An approach the acute abdomen
(Podcast will not cover specific conditions, these will be dealt with in other podcasts)

What is an acute abdomen?
An acute abdomen is a **Painful** Process, of **Acute Onset**, that may be associated to trauma and is characterized by **Progressively worsening pain and symptoms**, in many cases the causative condition **requires surgical intervention** to avoid complications and death

The most common cause of acute abdomen is Acute Appendicitis

What are the causes acute abdomen?

The list of conditions that can cause acute abdominal pain is extensive and includes abdominal and extra-abdominal conditions that may or may not need surgery as part of the treatment
The most common causes are obviously the Abdominal and Retroperitoneal Causes
1- Inflammatory and Infective

- Surgical conditions
  - Appendicitis
  - Cholecystitis
  - Colonic Diverticulitis
  - Severe PID (pyosalpinge)
  - Meckel's diverticulitis
  - Peri-nephric abscess
  - Psoas Abscess
- Non-surgical conditions
  - Acute Pancreatitis
  - Pyelitis
  - Retroperitoneal spontaneous haemorrhage (anticoagulation)
  - TB Lymphadenopathy
  - Gastritis/Duodenitis
  - Uncomplicated PUD
  - Enteritis-colitis

2- Perforation

- Gastric & Duodenal
- Small Intestine
- Colonic
- Gallbladder
- Abdominal oesophagus
- Urinary Bladder

3- Obstruction

- Mechanical bowel obstruction
  - Luminal: bezoars, gallstones, worms, fecal impaction
  - Mural (wall): tumors, TB, intussusception, chronic inflammatory conditions (Crohns)
  - Extra intestinal: adhesions, volvulus, hernias, abscess
- Toxic/Neurogenic

- Paralytic Ileus
- Pseudo-colonic obstruction
- Aganglionic Megacolon
- Toxic Megacolon

4- Vascular conditions
- Mesenteric ischaemia
- Mesenteric occlusion
- Strangulated hernia

5- Hemorrhagic Conditions
- Ruptured ectopic pregnancy
- Ruptured ovarian follicle
- Ruptured Liver (traumatic vs non-traumatic)
- Ruptured Spleen (traumatic vs non-traumatic)
- Mesenteric Rupture (traumatic)
- Leaking/Ruptured AAA

6- Torsion
- Ovarian torsion
- Epiploic appendix
- Sigmoid volvulus
- Mid-gut volvulus
- Caecal volvulus
- Gastric volvulus

7- Colic Pain
- Biliary
- Ureteric
- Appendicular
- Intestinal
- Uterine

The Extra-abdominal conditions may prove very difficult to exclude and on occasions may overlap with an actual surgical abdominal condition. Proper history taking and physical examination and selection of appropriate investigations assist in this regard

8- Surgical Conditions in the Abdominal Wall
- Abscess
- Necrotizing soft tissue infections
- Ruptured rectus abdominis (could be treated w/o surgery)

9- Thoracic
- Lobar pneumonia
- Pleural effusion
- Angina
- MI
- Acute pericarditis

10- Diseases of spine, spinal cord and intercostal nerves
- TB spine
- Osteomyelitis
- Herpes Zoster

Tabes Dorsalis

11- Other Medical conditions simulating acute abdomen
- Typhoid Fever
- Sickle cell crisis
- Uremia
- Purpura Crisis
- Diabetes Keto-acidosis
- Lead intoxication
- Hypercalcaemia
- Porphyria

Which ones are life threatening?

Nearly all surgical conditions causing acute abdomen are life-threatening

In very ill patients it is in the best interest of the patient that the surgeon makes a quick decision regarding who needs surgery and who doesn't with a fast assessment of basic information and minimal investigations rather that insisting in finding the actual diagnosis, which may only be done once the abdomen has been opened and explored.

More stable patients can be assessed and investigated before a surgical decision is made

What do you look for with regards to the abdominal pain?

The most important is the Onset and duration of Pain
Mode of Onset: sudden (perforation) or gradual (inflammation/infection)
Duration: the pain of most acute abdominal conditions appears within the first 6-24 hours, this is one of the most important elements in the diagnosis, a pain that is there for more than 2 weeks is usually not caused by acute abdomen
Character: Colic, constant, burning, throbbing, severe agonizing, worsening, non-changing
Radiation sites: shoulders (diaphragmatic irritation), back (biliary, pancreatitis, AAA), flanks (renal), central chest (biliary colic), groin (renal)
Migration: i.e. from epigastrium to RIF in acute appendicitis; from flank to groin renal disease
Aggravating factors: movement, cough, breathing (peritonitis)
Relieving factors: vomiting (obstruction), micturition (renal), medication

What are some of the other common presenting symptoms and signs with an acute abdomen?

Vomiting
- Character: accompanied by nauseas or not
- Timing of onset: before, during or after pain
- Content: food, bile, fecal, blood
- Frequency: related to pain episodes, persistent, isolated episodes
- Common conditions that present with vomiting
  - Obstruction

- Biliary Colic
- Renal Disease
- Pancreatitis
- Gastritis

Constipation

- Causes
  - Ileus secondary to intra-abdominal infection
  - Fecal Impaction
  - Mechanical Obstruction
  - Diverticulitis
  - Medications
  - Bed Bound (pseudo-obstruction)

Inability to pass gas PR in patients with complete mechanical obstruction is important when present (positive predictive value), but more often than not patients are still able to pass gas even in the presence of obstruction

Diarrhoeas

- Cause
  - Enteritis-colitis (acute and chronic)
  - Overflow in obstruction
- Character
  - Intermittent
  - Persistent
  - Acute
  - Chronic
- Contents
  - Watery Stools
  - Mucus
  - Pus
  - Blood/melaena
  - Combination

Urinary Symptoms:

Note: some intra-abdominal process can produce urinary symptoms e.g. Retrocaecal Appendicitis, Psoas Abscess

- Painful Micturition
- Dysuria
- Haematuria
- Pyuria
- Tenesmus
- Retention
- Foul Smell in urine

Fever

- Time of Onset
- Grade: low - high
- Character: constant, spiking, presenting at specific times of day
- Resolution: spontaneous, with medication

What are some of the key questions to ask in a history from the patient or their relative?
General Questions:

- Medical conditions and treatment
- Previous abdominal surgery for what? When?
- Trauma
- Occupation

Specific Questions

- Time of onset (duration of symptoms)
- Associated symptoms: vomiting, constipation, PR or PV bleeding
- Are Symptoms Worsening?
- Similar Episodes
- Fever
- Females: menstrual period, excessive bleeding, painful intercourse, pregnancies, C sections
- Predisposing Factors: food, exercise, medications

What is the approach a patient in the emergency department with an acute abdomen?

General
A detailed history and physical examination are essential, in many cases the diagnosis of acute abdomen is established just by listening to the patient
Vital signs are essential:

Tachycardia
Abnormal BP
Increased RR
Decreased urinary output (dehydration, shock)
Fever

Specific abdominal examination includes
Appearance of abdomen: flat, excavated, distended, surgical scars, masses, hernias
Auscultation: bowel sounds may be absent (peritonitis) or hyperactive (obstruction)
Palpation: Signs of peritonitis such as tenderness (localized or diffuse), muscle rigidity, rebound tenderness, mass (define character: smooth, irregular, hard, painful, mobility)
Specific clinical signs are present is some processes such as: Rovsing's sign and obturator sign in acute appendicitis, Murphy's sign in acute cholecystitis, etc.
Percussion: dullness in ascites, resonant in gas distension (obstruction)
As part of the physical exam **PR and PV examinations** are mandatory in cases with suspected acute abdomen
PR looking for presence of stools in rectum, blood, mucus, pus, tenderness in Douglas's pouch, tumors causing obstruction
PV abnormal cervix, excitation tenderness, adnexal masses, fullness in Douglas's pouch, blood or purulent discharge

How does radiology help?

CXR to identify free air in abdomen (air under diaphragm) and to exclude chest pathology mimicking AA (pneumonia, effusion)
AXR to identify signs of bowel obstruction, foreign bodies, and occasionally free air
Sonar assist with gallstone disease, liver pathology, ascites, diagnosis of gynaecological conditions, abscesses, appendicitis, pleural effusion, pericarditis.
CT scanning with IV, oral contrast or both provides very accurate diagnostic modality and assist with differential diagnosis

Due to the inherent risks (contrast nephropathy, radiation) and costs, CT is only used when clinical diagnosis is not possible or when results may change management approach: i.e. is important to determine if the patient needs an emergency or urgent surgical procedure, of just medical management

What are the base line investigations?

Blood tests that must always be done in suspected acute abdomen

Hb, WCC and Differential: look for anemia and leukocytosis with left shift
Urea, Electrolytes and Creatinine (U+E): look for signs of renal impairment (high Urea and Creatinine) and electrolyte abnormalities (specially Na, K)
C reactive protein (CRP) elevation
Urinalysis (strip test): presence of nitrates, ketones and blood
Serum Amylase elevation
Arterial Blood Gas Analysis demonstrating metabolic acidosis

Especial Blood test

LFT in patients with biliary disease
Lipase in suspected Pancreatitis
Serum Ca, Mg and PO4 if dehydration, hypercalcaemia, pancreatitis and bowel ischemia are suspected
Procalcitonin (PCT) specific marker of infection only requested if diagnostic doubt exist due to significant expense
Blood cultures directed by potential diagnosis
Urine cultures directed by potential diagnosis

Other tests

ECG to exclude cardiac conditions

How to prepare a patient for emergency laparotomy?

For the purpose of teaching the management of a patient with an acute abdomen is divided into five distinct phases:

Initial Assessment: includes history and physical examination
Resuscitation: aimed at reversing shock and improving organ function
Investigations: to ascertain primary diagnosis and differentials
Surgical Management: trip to OT for surgical control of the problem

Post-operative Care: to complete resuscitation process, and prevent or identify complications (may be done in ICU or the ward)

To simplify the management approach, we recommend to institute these basic actions:

1- **Insert IV lines** with large bore cannulas (14G, 16G, 18G), a CVP may be necessary if the patient is in shock
2- **Start IV fluids**: Ringer Lactate boluses 250-500 ml every 30 minutes. Starches (Voluven, Volulyte) could also be used in patients who are dehydrated, however, current evidence suggest worsening of inflammation and risk of organ failure and deaths when large volumes of starches are administered to patients with sepsis and bleeding.
3- **Insert Urinary catheter** and monitor urinary output: aim for 0.5 ml/kg/hour
4- **Insert Naso-gastric tube** and put on free drainage particularly if the patient is vomiting profusely and has signs of small bowel obstruction. Patient must be NPO
5- **Initiate IV Analgesia**, do not withhold pain medication even if blood pressure is low, adjust the dose of the medication.
Remember severe pain is a myocardial depressant resulting in more hypotension, plus a pain free patient is easy to manage.
Recommended: Morphine Sulphate 15 mg diluted in 13 ml of Saline or water for injection to a solution of 1mg/ml
Administer IV 1 mg per each 10 kg of body weight, titrated to desired effect (usually 5-7 mg initial dose then reduce depending on response)
6- **Initiate Antibiotics** if patient is overtly septic: broad spectrum with cover for anaerobes such as Augmentin (early initiation of A/B reduces the risk of death in sepsis)
7- **Order Blood Tests and Radiological Investigations** as needed
8- **Monitor Vital Signs** (Pulse, BP, RR, Urinary output, Temperature)
9- **Assess Response to Treatment** (improving condition, reversal of shock)
10- **Create a Plan of Action**: Consent, what type of surgery, when, done by whom, where is the patient going after the operation, consider need for re-look

Remember

In many patients the diagnosis of acute abdomen is made just by obtaining proper history and performing a thorough physical examination

Use especial investigations sparingly.
If your clinical diagnosis is clear do not waste time and resources with investigations that are not going to change your management

Before a patient is taken to theatre basic preparations must be done
Especially important are:
Reversal of shock
Rehydration
Initiation of antibiotics if sepsis present
Initiate Analgesia
Monitor response to treatment
Obtaining appropriate consent
Plan of action: what surgery, when, by whom, where is the patient going after surgery and do you need to re-look the patient

In very Ill patients is better to determine <u>if the patient needs surgery</u> than to find the correct diagnosis