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Intercostal Neuritis Masquerading as Acute Appendicitis: A Case Report

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Abstract

Abdominal pain is a common complaint among Emergency Department (ED) patients and accounts for approximately 10% of all visits. While some presentations are classic, making diagnosis and treatment expeditious, other presentations require time-intensive work-ups that yield no etiology in nearly 25%. The Emergency Physician (EP) is tasked to maintain a broad differential while ruling out surgical conditions such as acute appendicitis. Within this differential is abdominal wall pathology. We present a case of a 28 year-old female who presented with right lower quadrant pain, was diagnosed with intercostal neuritis and discharged with a non-steroidal anti-inflammatory drug (NSAID) and appendicitis precautions. Ultimately, timely diagnosis of these less emergent pathologies can improve patient satisfaction, prevent unnecessary tests and provide targeted treatment modalities.

Keywords: Appendicitis; Intercostal neuritis; Neuropathic pain; Right lower quadrant pain

Abbreviations:

ED: Emergency Department; NSAID: Non-Steroidal Anti-Inflammatory Drug; EP: Emergency Physician; CT: Computed Tomography

Introduction

The differential diagnosis of abdominal pain is extensive. The Emergency Physician (EP) must give thought to a variety of organ systems in order to tailor the work-up and arrive at a reasonable diagnosis. The potential causes of acute right lower quadrant pain include but are not limited to appendicitis, mesenteric adenitis, Meckel's diverticulitis, cecal diverticulitis, aortic aneurysm, ectopic pregnancy, ovarian torsion, ovarian cyst rupture, pelvic inflammatory disease, tubo-ovarian abscess, endometriosis, ureteral calculi, incarcerated or strangulated hernia, and urinary tract infection. Apart from these important intra-abdominal pathologies, there are many important extra-abdominopelvic causes of abdominal pain. These include thoracic disease (myocardial infarction, pneumonia); infections (streptococcal pharyngitis, mononucleosis); systemic illness (diabetic ketoacidosis, porphyria, vasculitides, sickle cell crisis); toxins and abdominal wall pathology (hematoma, neuropathic, muscle spasm) [1]. While abdominal wall etiologies are often a diagnosis of exclusion, certain pathology including rectus sheath hematomas can require emergency intervention [2,3]. Similarly, intercostal neuralgia or neuropathies have been shown to cause acute and chronic abdominal pain. These diagnoses are rarely made in the acute setting of an ED, but it is important to keep them in mind, especially in patients who have had a complete work-up with no identified cause to their pain.

Case Report

A 28 year-old female presented to the Emergency Department (ED) with complaints of right lower quadrant abdominal pain that began seven hours prior to arrival and five episodes of non-bloody and non-bilious emesis. The abdominal pain was sharp, severe at times, constant and non-radiating. On review of symptoms, she reported myalgias, lightheadedness, intermittent shortness of breath, sore throat, rhinorrhea, congestion and a couple episodes of loose stools over the course of the week. She denied fevers, chills, sick contacts, recent travel, dysuria, frequency, vaginal discharge, history of sexually transmitted infections, melena, hematochezia, or cough. She had no past medical and surgical history and took no medications. She denied tobacco use and reported occasional alcohol use.

On physical exam, the patient appeared well-nourished but was in distress with intermittent retching. She was lying supine on the gurney with minimal movement. Her vital signs included heart rate of 94 beats/minute, blood pressure of 135/73 mm Hg, temperature of 36.3 degrees Celsuis, respiratory rate of 18 breaths/minute, and SpO_2 of 97% on room air. Her mucous membranes were moist and her capillary refill was less than three seconds. Heart and lung exams were normal. On abdominal exam, there was no rash and she appeared minimally distended with normal bowel sounds. She was tender to palpation in the right lower quadrant near McBurney's with guarding, but no rebound. She did not have costovertebral angle tenderness to percussion. The remainder of her abdominal exam was unremarkable. Pelvic exam did not reveal malodorous discharge, cervical motion tenderness or adnexal tenderness.

Initial actions included intravenous fluids, antiemetics and pain control. Labs included a complete metabolic panel, lipase, complete blood count, urinalysis, and urine pregnancy test. All were negative and unremarkable. Despite other nonspecific symptoms, the patient's concerning serial abdominal exams prompted the ordering of appendix and pelvic ultrasounds.

The ED course was eventful for one episode of non-bloody, non-bilious emesis, which improved with Zofran, and continued complaints of right lower quadrant pain, which improved with fluids and morphine.

The ultrasound failed to visualize the appendix, but showed normal ovaries. There was no evidence of inflammatory changes nor free fluid in the pelvis. A General Surgery consultant recommended a Computed Tomography (CT) scan of her abdomen and pelvis but agreed to evaluate the patient prior to imaging, given the atypical features noted above. The patient was thus observed with further abdominal exams. A repeat examination revealed that the pain involved the entire right T10 dermatome. The right lower quadrant pain was reproduced by very lightly pressing a tongue blade posteriorly between the 10^{th} and 11^{th} ribs. The severe pain was also reproduced by sliding the sharp end of the tongue blade anteriorly over the T10 dermatome without applying pressure on the abdominal cavity. There was an abrupt border between tender and non-tender areas of her abdominal wall. No rash was found.

With these findings on repeat exam, the patient was given a Non-Steroidal Anti-Inflammatory Drug (NSAID) and observed for another hour. The pain resolved and, given her associated viral syndrome symptoms over the preceding week, it was determined that the etiology of her abdominal pain was likely intercostal neuritis. The CT scan was offered to the patient but eventually cancelled. However, with the inability to completely rule-out acute appendicitis with an equivocal ultrasound, the patient was discharged with a prescription for an NSAID, appendicitis return precautions, and follow-up recommendations. The patient did not return to the ED and several attempts to call for follow-up were unsuccessful up to several months after this initial encounter. It is unknown whether she presented to an outside hospital nor developed a dermatomal rash.

Discussion

Historical context

In 1924, Dr. Marshal Clinton published an article in JAMA citing subcostal neuritis as a cause of abdominal pain [4]. He reported several patients who received a complete work-up, sometimes including laparotomy, who potentially would have been diagnosed with a careful history and physical exam. Prior to this, other physicians, including orthopedic surgeon Dr. James Cyriax, acknowledged the role of vertebral or rib lesions causing irritation of the intercostal nerves leading to anterior chest or abdominal pain [5]. In 1926, Dr. John Carnett agreed with these physicians and subsequently devised "Carnett's sign" to aid the clinician in diagnosing abdominal wall pathology. The sign, which is often taught in medical schools, includes localizing the area of pain while the patient is supine and then having the patient lift the head and shoulders off the gurney in order to flex the abdominal muscles. According to Carnett, if the pain increases or stays the same in that localized region, it is likely that the pain is from the abdominal wall [6].

Multiple studies have illustrated the importance of suspecting abdominal wall pathology in patients presenting with acute abdominal pain. One such study in 1977 published in Lancet, looked at 120 ED patients presenting with focal acute abdominal pain in which an abdominal wall tenderness test was employed similar to the Carnett exam. In these patients 24 had a positive sign but 11 were still taken for laparotomy given concern for concurrent intra-abdominal pathology. Ten of the 11 laparotomies in patients with a positive abdominal wall tenderness test were negative but one was positive for appendicitis. The other 13 patients with a positive test were observed and discharged without complication [7,8].

Clinical features

Patients with neuropathic abdominal pain often describe their pain as dull and well localized with occasional radiation horizontally [9]. If due to nerve entrapment, the pain may radiate with twisting, bending or sitting [9]. Similar to other peripheral neuropathies, the pain may be associated with paresthesias and may radiate along the length of the nerve. History may reveal trauma to the ribs or trunk, surgery, viral syndromes, vitamin deficiencies, diabetes, family history or metastatic carcinoma [4,10]. On physical exam, light touch causes intense pain which is carefully differentiated from pain with light and deep palpation.

Management and disposition

Neuropathic pain is considered frequently in patients with chronic abdominal pain and in those with multiple ED presentations. However, acute viral neuritis can present with acute abdominal pain. It is important to evaluate patients with abdominal pain thoroughly, making sure to assume the most serious conditions first. Once those conditions (e.g. ovarian torsion or appendicitis in our case) are evaluated and excluded, other less common etiologies should be considered. Neuropathic abdominal pain must be considered early on for these patients, as appropriate diagnosis can ensure proper treatment, prevent recurrent presentations to acute care settings and unnecessary imaging studies.

Managing abdominal wall pain is tailored to the condition and may require outpatient referral. This is often the case in intercostal neuralgia, neuritis or abdominal cutaneous nerve entrapment syndrome. Management options include local anesthetic, referral to pain specialists for pain modulating medications, heat application, muscle relaxants or rarely nerve excision [8,10]. Important to all of this is patient education. Education is provided to encourage patients with complex pain syndromes to learn to cope with their pain and provide important return precautions for pain that may be caused by other pathology.

Conclusion

Emergency physicians (EPs) have an incredibly challenging job. Diagnosing and treating emergent medical conditions in patients presenting with acute abdominal pain is paramount. A careful history and thorough physical exam can help exclude emergent conditions and often identify rare disease processes like neuropathic pain. A good patient story coupled with the exam finding of intense pain with light touch can help the physician differentiate abdominal wall pathology from intra-abdominal processes. Ultimately, this diagnosis is an important consideration as these patients often go undiagnosed for extended periods of time. They may find benefit from NSAIDs in acute flares or local injections, pain modulating agents and referral to pain specialists. Early diagnosis can also obviate further medical expense and patient dissatisfaction [11-17]. While our patient was ultimately lost to follow-up and did not have the gold standard CT study in the ED to definitively identify intra-abdominal pathology, this case serves as a great reminder to all EPs to keep the differential broad in complex patient complaints such as abdominal pain.

Authors' Contributions

BL and LG participated in the caring for the patient in the emergency department. Both authors drafted and read the final manuscript for publication.

Authors' Information

BL is a second year emergency medicine resident at Stanford University in Palo Alto, California.

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