Evaluating Patients with Left Upper Quadrant Pain

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KEYWORDS

• Acute abdomen • Left upper quadrant (LUQ) • Splenic infarct • Splenic abscess • Gastritis • Peptic ulcer disease (PUD) • Perforation

KEY POINTS

- Imaging plays an important role in evaluating left upper quadrant (LUQ) pain in the acute setting.
- The anatomy of the peritoneal reflections, subperitoneal space, and peritoneal spaces play an important role in clarifying the pattern and appearance of disease in the LUQ.
- Currently, the primary imaging modality for evaluating acute LUQ pain is contrast-enhanced multidetector computed tomography, although ultrasound and MR imaging play important adjunctive roles. Fluoroscopic upper gastrointestinal studies are occasionally useful.
- The most common causes of acute LUQ pain include gastritis, peptic ulcer disease, sickle cell crisis and splenic infarct, and pancreatitis; the full differential diagnosis is longer.
- Several of the causes of LUQ pain are life threatening and require rapid diagnosis and treatment.

INTRODUCTION

Acute left upper quadrant (LUQ) pain is less common than pain at other sites in the abdomen; but several of the causes of acute LUQ pain can be life threatening, and rapid accurate diagnosis is critical.[1] Frequently, the radiologist is the first person to discover that the cause of a patient's nonspecific acute abdominal pain is a disease in the LUQ.[2] In a study of patients who presented to the emergency department (ED) with abdominal pain, only 4% of patients initially complained of LUQ pain, yet the most common posttest primary diagnosis was gastritis/peptic ulcer disease (PUD) complex.[3] Imaging plays a vital role in the evaluation of patients with acute LUQ pain. Physical examination in patients with abdominal pain has low specificity and low sensitivity.[4] One study found that interrater agreement between ED attendings and residents in detecting LUQ physical examination findings was only fair and was worse than for any other area of the torso.[5] Non–imaging-based tests also provide limited benefit. Nagurney and colleagues[3] evaluated and compared the usefulness of common tests in the evaluation of patients with abdominal pain. The initial pretest diagnosis and disposition were changed in more than one-third of patients in their study, and computed tomography (CT) was identified as the most useful test in these patients. In another study evaluating 4 different models for comparing abdominal pain, Gerhardt and colleagues[4] found that noncontrast helical CT was the most accurate "clinical predictor variable" in determining the need for urgent intervention.[4] They concluded that CT is "the single most useful diagnostic adjunct to augment the clinical evaluation."[4] The problems in obtaining a meaningful history and accurate physical examination are even more difficult in elderly patients who frequently have preexisting illnesses that can alter or mask the usual manifestation of acute disease.[6] As a result, thorough familiarity with the imaging

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manifestations of LUQ pathology and an ability to prescribe the most suitable imaging strategy for evaluation of this area are vital.

The most common causes of acute LUQ pain include gastritis, PUD, sickle cell crisis, splenic infarct, splenic abscess, and pancreatitis; a more complete differential diagnosis is given in **Box 1**.[1,7,8] This article discusses important common diseases of the spleen and stomach that cause acute LUQ pain and reviews aspects of other entities in the differential diagnosis in terms of their features that are unique to the LUQ. Relevant aspects of LUQ anatomy and the current role of CT, ultrasound (US), and MR imaging in evaluating this area are considered.

Box 1
Differential diagnosis of acute LUQ pain

- Spleen
  - Infarct and sickle cell crisis
  - Splenomegaly
  - Rupture
  - Abscess and infection
  - Ruptured splenic artery aneurysm
  - Splenic torsion
  - Splenic vein thrombosis
- Gastric
  - Gastritis
  - Gastric ulcer/PUD complex
  - Volvulus and gastric outlet obstruction
  - Postoperative complication
    - Laparoscopic Roux-en-Y gastric bypass
    - Gastric banding
- LUQ complications of pancreatitis
  - Pseudocysts and fluid collections in the lesser sac, subphrenic space, and LUQ subperitoneal space
  - Intrasplenic pseudocysts, hemorrhage, infarct
  - Gastric wall
  - Colonic spasm, obstruction, and adynamic ileus
  - Pseudoaneurysm of the splenic artery
  - Splenic vein thrombosis
- Splenic flexure
  - Colitis and ischemic colitis
  - Diverticulitis
  - Carcinoma
- Jejunum
  - Jejunal obstruction and internal hernias
  - Jejunal diverticulitis
- Left kidney
  - Renal colic
  - Pyelonephritis and renal abscess
- Left adrenal hemorrhage
- Left subphrenic abscess
- Diseases of the left hemithorax
  - Pulmonary disease (eg, left lower lobe pneumonia)
  - Diseases of the heart and pericardium (eg, coronary infarction)
- Diaphragmatic hernias

Data from Refs.[1,7,8]

ANATOMY AND APPROACH TO IMAGING

Anatomy

The interpretation of imaging studies is facilitated by familiarity with the peritoneal reflections that define the spaces of the LUQ (**Table 1**) and that fix the relationship between the spleen, stomach, and splenic flexure. The loose areolar tissue that surrounds the vessels, lymphatics, and nerves running within the peritoneal reflections constitutes the subperitoneal space that serves as a pathway for the spread of disease into and out of the LUQ.[9] A systematic approach to the anatomy is useful.

The transverse mesocolon (TM) is a peritoneal fold that surrounds the transverse colon with its root running along the ventral length of the body of the pancreas.[9,10] It divides the abdomen into supramesocolic and inframesocolic compartments and, therefore, may be considered the caudal border of the LUQ. It can be appreciated in the sagittal and coronal planes in patients with ascites; in the axial plane, its position in the LUQ can be localized by following the course of the left colic vein and the veins that drain the splenic flexure as they converge on the inferior mesenteric vein (IMV) (**Fig. 1**).[11] This subperitoneal space connects the transverse colon with the pancreas and also acts as a crossroad for the spread of disease throughout the abdomen because it is contiguous with ligaments that ultimately join all of the major subperitoneal routes in the upper abdomen.[9] The classic example of an acute disease process spreading via this pathway occurs in acute