

# Evaluating the Patient with Right Lower Quadrant Pain



Neel B. Patel, MD<sup>a,\*</sup>, Daniel R. Wenzke, MD<sup>b</sup>

## KEYWORDS

- Abdominal pain • Appendicitis • Diverticulitis • Epiploic appendagitis • Meckel's diverticulum
- Omental infarct • Neutropenic colitis • Inflammatory bowel disease

## KEY POINTS

- Right lower quadrant pain may be caused by a variety of conditions and clinical diagnosis is often challenging due to nonspecific clinical symptoms.
- Computed tomography (CT) is the primary imaging modality for the evaluation of right lower quadrant pain in most patients because it provides a rapid general survey of anatomy and potential pathology.
- CT protocol for the evaluation of suspected appendicitis or right lower quadrant pain will depend on the needs of referring clinicians, usually the emergency department, and individual work flow considerations of each radiology department.

## INTRODUCTION

Right lower quadrant abdominal pain is a common presenting symptom in the emergency department and can result from a wide spectrum of conditions, ranging from benign and self-limiting to those require urgent surgical or percutaneous intervention.<sup>1</sup> Optimal evaluation necessitates integration of patient history, clinical examination, laboratory tests, and imaging studies. The initial consideration in most patients is acute appendicitis; however, several other conditions may present with similar clinical, physical, and laboratory features. Other causes of right lower quadrant pain include mesenteric adenitis, Meckel diverticulum, neutropenic colitis, right-sided diverticulitis, epiploic appendagitis, omental infarct, and inflammatory bowel disease.

## IMAGING OF RIGHT LOWER QUADRANT PAIN

Computed tomography (CT) is the primary imaging modality for the evaluation of acute abdominal

pain in most patients because it provides a general survey of anatomy and potential pathology. The vast majority of imaging studies for evaluating right lower quadrant pain center on the diagnosis of acute appendicitis, the most frequent cause of abdominal pain requiring surgery. Delayed diagnosis can result in substantial morbidity.

CT imaging has proven to be a highly effective and accurate means of diagnosing acute appendicitis, with reported sensitivities of 90% to 100%, specificities of 91% to 99%, accuracies of 94% to 98%, positive predictive values of 92% to 98%, and negative predictive values of 95% to 100%.<sup>2-7</sup> The optimal CT technique for acute appendicitis remains controversial and most commonly consists of oral enteric and intravenous contrast-enhanced examinations. Many studies have focused on modifying CT protocols in an attempt to reduce patient radiation dose, eliminate adverse reaction and nephrotoxicity risk with intravenous contrast, and enable earlier scanning rather than waiting for bowel transit of oral contrast

<sup>a</sup> Jupiter Imaging Associates, Sheridan Healthcorp, Jupiter, FL, USA; <sup>b</sup> NorthShore University HealthSystem, University of Chicago, Pritzker School of Medicine, 2650 Ridge Avenue, Evanston, IL 60201, USA

\* Corresponding author.

E-mail address: neelbpatel@hotmail.com

material. Investigated strategies include scanning without intravenous and/or oral contrast, addition of rectal contrast, targeted imaging of the right lower quadrant, and reduced radiation dose scanning techniques.<sup>7-15</sup>

CT scans performed without oral, rectal, or intravenous contrast allow immediate scanning of symptomatic patients at a lower cost and without the risk of a contrast reaction. Lack of oral contrast may be a disadvantage in patients with a paucity of intra-abdominal fat, limiting detection of the appendix and subtle inflammatory changes in the right lower quadrant.<sup>2,16</sup> Identification of bowel wall thickening and luminal narrowing is also limited without enteric contrast.<sup>17</sup> Lack of intravenous contrast limits assessment of appendiceal wall thickening, differentiation of the appendix from surrounding vasculature, and reduces the ability to make an alternative diagnosis.<sup>9,18</sup>

Ultimately, the CT protocol for the evaluation of suspected appendicitis or right lower quadrant pain will depend on the needs of referring clinicians, usually the emergency department, and individual work flow considerations of each radiology department. For example, emergency departments are under increasing pressure to reduce average length of stay. Intravenous contrast-only protocol for select patients with abdominal pain reduced length of stay by 2 hours compared with oral contrast-prepped examinations.<sup>19</sup>

## ACUTE APPENDICITIS

Appendicitis is the most frequent cause of acute abdominal pain requiring surgical intervention and is the most common emergent abdominal operation performed in the United States.<sup>18,20</sup> The annual incidence of acute appendicitis across all ages is approximately 9.4 cases per 10,000, with the highest incidence of 15.3 cases per 10,000 occurring in the 10-year-old to 19-year-old age group.<sup>21</sup>

The appendix is a true diverticulum located at the base of the cecum near the ileocecal valve. Although the base of the appendix is relatively constant in position, the tip may migrate into a variety of positions, most commonly retrocecal, pelvic, and less commonly retroileal, preileal, subileal, postileal, and subcecal.<sup>22</sup> The appendix typically measures 6 to 9 cm in length, but can vary considerably, with longest reported appendix measuring 55 cm.<sup>23</sup>

Clinical examination remains an essential component of evaluating a patient with suspected acute appendicitis; however, overall diagnostic accuracy is approximately 80% with a range of 78% to 92% in male patients and 58% to 85% in female patients.<sup>18</sup> The lower diagnostic accuracy in females is likely due to gynecologic and

obstetric pathologies presenting with right lower quadrant pain. Most patients with acute appendicitis present with abdominal pain, although the classic presentation sequence of poorly localized periumbilical pain, followed by nausea and vomiting, and later migration of the pain to the right lower quadrant occurs in only one-half to two-thirds of all patients.<sup>24</sup> Diagnosis is complicated by variable clinical symptoms based on anatomic position of the appendix. In patients with a retrocecal appendix, the pain may be referred to the right flank, costovertebral angle, or, in males, the right testis. Patients with a pelvic or retroileal appendix may experience pain in the pelvis, rectum, adnexa, or, less commonly, left lower quadrant.<sup>24</sup>

CT findings of acute appendicitis generally reflect the severity of inflammation. Mild cases may have subtle imaging findings with a minimally distended, fluid-filled appendix measuring 5 to 6 mm in diameter and without appreciable periappendiceal fat stranding (**Fig. 1**).<sup>18</sup> Typically, acute appendicitis presents with luminal distension of 7 to 15 mm in diameter, circumferential wall thickening, appendiceal wall enhancement (homogeneous or stratified in a so-called “target sign”), and periappendiceal inflammatory change, occasionally with an appendicolith (**Figs. 2-4**).<sup>12,18</sup> Reactive inflammation may spread to the adjacent cecum. Triangular-shaped thickening of the cecum surrounding the appendiceal orifice is known as the “arrowhead sign” (**Fig. 5**), whereas linear inflammatory change separating the base



**Fig. 1.** Acute appendicitis. Contrast-enhanced axial CT image shows an abnormal appendix (*arrows*) with mild luminal distension and abnormal mural enhancement and thickening. No significant periappendiceal inflammatory stranding is present. (From Wenzke DR, Jacobs JE, Balthazar EJ, et al. *Diseases of the appendix*. In: Gore RM, Levine MS, editors. *Textbook of gastrointestinal radiology*. 4th edition. Philadelphia: Elsevier/Saunders; 2014. p. 964; with permission.)

Download English Version:

<https://daneshyari.com/en/article/4246691>

Download Persian Version:

<https://daneshyari.com/article/4246691>

[Daneshyari.com](https://daneshyari.com)