Abstract

Abdominal pain in young females of childbearing age can be challenging when presenting to the Emergency department due to the atypical nature of presentation. Delays in diagnosis or misdiagnosis of appendicitis in this group can lead to higher rates of complications. Highlighting these cases will hopefully reduce the incidence of delayed and misdiagnosis and lead to better patient outcomes. Here we present a case of a young female of childbearing age who presented with symptoms consistent with gastroenteritis, however ongoing abdominal pain prompted further investigation. The cause of the ongoing pain was confounded by the presence of an existing gynaecological condition and inconsistent presentation. A diagnosis of appendicitis was eventually made, and the patient proceeded to a laparoscopic appendectomy. On histopathological investigation the appendix was found to be gangrenous. The patient made a full recovery and was discharged from the hospital two days after surgery.

Keywords: Abdominal pain; Appendicitis; Emergency department; PID; pelvic pain; Occam’s Razor

Introduction

Occam’s Razor is a principle of parsimony that states “Numquam ponenda est pluralitas sine necessitate”, which can be translated to “Plurality ought never be posed without necessity” - that is, the simplest and most unifying explanation for any given problem is the one most likely to be correct [1]. This principle has been used by many fields of science, including medicine, for centuries to aid decision making when presented with multiple hypothesis for a given presentation. An extension of this is the statement “common things present commonly”.

Abdominal pain in young women is a common presentation to the Emergency department, with acute appendicitis accounting for over a quarter of surgical abdominal emergencies [2]. Other common complaints include gastroenteritis and Pelvic Inflammatory Disease (PID). These three conditions can create a diagnostic dilemma as the presenting symptoms can overlap [3], however not common pathologies like tuboovarian abscess and malignancies should not be ignored [11].

Acute appendicitis typically presents with pain (often localised to the right lower quadrant), anorexia, nausea and vomiting [4]. There is usually constipation, however diarrhea can occur if the ileum is irritated [5]. Depending on the location of the vermiform appendix there may also be suprapubic, with urinary frequency as the bladder is irritated (pelvic position), right loin pain (high retrocaecal position) or left iliac fossa pain (extension of appendix to left iliac fossa) [5]. The duration of symptoms is usually less than 24 hours.

Patients who present to ED with acute gastroenteritis may have symptoms including (but not limited to) diarrhea, nausea and vomiting. Symptoms may be of short duration or may have been present for days with the patient presenting severely dehydrated.

PID presentations can often be very subtle with symptoms including acute pelvic pain, febrile illness, vaginal discharge, postcoital or intermenstrual bleeding; less frequent symptoms include urethral syndrome (dysuria and pyuria), Bartholinitis, right upper quadrant pain due to perihepatitis and proctitis [6].

Appendicitis can be diagnosed clinically, however, the use of pathology and imaging can aid the diagnosis, especially in unclear presentations and where the patient may have confounding medical histories. Common pathology includes White Cell Count (WCC), Neutrophils (N), Liver Function Test (LFT), C Reactive Protein (CRP) and lipase, while imaging includes ultrasound scan (USS) and Computer Tomography (CT). Despite the array of testing available other reports have found inconsistent correlations between abnormal test results and the diagnosis of appendicitis [7].

It has been reported elsewhere that women of childbearing age with appendicitis have a higher risk of being misdiagnosed...
and those initially misdiagnosed frequently develop complications such as wound infections, abscess formation, peritonitis, infertility and even death [8]. The flip side of this is the relatively high rate (reported up to 30% [7]) of negative surgical exploration and exposure to unnecessary risks including anaesthetics, infections, bleeding and other possible long-term surgical complications such as adhesions [7].

In this report we present a case of a young female of childbearing age who presented with gastrointestinal symptoms suggestive of gastroenteritis, further investigated for a gynaecological issue and ultimately surgically managed prior to discharge.

Case Report

A 31-year-old female was brought by ambulance to our ED with about 36 hours of abdominal pain and associated nausea, vomiting and diarrhea. Onset was approximately 40 minutes after consuming sushi at a shopping center food court. On arrival she was alert and oriented with low grade fever of 38.4°C (tympanic), pulse rate of 96 bpm, blood pressure 105/60 mmHg and oxygen saturation of 97% on room air. Patient described the pain being crampy and severe with radiation to upper thigh and gluteal muscles and associated severe dysuria without frequency. On initial review she revealed her past medical history consisted only of migraines severe dysuria without frequency. On initial review she revealed her past medical history consisted only of migraines and anxiety for which she takes sertraline. She did not have any allergies.

Initial examination found generalized abdominal tenderness with voluntary guarding in the lower abdominal region. The remainder of the examination was unremarkable. The patient was started on symptomatic management with IV fluid (0.9% sodium chloride) as well as analgesia and antiemetics and was started on symptomatic management with IV fluid (0.9% sodium chloride) as well as analgesia and antiemetics. The patient was admitted into ED for further monitoring. The patient’s initial investigations were initiated during her ED stay (table 1, figures 1-3).

### Table 1: Pathology results over 5 day hospital admission  
(surgery was performed on day 3)

<table>
<thead>
<tr>
<th>Laboratory Test</th>
<th>Day 1</th>
<th>Day 2</th>
<th>Day 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haemoglobin (g/L)</td>
<td>116</td>
<td>95</td>
<td>112</td>
</tr>
<tr>
<td>White cell count (x10^9/L)</td>
<td>11.2</td>
<td>7.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Platelets (x10^9/L)</td>
<td>131</td>
<td>109</td>
<td>124</td>
</tr>
<tr>
<td>Neutrophils (x10^9/L)</td>
<td>9.4</td>
<td>4.7</td>
<td>2.3</td>
</tr>
<tr>
<td>C-reactive protein</td>
<td>116</td>
<td>132</td>
<td>103</td>
</tr>
<tr>
<td>Lipase (U/L)</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALP (U/L)</td>
<td>51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GGT (U/L)</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALT (U/L)</td>
<td>41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total bilirubin</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HCG quantitative (IU/L)</td>
<td>&lt;1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

On serial examinations during observation period the patient reported that the pain, nausea and vomiting had settled, and there were no further episodes of diarrhea since arriving to the ED. She had tolerated a meal and oral fluid. Further examination during her ED admission revealed a history of rectal polyps (colonoscopy performed 12 months prior) and she has been experiencing some discomfort in the genital area from an abscess that had been identified from a previous visit to another ED which had now increased in size. On examination, the patient's abdomen was tender to deep palpation in the lower region. Genital examination after patient's consent with the presence of chaperon, revealed a left sided, 3cm diameter Bartholin's abscess with surrounding cellulitis. There were no regional or systemic lymphadenopathy and the remainder of the exam was unremarkable. Point Of Care Ultrasound (POCUS) had been also performed in this case which demonstrated small amount of pelvic fluid, however because of the complexity of her condition and examination findings including lower abdominal tenderness, gynaecology and general surgery consult for the Bartholin’s abscess as well as ongoing abdominal tenderness mainly right lower quadrant region as well as PMH of rectal polyp were requested and was decide to proceed with formal abdominal and pelvic ultrasound by radiology team to investigate for appendicitis or pelvic pathology such as ruptured ovarian cyst. The ultrasound scan demonstrated a tender blind ending structure in the right iliac fossa measuring up to 9.3 mm in diameter consistent with acute appendicitis.

![Figure 1: Urine microscopy (day 2)](Image)

**Urine Microscopy**

- Leucocytes 0 x10^6/L
- Erythrocytes 30 x10^6/L

![Figure 2: High vaginal swab testing for PID (day 3)](Image)

**High Vaginal Swab**

- No polymorphs
- ++ squamous cells
- Normal variable flora

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Citation: Lewis M, Pouryahya P (2020) When the Simplest Solution is not the Right one: A Case of a Blunt Occam’s Razor. JUSEM-106.
A CT scan of the abdomen and pelvis was repeated with delayed oral contrast and reported as suggestive of acute appendicitis with no evidence of perforation or abscess formation. After review by the general surgery team the patient underwent a diagnostic laparoscopy with the aim for appendectomy. During surgery the patient was found to have a dilated, mildly inflamed appendix with inflammatory adhesions to small bowel which were swept off without diathermy. There was a small volume haemoperitoneum, and normal ovaries/fallopian tubes. The marsupialisation of the Bartholin’s abscess was also performed by the gynaecology team in the same theatre time.

The resected appendix was sent for histopathology which demonstrated extensively ulcerated appendix mucosa with congested and oedematous walls and dense transmural neutrophilic infiltrate, extensively extending into the adjacent mesenteric fat as well as focal necrosis of the muscle layer consistent with gangrenous appendicitis.

**Discussion**

This case demonstrates that although appendicitis is one of the most common surgical presentations to ED, it can still be challenging to diagnose, especially in young women of childbearing age. As previously mentioned, appendicitis is commonly misdiagnosed in young women of childbearing age, with the most common misdiagnoses being pelvic inflammatory disease, gastroenteritis and urinary tract infection, and the most common location of the misdiagnosis is in ED [8]. Despite CT being useful for confirming the diagnosis of appendicitis in unclear cases, CT readings can be difficult in young women given the frequently small amount of intra-abdominal fat [3], which was true for this case and resulted in a second CT scan being performed.

There are risks of performing a laparoscopic appendectomy [9, 7] and it has been reported that in-hospital delay to appendectomy is not a risk factor for “complicated” appendicitis [10], which could justify some delay in this case. However, the length of the delay to appendectomy may influence the complication rate and development of a gangrenous appendix. Delays of up to 24 hours do not seem to be associated with increased complications, whereas delays beyond this lead to increased complication rates [2].

Even with evidence of appendicitis from the USS performed within 24 hours of admission there was a delay of another 24 hours before laparoscopic appendectomy was performed. The changes in the appendix found on USS were initially thought to be due to inflammation as a result of colitis, or from inflammatory changes caused by PID. Due to the atypical presentation of this case, going straight to laparoscopy after the findings of the USS may not have been appropriate, however the length of the delay possibly could have contributed to the gangrenous appearance on histopathological examination.

Also, despite some studies suggesting the prevalence of POCUS in ED being low [12], it was utilised in this case but despite demonstrating free fluid in pelvis, was not helpful in narrowing down the differential diagnosis or guiding management.
The fact that appendicitis is still being misdiagnosed despite improvements in all modes of medical imaging suggests there is a need for further research into atypical presentations of appendicitis and how we may expedite cases from ED to surgery. This could lead to reduced complication rates and better patient outcomes.

**Conclusion**

This case is an example of potential confirmation bias or diagnostic momentum [13], and reminds us as ED clinicians, to keep an open mind when managing patients with symptoms/signs that are clearly suggestive of one specific diagnosis. This is especially true in patients in this demographic, where there are multiple issues or subtle symptoms/signs that can easily be missed, in particular in a busy department. We must also advocate for our patients in situations where we see delays in their care that could compromise patient outcomes.

**Ethics**

This Study was approved by Monash Health Ethics committee (RES-20-0000-207Q) with patient’s consent.

**References**

7. Chen KC, Arad A, Storrar J, Christy AG. The clinical value of pathology tests and imaging study in the diagnosis of acute appendicitis. (1469-0756 (Electronic)).