Pericolic Mesenteric Lymph Nodes: An Aid in Distinguishing Diverticulitis from Cancer of the Colon

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OBJECTIVE. This study was done to determine if the detection of pericolic lymph nodes on CT scans could be used to differentiate cancer of the colon from diverticulitis.

MATERIALS AND METHODS. We retrospectively evaluated 58 CT scans from 57 patients with proven diverticulitis or cancer of the colon. The CT scans were evaluated by five board-certified radiologists who were unaware of the proven diagnosis. Consensus opinions regarding the presence and size of pericolic lymph nodes were recorded. These data were correlated with the proven diagnoses to determine the correlation between the observed findings and the type of colonic abnormality. Fisher's exact test was used to determine statistical significance.

RESULTS. Lymph nodes were seen in 22 (71%) of 31 cases of colonic cancer and in four (15%) of 27 cases of diverticulitis. The lymph nodes were 0.5–2.5 cm in short-axis diameter. We saw no difference in node size for patients with colonic cancer versus patients with diverticulitis. The nodes were most commonly located along the blood vessels in the mesenteric fat. Statistical analysis showed a significant difference (p < .001) in the frequency but not in the size of nodes between the two groups of patients. The detection of nodes resulted in a diagnostic sensitivity and specificity for colonic cancer of 71% and 85%, respectively.

CONCLUSION. Pericolic lymph nodes are seen much more frequently in patients with colonic cancer than in patients with diverticulitis. The detection of pericolic lymph nodes in patients suspected of having diverticulitis should raise the suspicion of underlying colonic cancer that should, in turn, prompt additional evaluation.

C T is often used in evaluating colonic disease. Two of the most common diseases of the colon evaluated by CT are diverticulitis and colonic cancer. The differentiation of these two entities is crucial for appropriate clinical management. However, a few reports [1–3] have indicated an overlap in the imaging appearance of these diseases in about 10% of cases. To our knowledge, no reports have investigated the usefulness of using visualized pericolic lymph nodes on the CT scans of patients with suspected diverticulitis or colonic cancer as a diagnostic discriminator between the diseases. We hypothesized that pericolic lymph nodes should be detected more frequently in patients with colonic cancer than in patients with diverticulitis and therefore might be a useful sign for differentiating the two diseases. We performed this study to test that hypothesis.

Materials and Methods

Through review of our surgery database from 1993 to 1995 we identified 58 CT scans of 57 patients with proven diverticulitis or colonic cancer. The patients consisted of 41 males and 17 females who were 17–71 years old (mean, 57 years old). The CT scans were obtained on four different CT scanners (HiSpeed Advantage; General Electric Medical Systems, Milwaukee, WI; PQ Helical; Picker International Division, Highland Heights, OH; Tomoscan TX-60; Philips Medical Systems, Shelton, CT; or DR-3; Siemens, Erlangen, Germany). Scans through the abdomen and pelvis were obtained using a current of 200 to 300 mA, 120 kVp, 7- to 10-mm collimation, and 7- to 10-mm intervals. All patients received contrast material orally (1000 ml of 2–4% Gastrografin [diatrizoate meglumine; Bracco Diagnostics, Princeton, NJ]) 2–2.5 hr before the CT study. Rectal contrast material was administered in 85% of the patients. All patients received 125–150 ml of ionic or nonionic iodinated IV contrast material (approximately 40 g) that was mechanically injected at a rate of 1–3 ml/sec. Scan-
ning began at the dome of right hemidiaphragm 40–70 sec after the start of injection.

CT scans were evaluated by five board-certified radiologists for the presence and size of pericolic lymph nodes, and a consensus was reached. Lymph nodes were considered to be present when a nodular soft-tissue density was identified in the pericolic fat adjacent to the visualized colonic abnormality. Only nodules that were clearly distinct from blood vessels and the primary mass were noted [4, 5]. All visible pericolic lymph nodes were recorded. The lymph nodes were classified by short-axis diameter into three groups (<1 cm, 1–2 cm, and >2 cm). When more than one lymph node was seen, the short-axis measurement of the largest lymph node was recorded. Retroperitoneal lymph nodes outside of the mesocolon were not included in this evaluation. None of the patients had other diseases that could account for pericolic lymph nodes. In 50 (88%) of 57 patients the diagnosis was confirmed by surgical or colonoscopic findings. In one patient, two lesions were seen, one in the sigmoid and one in the descending colon. In four cases of diverticulitis diagnosis was made by clinical follow-up, and in three cases of colonic cancer diagnosis was made by biopsy of metastatic disease in other organs.

The difference in the frequency and size of visualized nodes between diverticulitis and colonic cancer was calculated. Fisher’s exact test was used to determine if a statistically significant difference was present in these parameters for the two diagnoses. The sensitivity and specificity of visualized nodes for the diagnosis of colonic cancer was calculated.

**Results**

We found 27 cases of diverticulitis and 31 cases of colonic cancer (Figs. 1–3). Pericolic lymph nodes were seen in 22 (71%) of 31 patients with colonic cancer (Figs. 1 and 2) and in four (15%) of 27 patients with diverticulitis (Fig. 3). The lymph nodes ranged in size from 0.5 to 2.5 cm in diameter. Of the 22 patients with colonic cancer with lymph nodes seen on CT scans, the largest lymph nodes were less than 1 cm in 13 patients, between 1 and 2 cm in seven, and greater than 2 cm in two. In 17 of these 22 patients, pericolic lymph nodes were resected and submitted for pathologic examination. Surgery was not performed in the remaining five patients. Lymph node metastasis was present in six of 12 patients with nodes smaller than 1 cm, two of four patients with lymph nodes 1–2 cm in size, and one patient with lymph nodes larger than 2 cm. Thus the lymph nodes were positive for metastasis in nine (53%) of 17 cases of colonic cancer for which surgical specimens were available. In three patients, lymph nodes were not seen on CT scans although the surgical specimens showed nodal metastases. The node size in these cases was not available from pathology reports. All lymph nodes in patients with diverticulitis were smaller than 2 cm. The difference in the frequency of visualized lymph nodes in patients with colonic cancer versus diverticulitis was statistically significant (p < .001). However, the size of lymph nodes was not statistically significant. The detection of pericolic lymph nodes yielded a diagnostic sensitivity and specificity for colonic cancer of 71% and 85%, respectively.

**Discussion**

Numerous authors have reported on the appearance of diverticulitis or colonic cancer on CT scans [1, 2, 6–9]. Both diseases have been described as focal colonic processes that produce abnormal thickening of the wall of the colon and variable inflammation of the pericolic soft tissues. Further, each disease has been described as having a typical appearance that is fairly specific for the diagnosis [2, 3, 6–9]. Diverticulitis usually affects a short segment (<5 cm) of colon and produces eccentric irregular bowel wall thickening and minimal pericolic inflammation. However, not all cases of diverticulitis or colonic cancer have a typical appearance. A few authors have reported an overlap in the CT appearance of these diseases [1–3]. The paper by Balthazar et al. [1] has provided the most detail. In that study, the researchers found 16 of 150 cases of diverticulitis in which CT findings were atypical and further evaluation was needed. The points of overlap include colonic wall thickening of more than 1 cm, associated soft-tissue mass, wall thickening with luminal narrowing, wall thickening without pericolic inflammation, and short segments of wall thickening. The presence or absence of pericolic lymph nodes was not discussed.

Colonic carcinoma is one of the most common causes of enlarged lymph nodes in the mesocolon and the pericolic region [7–9]. The visualization of lymph nodes in these regions in patients with colonic carcinoma strongly suggests nodal metastasis. However, the criteria used in calling lymph nodes ab-
normal or suggestive of metastasis vary [7–9]. Freeny et al. [7] used a size of 1.5 cm or a cluster of three nodes of smaller diameter as criteria for abnormality. In their series of 80 patients using these criteria, they found seven true-positive and 20 false-negative evaluations. Balthazar et al. [8] considered 1 cm or larger or a cluster of three nodes as abnormal. Of the 90 cases in their series, 38 were true-positive and 14 were false-negative. The latter study showed increased sensitivity for nodal disease using a node size of 1 cm as abnormal. Neither of the studies mentioned if they measured the long or short axes of the lymph nodes. Herrera-Omelas et al. [10] stressed the frequency of malignancy in small lymph nodes. They noted that in 52 patients who underwent surgery, 52 of 60 lymph nodes with metastasis were smaller than 1 cm. Thus, suspicion of metastasis even in small visible lymph nodes in the pericolic mesentery should be high.

In contrast, although large abdominal lymph nodes have been reported in nonmalignant conditions such as celiac disease, Whipple’s disease, cirrhosis, systemic mastocytosis, Crohn’s disease, and sarcoidosis [11–14], Deutch et al. [12] reviewed 2100 consecutive CT studies and found abdominal lymphadenopathy in 16 cases, of which nine (6%) were due to benign causes. In only two (one with Crohn’s disease and one with systemic mastocytosis) of the nine patients were enlarged small bowel mesenteric lymph nodes seen. In two recent studies, Rao et al. [15, 16] reported the presence of lymph nodes in cases of mesenteric adenitis, cecal diverticulitis, right-sided colitis, and sigmoid diverticulitis mimicking appendicitis. In these cases demonstration of a normal appendix excluded the diagnosis of appendicitis. To the best of our knowledge, the frequency of enlarged pericolic or mesocolic lymph nodes in patients with diverticulitis has not been reported.

In our study we evaluated the reliability of pericolic lymph nodes revealed by CT as a discriminator for differentiating colonic cancer from diverticulitis. We found that a large percentage (71%) of patients with colonic cancer had visible pericolic lymph nodes, whereas only a small percentage (15%) with diverticulitis did. We considered all visible nodes to be abnormal but grouped them by the short-axis diameter [17]. Of the 22 cases of colonic cancer, lymph nodes in approximately one half measured smaller than 1 cm, in one third measured 1–2 cm, and in two cases measured larger than 2 cm. Of the four cases of diverticulitis, one half of the lymph nodes were smaller than 1 cm, and one half measured 1–2 cm. Thus, although lymph nodes were present far more frequently in cases of colonic cancer than in cases of diverticulitis, no relationship was found between node size and disease process. Lymph node metastasis was present in nine of 17 cases of colonic cancer for which pathologic analysis was available. We found no correlation between node size and presence of metastasis. Lymph nodes are seen far less frequently in cases of diverticulitis than in cases of colonic cancer. When they are seen, they should be considered atypical for diverticulitis, which should raise the suspicion of an underlying malignant process.

Our study has three relative limitations. The most important limitation is that we do not have pathologic correlation in all patients because five of 22 patients with colonic cancer did not undergo surgery because of advanced disease. In cases of diverticulitis, we do not know for certain that the visualized soft-tissue nodules identified actually represented lymph nodes or were perhaps small inflammatory foci or volume averaging of adjacent soft tissues. The nodes that are normal in other inflammatory conditions suggests that these nodules are likely to be lymph nodes. Secondly, we do not know if the lymph nodes seen on CT scans in cases of colonic cancer were the same ones that were involved by tumor, partly because surgical and pathologic reports gave the number of total nodes and involved nodes but not by exact location. However, the visible lymph nodes are conceivable more likely to be involved. The third limitation refers to the significance of the data as it pertains to the treatment of the patients. To determine the clinical impact from this data or to develop an algorithmic approach to treatment, a larger prospective study is needed. We also did not evaluate other CT findings in both diseases. Nonetheless these limitations do not negate our findings of a statistically significant difference in the number of apparent lymph nodes shown by CT in patients with colonic cancer versus the number shown in those with diverticulitis. We believe that the presence of pericolic lymph nodes is not a typical feature of colonic diverticulitis.

In conclusion, we have found a statistically significant difference in the frequency of visible pericolic lymph nodes in patients with colonic cancer versus those with diverticulitis.

Therefore, in patients with CT findings of diverticulitis, visualization of pericolic lymph nodes should raise the suspicion of an underlying malignancy and initiate further investigation.

References