Abdominal pain complaints comprise about 5% of all Emergency Department visits. The etiology of the pain may be any of a large number of processes. Many of these causes will be benign and self-limited, while others are medical urgencies or even surgical emergencies. As with any complaint in the ED, the worst diagnosis is always entertained first. Therefore, there is one thought, which the ED practitioner must maintain in the foreground of his mind: “Is there a life threatening process?”

**Etiology**

A breakdown of the most common diagnoses of abdominal pain presentations is listed below. Note that nearly half of the time, “unknown origin” is the diagnosis made. This is a perfectly acceptable conclusion, after a proper work-up has ruled out any life threatening illness.

Common Diagnoses of Non-traumatic Abdominal Pain in the ED

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Abdominal pain of unknown origin</td>
</tr>
<tr>
<td>2</td>
<td>Gastroenteritis</td>
</tr>
<tr>
<td>3</td>
<td>Pelvic Inflammatory Disease</td>
</tr>
<tr>
<td>4</td>
<td>Urinary Tract Infection</td>
</tr>
<tr>
<td>5</td>
<td>Ureteral Stone</td>
</tr>
<tr>
<td>6</td>
<td>Appendicitis</td>
</tr>
<tr>
<td>7</td>
<td>Acute Cholecystitis</td>
</tr>
<tr>
<td>8</td>
<td>Intestinal Obstruction</td>
</tr>
<tr>
<td>9</td>
<td>Constipation</td>
</tr>
<tr>
<td>10</td>
<td>Duodenal Ulcer</td>
</tr>
<tr>
<td>11</td>
<td>Dysmenorrhea</td>
</tr>
<tr>
<td>12</td>
<td>Simple Pregnancy</td>
</tr>
<tr>
<td>13</td>
<td>Pyelonephritis</td>
</tr>
<tr>
<td>14</td>
<td>Gastritis</td>
</tr>
<tr>
<td>15</td>
<td>Other</td>
</tr>
</tbody>
</table>


Two important factors modify the differential diagnosis in patients who present with abdominal pain: sex and age. Other common diagnoses of abdominal pain in men and women are as follows.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Male</strong></td>
<td><strong>Female</strong></td>
</tr>
<tr>
<td>Perforated ulcer</td>
<td>Nonspecific</td>
</tr>
<tr>
<td>Gastritis</td>
<td>Diverticulitis</td>
</tr>
<tr>
<td>Appendicitis</td>
<td>Acute Cholecystitis</td>
</tr>
</tbody>
</table>

The other factor is age over 70 years. As you can see from the table below, the breakdown of causes varies significantly for this population.

Causes of Abdominal Pain in Patients Over 70 Years Old

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Cholecystitis</td>
<td>26.0%</td>
</tr>
<tr>
<td>Malignant Disease</td>
<td>13.2%</td>
</tr>
</tbody>
</table>
Ileus 10.7%
Nonspecific Abdominal Pain 9.6%
Gastroduodenal Ulcer 8.4%
Acute Diverticular Disease of the Colon 7.0%
Incarcerated Hernia 4.8%
Acute Pancreatitis 4.1%
Acute Appendicitis 3.5%
Other Causes 12.7%


**Types of Pain**

A patient’s description of the pain is vital in assessing the problem. Careful questioning will allow the physician to discern the origin of the pain and formulate a good working differential diagnosis list.

**Visceral pain** is described as crampy, dull and gaseous. It typically arises from the walls of hollow viscera and capsules of solid organs due to abnormal stretching or distention, ischemia, or inflammation. Localization is often vague and frequently midline. It is generally accompanied by autonomic responses causing nausea, pallor, and diaphoresis.

**Somatic pain** on the other hand is well localized and sharp in quality. It arises from the parietal peritoneum, mesenteric roots, and anterior abdominal wall due to chemical or bacterial inflammation.

**Visceral vs. Parietal pain**

<table>
<thead>
<tr>
<th>Type</th>
<th>Location</th>
<th>Time</th>
<th>Activity (movement)</th>
<th>Vomiting</th>
<th>Palpation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visceral</td>
<td>Central</td>
<td>Intermittent or constant</td>
<td>Little or no change in pain</td>
<td>Decreases or no change in pain</td>
<td>Little or no change in pain</td>
</tr>
<tr>
<td>Parietal</td>
<td>Peripheral or generalized</td>
<td>Constant</td>
<td>Increases pain</td>
<td>Increases or no change in pain</td>
<td>Increases pain</td>
</tr>
</tbody>
</table>

**Referred pain** is due to fibers from different organs returning to the CNS overlapping with pathways from cutaneous sites which had similar embryologic origin [e.g. diaphragmatic irritation refers pain to the shoulder via C4 (Kehr’s Sign)].
History

Most diagnoses can be made by history alone. Therefore, it is essential to listen carefully to the patient and ask specific questions. Useful information is listed on the following pages.

Clinical Evaluations – The History

1 Time of onset
   Medications (medication induced gastritis or perforation, e.g. nonsteroidal anti-inflammatory drugs)
   Sleep (has the pain been severe enough to impede sleep or did it awaken the patient?)
   Activity (which may have exposed the patient to trauma, spider bite, or other impacting factor)

2 Mode of onset
   Abrupt/severe vs gradual
   a severe pain of abrupt onset
      (Think catastrophe e.g. vascular, anterior ulcer perforation, or renal obstruction)
   b less severe initially, but increasing
   c gradual onset with slow progression
   d intermittent pain

3 Location
   Migration (e.g. epigastric gradually moving to right lower quadrant or flank pain moving to groin)

4 Character
   Severity/magnitude of stimulus
   Intermittent crampy
   Severe and colicky

5 Duration
   New onset of abdominal pain (vs. chronic pain)
   6 hours duration
   Elderly delay seeking help (this may allow walling off of an abscess or progression of the process)

6 Progression
   Sudden increase
   Sudden change in sensation

7 Medical History
   Previous surgery
   MVA
   Sexual activity
   Recurrence of same problem
   Travel
   COPD
   Exposure / Occupation
   CAD
   Psychiatric
   Immunosuppression

8 Menstrual history

9 Contributory Symptoms
   Anorexia
   Nausea
   Vomiting (color)
   Bleeding
   Diarrhea
   Constipation
Obstipation    Belching
Flatus        Dysuria
Sputum        SOB
Chest Pain (acute myocardial infarction)

**Physical Examination**
The physical exam serves several purposes:
1. To confirm suspicions from the history
2. To localize the area of disease
3. To avoid missing extra-abdominal causes of pain
There are numerous components to the examination, all of which are important. These include careful consideration of each of the following items.

Vital Signs  temperature, BP, pulse, respiratory rate.
Check orthostatic vital signs

Abdomen
Observation  general appearance: conscious, alert, upright, diaphoretic, pale, distressed, writhing, motionless, smiling.
Inspection   distended, ecchymosis, scars, hernias, caput Medusa
Auscultation bowel sounds present (listen long enough), pitch, bruits
Palpation    Patient must be relaxed. Start gently.
Guarding (voluntary and involuntary)
Masses
Tenderness (watch patients facial expression and use point 1 and 2 comparison method)
Have patient tense abdominal wall and re-palpate –difference?
Rebound (vs. startle)  peritoneal signs
Rebound without guarding is generally not true rebound
Also shake pt., heel strike, have pt cough, have pt jump
Some MD’s will kick or jar the stretcher
Special maneuvers / signs
Murphy’s sign-respiratory arrest on inspiration during palpation of the right upper quadrant of the abd.
Rovsing’s sign-pain referred to the right lower quadrant on palpation of opposite side of the abd.
Obturator sign-pain with internal rotation of flexed hip
Iliopsoas sign-pain with hyperextension of the hip
Turn pt on side and reexamine the abdomen in the lateral decubitus position
Percussion  liver size, tympany, localization of tenderness
Rectal      blood, masses, tenderness
Pelvic      blood, masses, tenderness, discharge

_Do Not Forget Heart_ (including peripheral pulses), **Lungs, External Genitalia, and General Exam**!
Formulation of the differential diagnoses

Based on the information obtained from the history and physical examination, a good working list of possible diagnoses to be ruled out should be formulated. This should be based on a keen knowledge of gross anatomy, embryology, neuroanatomy, and physiology. Various lists suggesting causes of pain based on the localization of pain are available and one such list is presented below and it is not exhaustive. It should not be memorized, but rather should be understood. The history and physical will help narrow the possibilities further.

**Differential Diagnoses of Acute Abdominal Pain by Location**

<table>
<thead>
<tr>
<th>Right Upper Quadrant</th>
<th>Left Upper Quadrant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendicitis</td>
<td>Aortic Dissection</td>
</tr>
<tr>
<td>Cholangitis</td>
<td>Gastritis</td>
</tr>
<tr>
<td>Cholecystitis</td>
<td>Duodenal Ulcer</td>
</tr>
<tr>
<td>Choledocholithiasis</td>
<td>Gastric Ulcer</td>
</tr>
<tr>
<td>Fitz-Hugh &amp; Curtis Syndrome</td>
<td>Herpes Zoster</td>
</tr>
<tr>
<td>Hepatic Abscess</td>
<td>Intestinal Obstruction</td>
</tr>
<tr>
<td>Hepatitis</td>
<td>Ischemic Colitis</td>
</tr>
<tr>
<td>Hepatomegaly</td>
<td>Left Lower Lobe Effusion/Empyema</td>
</tr>
<tr>
<td>Myocardial Infarction</td>
<td>Myocardial Infarction</td>
</tr>
<tr>
<td>Pancreatitis</td>
<td>Pancreatitis</td>
</tr>
<tr>
<td>Peptic Ulcer Disease</td>
<td>Pericarditis</td>
</tr>
<tr>
<td>Pericarditis</td>
<td>Pleurisy (diaphragmatic)</td>
</tr>
<tr>
<td>Pleurisy (diaphragmatic)</td>
<td>Pneumonia (basal)</td>
</tr>
<tr>
<td>Pneumonia (basal)</td>
<td>Pulmonary Embolism</td>
</tr>
<tr>
<td>Pulmonary Embolism</td>
<td>Pyelonephritis</td>
</tr>
<tr>
<td>Pyelonephritis</td>
<td>Renal Colic</td>
</tr>
<tr>
<td>Renal Colic</td>
<td>Splenic Infarction Rupture</td>
</tr>
<tr>
<td>Subphrenic Abcess</td>
<td>Subphrenic abcess</td>
</tr>
<tr>
<td>Thoracic Aneurysm (dissecting)</td>
<td>Thoracic Aneurysm (dissecting)</td>
</tr>
</tbody>
</table>

**Differential Diagnoses of Acute Abdominal Pain by Location (continued)**

<table>
<thead>
<tr>
<th>Right Lower Quadrant</th>
<th>Left Lower Quadrant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendicitis</td>
<td>Diverticulosis</td>
</tr>
<tr>
<td>Cholecystitis (acute, perforated)</td>
<td>Ectopic Pregnancy (ruptured)</td>
</tr>
<tr>
<td>Diverticulitis</td>
<td>Endometriosis</td>
</tr>
<tr>
<td>Ectopic Pregnancy (ruptured)</td>
<td>Epididymitis</td>
</tr>
<tr>
<td>Endometriosis</td>
<td>Fecal Impaction</td>
</tr>
<tr>
<td>Epididymitis</td>
<td>Hip Pain</td>
</tr>
<tr>
<td>Gastroenteritis</td>
<td>Incarcerated/ Inguinal Hernia</td>
</tr>
<tr>
<td>Hip Pain</td>
<td>Intestinal Obstruction</td>
</tr>
</tbody>
</table>
Intestinal Obstruction Ischemic Colitis
Leaking Aortic Aneurysm Leaking Aortic Aneurysm
Mittelschmerz Mittelschmerz
Pelvic Inflammatory Disease Mfchhausen Syndrome
Peptic Ulcer (perforated) Pelvic Inflammatory Disease
Psoas Abscess Psoas Abscess
Rectus Hematoma Rectus Hematoma
Regional Enteritis Regional Enteritis
Renal Colic Renal Colic
Salpingitis Salpingitis
Torsion of Ovarian Cyst or Tumor Torsion of Ovarian Cyst or Tumor
Urinary Tract Infection Urinary Tract Infection

Diffuse Pain
Abdominal Angina Mesenteric Thrombosis/ Ischemia
Aortic Aneurysm (rupture) Mfchhausen Syndrome
Appendicitis (early) Pancreatitis
Colitis Pelvic Inflammatory Disease (severe)
Diabetic Ketoacidosis Peritonitis
Gastroenteritis Porphyria
Intestinal Obstruction Sickle Cell Crisis
Leukemia Tabes Dorsalis
Mesenteric Lymphadenitis Uremia

Early Treatment
It is easy to become so focused on trying to establish the diagnosis, that one
forgets to treat the patient. Frequently, the patient must be treated without a formal
diagnosis and sometimes even with minimal history and only a cursory initial physical
examination. This may include treatment of shock, intractable vomiting, and bleeding.
At some point, as much history as possible must be obtained and a thorough examination
be performed.
Typical interventions may include the following.
Insert one, preferably 2, large bore intravenous catheters (14 or 16 gauge).
No scalp vein needles.
Consider a central line: jugular, femoral, or subclavian.
Draw blood for CBC with diff, electrolytes, amylase, lipase, BUN, creatinine.
Draw extra tubes for type and cross and
other tests which may be needed later.
Begin infusion of isotonic solutions (NS or LR).
Record I/O’s, titrate fluid to BP and pulse.
Begin O₂ at 5-10 L/min (with significant COPD 2 L/min)
Insert nasogastric tube- Generally, do not lavage stomach with NG tube as it can
not remove large particles of food or blood clots.
Insert foley
Maintain good urine output
Check for blood in urine
Pregnancy test β subunit, either urine or serum
Obtain arterial blood gas

**Laboratory Tests**
Specific tests to be ordered should be selected to confirm or rule out specific diagnoses on the working differential.

Liver enzymes – SGOT (AST), SGPT (ALT), GGT, Bilirubin (direct and indirect)
Amylase [non specific (sources include pancreas, salivary glands, small bowel and fallopian tubes), rises early and falls early]
Lipase (specific for pancreatic injury, rises later and stays elevated longer)
CBC
H/H
WBC and diff.
Electrolytes
Glucose
BUN & Creatinine
UA
Most useful if normal since nonspecific:
PT/PTT & INR
Lactic Acid

**Other Tests**

EKG

Radiographic Tests
CXR or Upright Chest X-ray
1 Pulmonary disease
2 Free air under diaphragm
3 Air filled viscera in chest
4 Mediastinal air

KUB or Plain Film of Abdomen
1 Fluid filled loops
2 Abdominal densities
3 Renal calculi
4 Gallstones
5 Pancreatic or splenic calcifications
6 Air in biliary tree
7 Obscured psoas shadow
8 Displaced stomach bubble
9 Displaced kidney
10 Enlarged splenic shadow
11 Displaced splenic flexure
Upright Abdominal x-ray (If patient can stand, obtain and upright abdomen)
1 Air-fluid levels  
2 Air in stomach, intestine, colon  
3 Massive dilation of colon

Left Lateral Decubitus (If patient is bedridden, obtain a left lateral decubitus film)  
1 Free air  
2 Air fluid levels

Clinical Findings Associated With a Statistically Significant Likelihood of an Abnormal Abdominal Radiograph

<table>
<thead>
<tr>
<th>Clinical Finding</th>
<th>Likelihood Ratios*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likelihood predictive of abnormality (&gt;1)</td>
<td></td>
</tr>
<tr>
<td>Increased, high pitched bowel sounds</td>
<td>57.5</td>
</tr>
<tr>
<td>Distention</td>
<td>9.5</td>
</tr>
<tr>
<td>History of abdominal surgery</td>
<td>7.4</td>
</tr>
<tr>
<td>Blood in urine</td>
<td>6.3</td>
</tr>
<tr>
<td>History of renal-ureteral calculi</td>
<td>5.8</td>
</tr>
<tr>
<td>Flank pain, tenderness</td>
<td>5.0</td>
</tr>
<tr>
<td>History of abdominal tumor</td>
<td>4.7</td>
</tr>
<tr>
<td>History of gallbladder disease</td>
<td>4.2</td>
</tr>
<tr>
<td>Severe abdominal pain and tenderness</td>
<td>3.0</td>
</tr>
<tr>
<td>Generalized abdominal pain and tenderness</td>
<td>1.8</td>
</tr>
<tr>
<td>Abdominal pain for less than 1 day</td>
<td>1.8 †</td>
</tr>
<tr>
<td>Vomiting</td>
<td>1.8 †</td>
</tr>
</tbody>
</table>

| Likelihood predictive of abnormality (<1)              |                    |
| History of ulcer disease                              | 0.3                |
| Mild abdominal pain                                   | 0.3                |
| Abdominal pain for more than one week                 | 0.5 †              |

* Defined as the prevalence of each clinical variable in patients with abnormal abdominal radiographs divided by the number of patients who have abdominal radiographs. P<.001 unless otherwise noted.
† p<.005

Don’t leave ill patients alone in x-ray!

Sonography

Indications for ultrasound scanning in patients with acute abdominal pain
   - Right upper quadrant pain or possible cholelithiasis
   - Potential abdominal aortic aneurysm
   - Detection of ascitic fluid
Potential obstructive uropathy in iodine sensitive patient
Potential acute pelvic disorder, such as ectopic pregnancy, tuboovarian abscess, or ovarian cyst.

**Treatment**
Don’t delay therapy while formulating a differential diagnosis or while waiting on laboratory or other tests to be completed.
Most patients will ask early on for medication to alleviate pain. Historically, pain medication was universally withheld until a diagnosis was reached and until a surgeon had seen and evaluated the patient and approved of the medication. This archaic system is more and more being replaced with more humane treatment. It is with general approval that some pain medication may be given, titrated to ease the patient. It is nonetheless imperative to have performed an initial examination and to continue to perform serial examinations subsequently. The old fear was always that the medication would mask the problem. In the meantime it has been learned that an exam may be much more productive when the pain has been lessened somewhat and the patient is more cooperative with the exam. Small amounts of narcotics given IV are well suited for this purpose. Beware of large amounts of sedating antiemetics (e.g. 25 mg promethazine, IV. ½ or even ¼ of this dose is recommended), which will render the patient too sleepy to examine.

Obtain surgical consultation if necessary. Consult the surgeons as soon as you feel that a consult will certainly be necessary, so they may be involved as soon as possible.

<table>
<thead>
<tr>
<th>Causes of Acute Abdominal Pain Requiring an Emergency Operation</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Appendicitis</td>
<td>36.9%</td>
</tr>
<tr>
<td>Intestinal Obstruction</td>
<td>35.2%</td>
</tr>
<tr>
<td>Perforated Ulcer</td>
<td>8.2%</td>
</tr>
<tr>
<td>Acute Cholecystitis</td>
<td>6.2%</td>
</tr>
<tr>
<td>Abscess</td>
<td>4.4%</td>
</tr>
<tr>
<td>Pancreatitis</td>
<td>2.1%</td>
</tr>
<tr>
<td>Diverticulitis</td>
<td>1.5%</td>
</tr>
<tr>
<td>Colon Perforation</td>
<td>1.1%</td>
</tr>
<tr>
<td>Other Causes</td>
<td>4.4%</td>
</tr>
</tbody>
</table>

Decision Tree of Evaluation of Abdominal Pain

Conclusion

A lesson frequently relearned by everyone is that *if one listens carefully, the patient will tell the physician the diagnosis*. The history and physical should yield the diagnosis some 90-95% of the time. Additional testing should be used to confirm the presumptive diagnosis. It is rare that “fishing” with laboratory tests will yield a diagnosis when the H&P does not and this practice should be condemned. This cannot be stressed enough. It will keep the physician from “shotgunning” unnecessary laboratory and X-ray tests, wasting time and patient’s money. When in doubt, go back and talk with and re-examine the patient.