The Journal of Emergency Medicine, Vol. 49, No. 5, pp. 623–626, 2015

0736-4679/$ - see front matter

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http://dx.doi.org/10.1016/j.jemermed.2015.05.013

# Clinical Communications: Adults

## RIGHT LOWER QUADRANT PAIN IN A YOUNG FEMALE: ULTRASOUND DIAGNOSIS OF RECTUS ABDOMINIS TEAR

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☐ **Abstract—Background: Right lower quadrant pain in young females presents a frequent diagnostic challenge for emergency physicians, with a broad differential and several important diagnoses. Using an "ultrasound first" imaging strategy can help decrease the use of computed tomography scans, with associated savings in radiation exposure, cost, and other resource use. Case Report: We report a case of right lower quadrant pain in a young woman. After her initial history and physical examination, appendicitis was the leading differential. A bedside ultrasound was performed, leading to the uncommon diagnosis of rectus abdominis muscle tear. The sonographic findings of a muscle tear include increase in size, loss of linear, homogeneous architecture, and decreased echogenicity. Making this diagnosis at the bedside using ultrasound obviated the need for further imaging, avoiding unnecessary radiation exposure, and decreasing emergency department length of stay and overall cost, while leading to a tailored treatment plan.**

**Why Should an Emergency Physician Be Aware of This? Rectus abdominis tear is a cause of right lower quadrant pain that may mimic appendicitis and should be considered in patients with this complaint. The ability to make this diagnosis with bedside ultrasound may assist in several important patient-oriented outcomes.** © **2015 Elsevier Inc.**

☐ **Keywords—right lower quadrant pain; ultrasound; rectus abdominis; muscle tear**

Streaming videos: Six brief real-time video clips that accompany this article are available in streaming video at www.journals.elsevierhealth.com/periodicals/jem. Click on Video Clips 1, 2, 3, 4, 5, and 6.

### INTRODUCTION

Females with right lower quadrant pain can be a diagnostic challenge in the emergency department (ED), with a list of important diagnoses that are difficult to exclude based solely on history and physical examination. The routine use of computed tomography scans is costly and time consuming, and there is increasing awareness of the risk of ionizing radiation from these studies (1). Many recent studies have demonstrated benefits using an "ultrasound first" imaging strategy in suspected appendicitis, with decreased costs, radiation exposure, and high accuracy (2–4).

Ultrasound can be used at the bedside to evaluate not only appendicitis, but also other important etiologies, including ureteral obstruction, adnexal and ovarian pathology, and hernias, among others. In this case, an uncommon diagnosis, rectus abdominis tear, was made using bedside ultrasound and should be considered in patients with abdominal pain. Knowledge of this diagnosis and its sonographic findings should assist emergency physicians in their bedside evaluation of patients with abdominal pain and, it is hoped, benefit patients by

RECEIVED: 5 November 2014; FINAL SUBMISSION RECEIVED: 1 May 2015;
ACCEPTED: 14 May 2015

reducing radiation exposure and resource use, and allowing more specific treatment plans.

## CASE REPORT

A 23-year-old woman presented with right lower quadrant pain for 3 days that was getting progressively worse. She initially believed she pulled a muscle and thus limited her activity, without improvement in her symptoms. The pain worsened with movement. She had begun to experience nausea and loss of appetite. There were no other gastrointestinal or genitourinary symptoms, and her symptoms felt different than a prior ovarian cyst. Past medical and surgical history was unremarkable, and social history revealed that she worked as a gymnastic performer in a traveling musical production.

Physical examination revealed an athletic woman with normal abdominal inspection. There was right lower quadrant tenderness with voluntary guarding and a positive psoas sign. There was no costovertebral angle tenderness. Pelvic examination was normal. Urine and pregnancy tests were negative.

Typical for this type of presentation, a broad differential diagnosis was considered, which included ovarian and adnexal pathology, ureterolithiasis, urinary tract infection, appendicitis, inguinal hernia, and other intestinal pathology. Appendicitis was the leading differential consideration after the initial examination.

A bedside ultrasound was performed, primarily to investigate the appendix. Normal internal right lower quadrant landmarks (bladder, iliac vessels, and psoas muscle, seen in Figures 1 and 2) were seen and the appendix was not definitively identified. There were no other sonographic findings to explain the patient's symptoms. During the ultrasound examination, a swollen, heterogeneous area was identified at the origin of the rectus abdominis (as seen in Figures 1–4; Videos 1–5, available online), interrupting the organized, linear, and homogeneous appearance of normal skeletal muscle. This lesion was noted to be superficial to the peritoneal lining and other intra-abdominal landmarks, as well as contained within the otherwise organized, linear architecture of the rectus abdominis. This area corresponded to the patient's area of maximal tenderness on further examination. There was minimal color flow within this area (seen in Figure 5). Comparison views were made of the contralateral side, which appeared to have normal muscular architecture (as seen in Figure 6; Video 6,

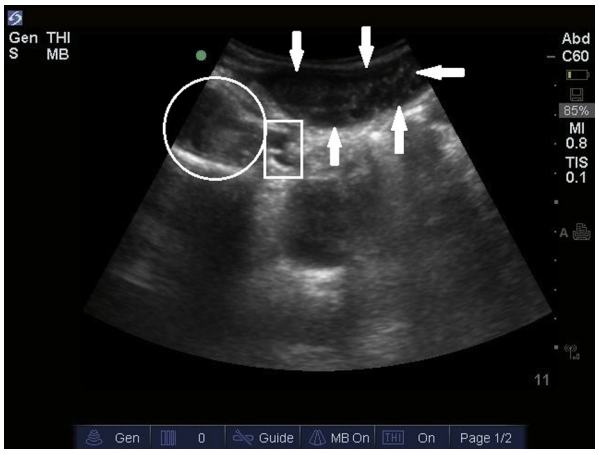


**Figure 2. Rectus abdominis tear, low frequency 2. Here again, the swollen area of the rectus abdominis (closed arrows) is seen within the abdominal wall at a shallow depth, superficial to the iliac vessels (box) and the psoas muscle (circle).**

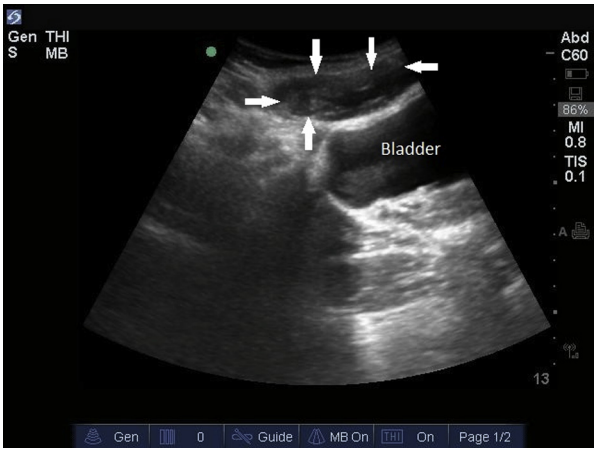


**Figure 1. Rectus abdominis tear, low frequency. Here the swollen area of the rectus abdominis muscle (closed arrows) is seen. Note its enlargement, heterogeneous, more hypoechoic, and disorganized appearance (compare to Figure 6). Also, note its location superficial to the bladder and within the abdominal wall.**

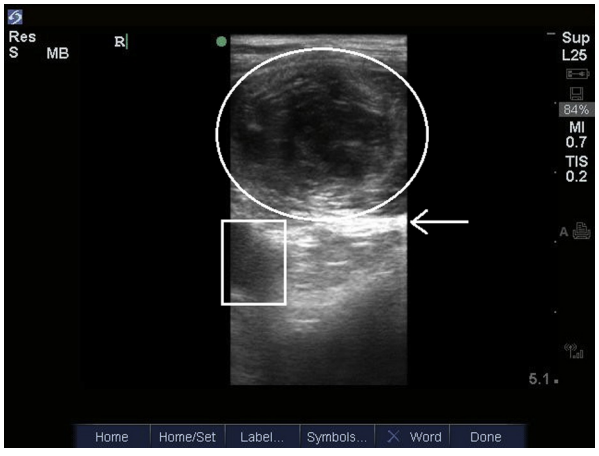


**Figure 3. Rectus abdominis tear, short axis, high frequency. Here, the rectus abdominis muscle is seen to be enlarged, heterogeneous, hypoechoic, and disorganized (circle), consistent with a muscle tear. Note the depth and the relation to the deeper iliac vessels (box) and the peritoneal lining (open arrow).**