

EM CASE OF THE WEEK.

BROWARD HEALTH MEDICAL CENTER
DEPARTMENT OF EMERGENCY MEDICINE



Care Warriors

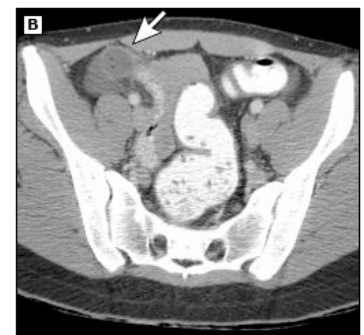
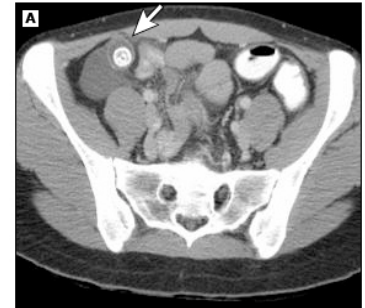
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Acute Appendicitis

A 39-year-old male with no past medical history presents to the ED complaining of right lower quadrant abdominal pain for the past 2 days. The pain initially started periumbilically, but has since migrated to the right lower quadrant over the last 24 hours. The patient also complains of associated nausea, vomiting, and fever. Vital signs show a HR of 110, temperature of 100.9 °F, and BP of 130/72. On physical exam, the patient is severely tender to palpation in the right lower quadrant, has McBurney's point tenderness, and no rebound tenderness or guarding. Labs demonstrate a WBC of 12K with no other abnormalities. A CT scan of the abdomen shows an inflamed appendix with no evidence of perforation or abscess. According to a recent study, which of the following initial treatment options may be just as effective as immediate appendectomy?

- A. IV fluids, NG tube decompression, and pain control
- B. Cefoxitin 2g IV plus Metronidazole 500 mg IV
- C. Ertapenem 1g IV with follow-up in 24 hours for re-evaluation
- D. Cefazolin 1g IV followed by exploratory laparotomy



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Images A & B show an inflamed appendix with an intraluminal appendicolith and surrounding fluid

EM Case of the Week is a weekly "pop quiz" for ED staff.

The goal is to educate all ED personnel by sharing common pearls and pitfalls involving the care of ED patients. We intend on providing better patient care through better education for our nurses and staff.

BROWARD HEALTH MEDICAL CENTER

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The correct answer is C. Ertapenem 1g IV with follow-up in 24 hours for re-evaluation.

Acute appendicitis refers to an inflammation and infection of the appendix most commonly caused by obstruction of the appendiceal lumen. Obstruction can occur secondary to lymphoid hyperplasia, a fecalith, or a foreign body. When obstructed, the appendix becomes distended resulting in vascular compromise. This eventually leads to ischemia, necrosis, and necrosis. Stasis of the fluid within the appendix also occurs, promoting bacterial overgrowth. The most common organisms involved are from fecal flora and include E. Coli, Peptostreptococcus, Bacteroides, and Pseudomonas.¹

Classifications

Uncomplicated: no evidence of perforation or abscess
Complicated: appendiceal perforation or abscess

Perforation or abscess should be suspected in patients who have a fever >103° F, WBC >15k, fluid collection in the right lower quadrant, extra-luminal air, peritoneal signs, and/or are toxic appearing.^{1,2}

Disease Severity Score

- Grade 1 – Inflamed
- Grade 2 – Gangrenous
- Grade 3 – Perforated with localized free fluid
- Grade 4 – Perforated with regional abscess
- Grade 5 – Perforated with diffuse peritonitis^{1,2}

Treatment

Immediate appendectomy is the treatment of choice recommended by the American College of Surgeons and World Society of Emergency Surgery for all patients who arrive to the ED within 24 to 72 hours after the onset of their symptoms.²

Prior to surgery, the EM physician should hydrate the patient with IV fluids, replete any electrolyte abnormalities, and give pre-operative antibiotics. Empiric antibiotic choice is dependent on the presence or suspicion of perforation. In patients with a non-perforated appendix, a single dose of ampicillin/sulbactam or a 1st or 2nd generation cephalosporin can be given along with metronidazole. In patients with a perforated appendix, it is recommended to use piperacillin/tazobactam, ticarcillin/clavulanate, or a 3rd generation cephalosporin in addition to metronidazole.²

Discussion

Appendicitis is one of the most common abdominal surgeries performed in the US accounting for over 300,000 cases and over \$2 billion in healthcare expenses annually.³ For over 120 years, the mainstay of treatment for acute appendicitis has been appendectomy. However, non-operative treatment, consisting of broad-spectrum antibiotic regimens for uncomplicated cases, may become an option in lieu of the classic appendectomy in future patients. This approach, typically reserved for poor surgical candidates or those who refuse surgery, could end up having utility in the general population as well.^{2,3}

For a list of educational lectures, grand rounds, workshops, and didactics please visit BrowardER.com and **click** on the **“Conference”** link.

All are welcome to attend!

Warriors

Several European trials over the past 20 years have sought to compare the efficacy of non-operative management versus appendectomy. Systematic review and meta-analysis of these studies revealed that non-operative management is just as safe as an appendectomy.² These studies showed that there was no increased risk of perforation or sepsis when using an antibiotic-first approach.³ This strategy was also associated with fewer complications, less pain and disability, and a greater overall symptom reduction.^{2,3} However, a significant number of patients randomized to the antibiotic-first approach ended up receiving an appendectomy within 48 hours or had recurrent appendicitis requiring surgery later on in life.²

Until recently, there were no U.S. trials comparing the antibiotic-first approach to appendectomy. In December of 2016, Talan et al published their pilot study, *Antibiotics-First Versus Surgery for Appendicitis: A US Pilot Randomized Controlled Trial Allowing Outpatient Antibiotic Management*, in the *Annals of Emergency Medicine*. In this study, patients diagnosed with uncomplicated acute appendicitis confirmed by imaging were randomized to either an antibiotics-first approach or appendectomy. The results of the study were relatively consistent with the previous European trials with a reduction in recurrent appendicitis rates and in patients requiring appendectomy after randomization to the antibiotic-first group. Overall, it showed that an antibiotic-first approach was both safe and effective for their study population. The results of this study, although encouraging, did not come without some major limitations including sample size, study population, only a 30 day follow-up period, and lack of blinding.^{3,4,5}

As it was only a pilot study, it cannot establish safety or efficacy, but it did open the door for a larger, multi-center trial in the US, which is currently being conducted.³ Many questions remain that will hopefully be answered by this larger, phase 3 trial. These questions include, but are not limited to, what are the long-term recurrence rates, quality of life, and satisfaction rates of patients manage non-operatively?, which populations of patients will benefit most from non-operative management?, and how will this impact healthcare costs?^{4,5}

Although far from being the standard of care, this could mark the beginning of shift in management of the patient with acute uncomplicated appendicitis.



ABOUT THE AUTHOR

This month's case was written by Ben Myers. Ben is a 4th year medical student from NSU-COM. He did his emergency medicine rotation at BHMC in July 2017. Ben plans on pursuing a career in Emergency Medicine after graduation.

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