteries were considered regional. Involvement of other intraabdominal lymph nodes, such as retropancreatic, hepato-duodenal, aortic, portal, retroperitoneal, or mesenteric, were considered distant.

The upper gastrointestinal radiographic findings for the low-grade and high-grade lymphomas were compared by means of a Fisher’s exact test (two-tailed). The thickness of the gastric wall on CT for both low-grade and high-grade lymphomas was compared by means of a Student’s t test. The thickness of the gastric wall depicted on CT was correlated with the depth of invasion revealed on pathologic specimen by means of a one-way analysis of variances test. A p value less than 0.05 was considered statistically significant.

Results

Clinical Findings

Of 29 patients with low-grade lymphoma, findings were positive for H. pylori on histology in 22 patients and negative in three. The presence of H. pylori was not evaluated in the remaining four patients. Four patients who were positive for H. pylori underwent administration of antibiotics; complete remission was attained in three patients (Fig. 1). One patient was lost to follow-up. Twenty-five patients with low-grade lymphoma underwent curative surgical resection without preoperative medical therapy; two of them underwent adjunctive chemotherapy. Regarding the depth of invasion on the surgically resected specimens, lymphoma cells were localized in the mucosa in eight patients, in the submucosa in 13 patients, in the muscularis propria in three patients, and beyond the serosa in one patient.

Of 28 patients with high-grade lymphoma, findings were positive for H. pylori on histology in two patients and negative in two. The presence of H. pylori was not evaluated in the
remaining 24 patients. Eighteen patients with high-grade lymphoma underwent surgical resection without preoperative medical therapy; seven of them underwent adjunctive chemotherapy. Regarding the depth of invasion on the surgically resected specimens, lymphoma cells were localized in the submucosa in three patients, in the muscularis propria in seven patients, and beyond the serosa in eight patients. Ten of the 28 patients with high-grade lymphoma underwent chemotherapy or radiotherapy without surgical treatment.

Radiologic Findings

Radiography.—Twenty-seven of 29 patients with low-grade lymphoma and all 28 patients with high-grade lymphoma showed abnormal findings on upper gastrointestinal radiography. Five of the patients with low-grade lymphoma had multiple lesions (one had three and four had two lesions), and the total number of lesions was 33. Of the patients with high-grade lymphoma, one had two lesions; the total number was 29.

The findings observed on upper gastrointestinal tract radiography for low-grade and high-grade MALT lymphoma are compared in Table 1. The finding of ulcerative lesions (39%) was the most common in low-grade lymphoma, whereas the finding of polypoid lesions (38%) was most common in high-grade lymphoma. In the 29 patients (33 lesions) with low-grade MALT lymphoma, the upper gastrointestinal series revealed 13 ulcerative lesions (39%; eight shallow and five deep-ulcer) (Fig. 2), 10 nodular lesions (30%; Fig. 1), four infiltrative lesions (12%; three focal and one diffuse-infiltration), two polypoid lesions without ulcer (6%), and four combined lesions (12%; Figs. 3 and 4). Most (8/13) of the ulcers were shallow (Fig. 2) with indistinct margins. Of the eight patients with shallow ulcers, seven had surrounding fold thickening or marginal nodularity. In the patients with mucosal nodularity, the second most common finding, the nodules had distinct margins, were round or oval, and were varied in size. Of the 10 patients with mucosal nodularity, two patients had innumerable small nodular lesions that appeared as a diffuse enlargement of the areae gastricae with a coarse pattern.

Of the four patients who underwent the administration of antibiotics for eradication of H. pylori, one had innumerable nodules of varied sizes that could be mistaken for areae gastricae with a coarse pattern. Another patient was found to have a shallow ulcer with base nodularity and surrounding fold thickening. No abnormal findings were seen on upper gastrointestinal radiography in the remaining two patients.

In 28 patients (29 lesions) with high-grade lymphoma, upper gastrointestinal radiography revealed 11 polypoid lesions (38%; seven with ulcer and four without ulcer) (Fig. 5), nine infiltrative lesions (31%; eight diffuse and one focal-infiltration) (Fig. 6), six ulcerative lesions (20%; five deep and one shallow ulcer) (Fig. 7), one nodular lesion (3%), and two combined lesions (7%). All polypoid masses were large (range, 4–17 cm; mean, 8.3 cm), and most (5/6) of the ulcers were deep. Four of the eight patients with diffuse infiltrative lesions were found to have accompanying luminal narrowing.

When we applied a statistical analysis, the integrated distributions of patterns found on upper gastrointestinal radiography in the two groups were significantly different ($p < 0.0001$). In the 43 patients who underwent surgical resection (25 with low-grade and 18 with high-grade lymphoma), the mean thickness of the gastric wall measured on CT was 0.3 cm for mucosa, 0.88 cm for submucosa, 1.9 cm for muscle, and 3.73 cm for serosal invasion as measured on the surgically resected specimen (Fig. 8). The difference was statistically signific

### Table 1: Radiographic Findings in Patients with MALT Lymphoma

<table>
<thead>
<tr>
<th>Lesion Type</th>
<th>Low-Grade Lymphoma</th>
<th>High-Grade Lymphoma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infiltrative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Focal</td>
<td>3 (9)</td>
<td>1 (3)</td>
</tr>
<tr>
<td>Diffuse</td>
<td>1 (3)</td>
<td>8 (28)</td>
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<tr>
<td>Polypoid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>With ulcer</td>
<td>0 (0)</td>
<td>7 (24)</td>
</tr>
<tr>
<td>Without ulcer</td>
<td>2 (6)</td>
<td>4 (14)</td>
</tr>
<tr>
<td>Ulcerative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deep</td>
<td>5 (15)</td>
<td>5 (17)</td>
</tr>
<tr>
<td>Shallow</td>
<td>8 (24)</td>
<td>1 (3)</td>
</tr>
<tr>
<td>Nodular</td>
<td>10 (30)</td>
<td>1 (3)</td>
</tr>
<tr>
<td>Combined</td>
<td>4 (12)</td>
<td>2 (7)</td>
</tr>
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Note.—Upper gastrointestinal tract radiography was performed in patients with low-grade and high-grade mucosa-associated lymphoid tissue (MALT) lymphoma. Numbers in parentheses are percentages.

*33 lesions in 29 patients.

*29 lesions in 28 patients.
Abdominal lymphadenopathy was observed in four (14%) of 29 patients with low-grade lymphoma, whereas it was seen in 21 (75%) of 28 patients with high-grade lymphoma. Distant lymph node involvement occurred less frequently in low-grade lymphoma (one patient, 4%) than in high-grade lymphoma (seven patients, 25%).

**Discussion**

The distinctive low-grade B-cell MALT lymphoma of the stomach has been well characterized [4–10, 12–15], but its relationship with the more commonly occurring large B-cell gastric lymphoma and the histologic classification of gastric lymphoma has not been clarified. Isaacson and Wright [3] classified primary B-cell lymphoma of MALT into low-grade and high-grade lymphomas with or without evidence of a low-grade component. However, de Jong et al. [21] classified gastric MALT lymphoma into four categories: classic low-grade MALT lymphoma (A); mixed form (B); unequivocal high-grade transformation (C); and diffuse large B-cell lymphoma without reference to MALT (D). This confusion may arise from the question of whether any biologic difference exists between gastric large B-cell lymphomas of MALT origin and those of putative non-MALT origin, but that discussion is beyond the scope of our study.

No difference was shown in the clinical outcome of high-grade categories C and D (by the classification of de Jong et al. [21]); the 10-year survival rate was approximately 45% for both, whereas it was 90% for the classic low-grade MALT lymphoma. Montalban et al. [5] found that complete remission had been achieved in 91% of patients in the low-grade group, but was substantially
lower (70%) in the high-grade group. Castrillo et al. [4] found that patients with low-grade lymphoma had a 100% actuarial survival at 156 months, which was significantly better than that of 52% recorded for patients in the high-grade group. These researchers suggested that the prognosis of gastric lymphoma depended primarily on the histologic grade and stage, which are closely related. Histologic classification into low-grade and high-grade separates the distinctive groups of gastric MALT lymphoma, which show striking clinical and prognostic differences. Therefore, we divided the primary B-cell lymphomas of the stomach into the classic categories of low-grade and high-grade without evidence of low-grade component.

The therapeutic approach for gastric MALT lymphoma differs for the two histologic grades. Unlike high-grade lymphoma, low-grade MALT lymphoma may be treated by eradication of H. pylori. Dual or triple therapy including antibiotics and a proton pump inhibitor seems very promising, resulting in 60–70% complete regression [8, 9]. Many investigators supposed H. pylori eradication to be the first step of treatment, with surgery being reserved for those cases in which this treatment fails [5, 8, 9]. The pathogenesis of gastric MALT lymphoma associated with H. pylori has been extensively investigated. Isaacson [22] suggested that most gastric MALT lymphoma arose in MALT that was acquired in response to H. pylori infection and developed by a stepwise accumulation of genetic abnormalities, depending on H. pylori–specific activated intratumoral T-cells and direct antigen stimulation. Some preliminary data suggest that the rate of ongoing mutations gradually declines during disease progression and that the activity disappears finally in high-grade lesions. On the basis of that theory, it is suggested that in low-grade lymphoma, the eradication of H. pylori may abolish the antigenic drive of B-cell proliferation, leading to a regression of lymphoma [7, 22]. In contrast with low-grade lymphoma, the proliferative process of high-grade lymphoma is probably fully autonomous and no longer dependent on antigenic drive and is therefore unresponsive to H. pylori eradication [7, 22]. This premise offers avenues toward new therapies and augments the need to differentiate low-grade from high-grade MALT lymphoma before adopting a therapeutic approach.

Some comparative clinicopathologic studies have evaluated the differences in the endoscopic and macroscopic findings in gastrectomy specimens from patients with low-grade and high-grade lymphoma [4, 5, 7, 15]. Both Castrillo et al. [4] and Montalban et al. [5] found a significant difference, with predominance of an infiltrative pattern (38–55% of patients) in the low-grade group and of a tumor pattern (46–96% of patients) in the high-grade group. Taal et al. [7] described the significant differences in the interpretation of endoscopic findings, showing that the low-grade lymphomas were interpreted mainly as benign conditions such as benign ulcers (52% of cases), whereas the high-grade lymphomas were most often interpreted as malignancies such as advanced carcinoma (71% of cases). To our knowledge, no analysis of the differing radio-

Fig. 3.—44-year-old woman with low-grade gastric mucosa-associated lymphoid tissue lymphoma. Spot radiograph of upper gastrointestinal tract shows multiple nodules (black arrows) of varied size and shallow depression in posterior wall of gastric body. Note convergent rugae (white arrows) that project to multiple points.

Fig. 4.—48-year-old woman with low-grade gastric mucosa-association lymphoid tissue lymphoma with combined pattern. A, Spot radiograph of upper gastrointestinal tract shows discrete ulcer (u) with convergence of surrounding rugae (arrows) in posterior wall of gastric body, which looks like early gastric carcinoma. B, Spot radiograph shows multiple nodules (arrows) of varied sizes in large area of gastric body and antrum, which are located distal to ulcer (U) in A.
graphic patterns seen in low-grade and high-grade malignancies related to the MALT concept has been published.

In our study, the distribution of upper gastrointestinal radiographic findings differed significantly between low-grade and high-grade lymphomas. The characteristic feature that may be typical for low-grade lymphoma as compared with high-grade lymphoma was the presence of a superficial lesion such as mucosal nodularity (30%), shallow ulcer (24%), or a slightly thickened fold. These findings reflect the depth of invasion on the histopathologic specimen of the low-grade lymphoma, most of which were confined to the mucosa or submucosa (84%). Our results are consistent with the observations of Ohashi et al. [15] in their investigation with a relatively long-term follow-up, which showed that low-grade MALT lymphoma remained superficial for a long time and showed a gradual progression macroscopically and histologically before invading deeper tissues. They suggested that low-grade MALT lymphoma with favorable clinical outcome showed an indolent natural history and prolonged confinement to the site of origin [15]. In our study, these superficial lesions were extremely rare in high-grade lymphoma (mucosal nodularity in one patient and shallow ulcer in one patient), whereas a bulky tumor mass (38% of cases) or diffuse, very thickened folds (28% of cases) were frequent. These radiologic differences between the two different histologic groups of lymphoma reflect histopathologic findings in which the most common macroscopic type of low-grade lymphoma was a su-

Fig. 5.—84-year-old man with high-grade gastric mucosa-associated lymphoid tissue lymphoma with large mass. 
A, Spot radiograph of upper gastrointestinal tract shows large submucosal mass (arrows) at lesser curvature side of gastric body and antrum. 
B, Low-power photomicrograph shows large mass-forming malignant cell cluster (M) involving entire layers of stomach with serosal penetration.

Fig. 6.—58-year-old man with high-grade gastric mucosa-associated lymphoid tissue lymphoma with diffuse infiltration. 
A, Spot radiograph of upper gastrointestinal tract shows diffuse luminal narrowing with marked fold thickening of gastric fundus and body. 
B, Contrast-enhanced transverse CT scan shows encircling, markedly thickened gastric wall (arrows).
Radiography of Lymphoma of the Stomach

Perficial spreading type without ulceration, whereas high-grade lymphoma was a tumor-forming type [23]. That study found no tumor-forming type in the low-grade lymphoma and no superficial spreading type without ulceration in the high-grade lymphoma [23].

In our study, the differing histopathologic findings between the two groups of lymphomas are reflected in the findings on CT. Eight (28%) of the 29 patients with low-grade lymphoma had no abnormal findings on CT. Even in the remaining 21 patients in whom gastric abnormalities were identified on CT, the mean gastric wall thickness (0.8 cm) was much less than that of the patients with high-grade lymphoma (mean thickness, 2.5 cm). In most of the patients with low-grade lymphoma, the wall thickness did not exceed 1.3 cm, with the exception of one patient (maximal thickness, 2.5 cm). These findings reflect the superficial spreading type in low-grade lymphoma, and the wall thickness was proportional to the depth of invasion on the histopathologic specimen.

Our study had limitations. First, it was a retrospective analysis, so we could not determine the true sensitivity and specificity of upper gastrointestinal radiography and CT for detecting and differentiating these MALT lymphomas without bias. Second, most of the patients with low-grade MALT lymphoma in our study underwent surgical resection as the first step of treatment, so we could not directly correlate the upper gastrointestinal findings with the agent responsible for the eradication of H. pylori. Third, we excluded the patients with mixed type (high-grade with low-grade components) from our study population. Because our study was a retrospective one, it was not possible to correlate low-grade and high-grade findings in pathologic specimens with those of radiologic findings. We could do nothing but assume, therefore, that it might be a mixed type if the biopsy revealed low-grade MALT lymphoma but the imaging was more consistent with high-grade lymphoma or of both high-grade and low-grade lymphoma. In patients with such findings, we would recommend asking for more biopsy samples.

Fig. 7.—72-year-old man with high-grade gastric mucosa-associated lymphoid tissue lymphoma with deep ulcer. 
A, Spot radiograph of upper gastrointestinal tract shows large, deep ulcer (u) with surrounding mound. 
B, Low-power photomicrograph shows large ulcer (thick arrow) with malignant cell nests (thin arrows) at margin of ulcer. Histopathologic examination found nests were composed of large blast-transformed cells (not shown).

Fig. 8.—Bar chart shows mean thickness of gastric wall measured on CT correlated with depth of invasion on surgically resected specimen. Note that the deeper the invasion depth, the thicker the wall.
In conclusion, gastric MALT lymphomas appear to form a progressive spectrum of disease. However, they can be reliably separated into two histologic classifications, low-grade and high-grade, that show significantly different radiologic findings. Most low-grade lymphomas show superficial spreading lesions, such as mucosal nodularity, shallow ulcer, and minimal fold thickening. In view of the different therapeutic options and prognoses, the radiologic differentiation of low-grade from high-grade gastric MALT lymphoma is of great value.

References