CHAPTER OVERVIEW - LEFT ILIAC FOSSA

There is a lot going on in the left iliac fossa.

Most importantly, different types of colitis - ischemic, diverticular, infective and ulcerative. These can bleed and even perforate. Don't forget to look at the groin for inguinal and femoral hernias and always dip the urine for beta-HCG in a female of child-bearing age. Often, its just Mittelschmerz (German for middle pain) but you need to prove it's not an ectopic.

CLICKABLE Calculators

SOFA - Sequential Organ Failure Assessment score

LIF pain +/-

1. PR Bleeding/ H/O IHD -Think **Ischaemic colitis**
2. Diarrhoea + Fever – Think **Infective colitis/Diverticulitis**
3. Abdominal distension – Think **Sigmoid volvulus**
4. Female of child bearing age – **Gynaecological emergencies**
5. L.U.T.S – **Urological emergencies**
6. Palpable irreducible swelling – Think **Hernia(Obstructed/strangulated)**

Examination:
General + Abdominal
(+ hernial orifices)

Relevant Findings:
- Percussion Tenderness = Peritonism
- Tender, Non reducible hernia +/- Skin changes
- Palpable mass

Observations/NEWS
(**q-SOFA** sepsis criteria)

Q-SOFA Sepsis Criteria
- ❑ SBP < 100 mmHg
- ❑ GCS < 15
- ❑ RR > 22/minute

If 2/3 of the above present = SEPSIS

Investigations:
1. **Bloods**: FBC, U&E, LFT, Coagulation screen, G&S
2. **Urine Dip + Beta HCG**
3. **Radiology:** AXR

1. Peritonism +/- Sepsis (2/3 present) OR
2. Irreducible hernia +/- Obstruction

YES - Urgent senior advice

1. NBM + Strict Input/output charting
2. IV Fluids (see NICE guidelines)
3. Regular Paracetamol + Opiate and PRN Morphine + Antiemetic
4. IV Antibiotics if septic/ deranged inflammatory markers*
5. Stop Anticoagulants if bleeding/Abnormal Coagulation
6. Follow AKI bundle if AKI**

While awaiting senior review – DO THIS..

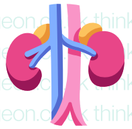
NO - Review on ward round

1. Orally Sips only
2. AKI - IV fluids + medication review **
3. Regular Paracetamol + Opiate and PRN Morphine + Antiemetic
4. VTE Prophylaxis
5. Pelvic USS (Female of childbearing age)

* Refer to trust guidelines for choice of antibiotics
** Refer to trust AKI guidelines

Fluid Guidelines

AKI Guidelines



ISCHAEMIC COLITIS

Inflammation of the COLON due to an acute, transient reduction in blood supply leading to mucosal inflammation and haemorrhage.

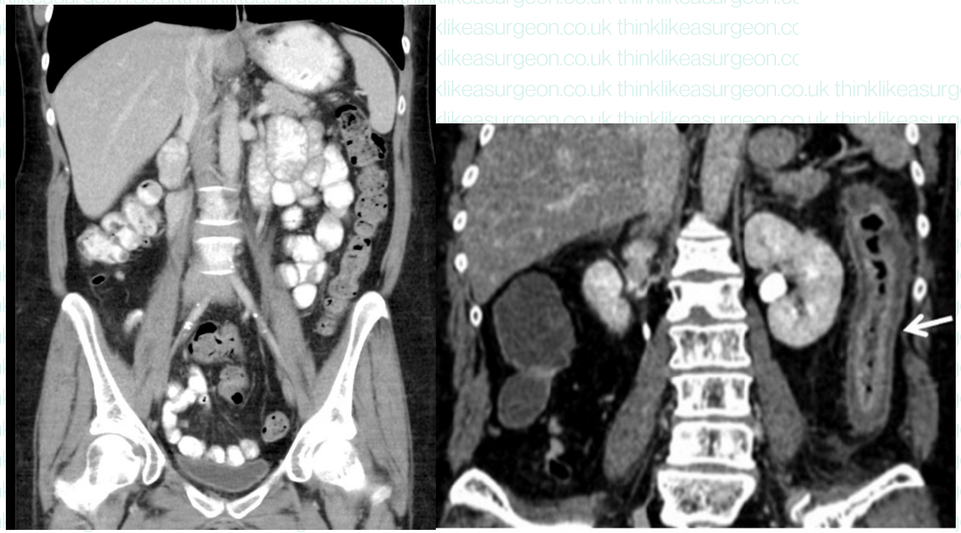
Risk Factors - Multifactorial (IHD, AF, Medications, etc.) + Systemic hypoperfusion
Most commonly affected sites - Watershed territories (GRIFFITHs point and SUDEKs point)

Presentation -
Most common - acute, dull abdominal pain + Diarhhoea/ PR bleeding

Examination -
Left lower and upper quadrant tenderness +/- peritonism
(Peritonism is a sign of full thickness ischaemia)
DRE may reveal blood clots/fresh blood.

Investigation of choice -

- CT Abdomen + Pelvis with I.V contrast - Investigation of choice
- Colonoscopy (Ideally with 48 hours)
- Bloods - FBC/Coagulation/U&E/**Lactate**/ CRP



Images: Left - Normal colon on coronal views of CT AP with I.V contrast and **Right -** thickened left colonic wall (arrow) on coronal views of CT AP with I.V contrast

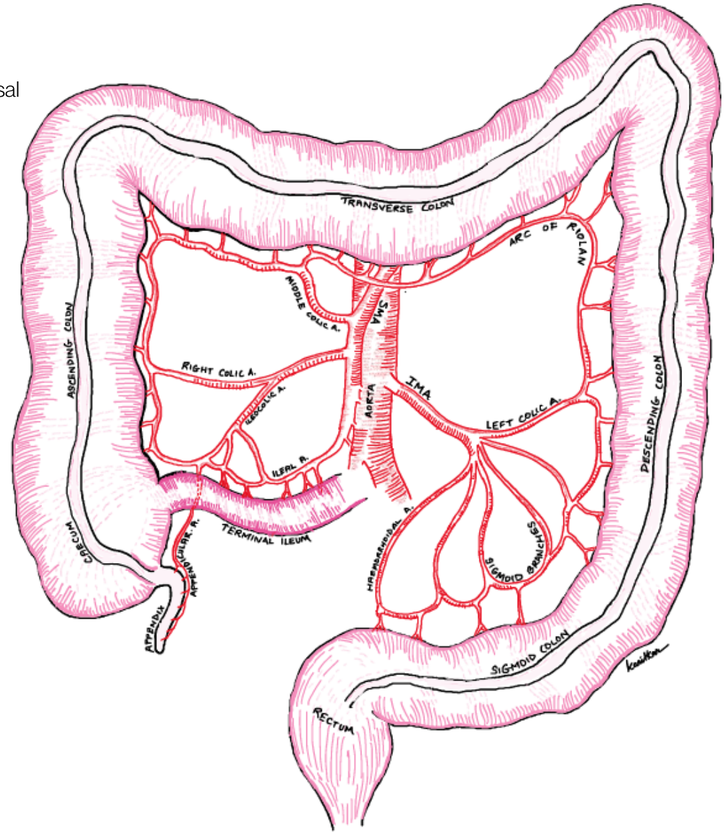


Illustration: Blood supply of the colon.

Differential diagnoses - All colitis looks similar on CT.

1. Infective colitis
   - Recent antibiotics/immunocompromised patient - Send stool C/S + Microscopy
2. Diverticulitis
   - Past history of diverticular disease on CT/colonoscopy
3. Inflammatory Bowel Disease
   - Family history - Crohns Colitis/Ulcerative Colitis

Complications - May need HDU/ITU escalation

1. Acute -
   - Local - Necrosis & Perforation
   - Systemic - Driven by sustained hypoperfusion (M.O.D.S)
2. Chronic - Stricture & obstruction

Management of Ischaemic colitis -
Aim of management is to find the cause and reverse the hypoperfusion.
Sometimes patients may need a colonoscopy to confirm diagnosis.

1. IV fluids + Oral sips only + Strict Input/output charting (consider catheterisation in unwell patients)
2. Consider oxygen therapy if saturating below threshold
3. IV Antibiotics based on trust guidelines (Not always indicated, ask a senior)
4. Continue VTE prophylaxis (TEDS + Prophylactic LMWH)
5. Treat the cause (AF, Medication, Hypotension)
   - AF - ECG, Fluids + B-Blocker/Digoxin (Based on guidelines)
   - Atrial/ventricular thrombus - Consider Echo after d/w senior
6. Surgery - Emergency Laparotomy and Colonic resection (If no response to conservative measures)
7. Long term -
   - Smoking cessation
   - Reduce alcohol intake
   - Exercise, aim normal BMI

WORTH A READ

Radiopaedia

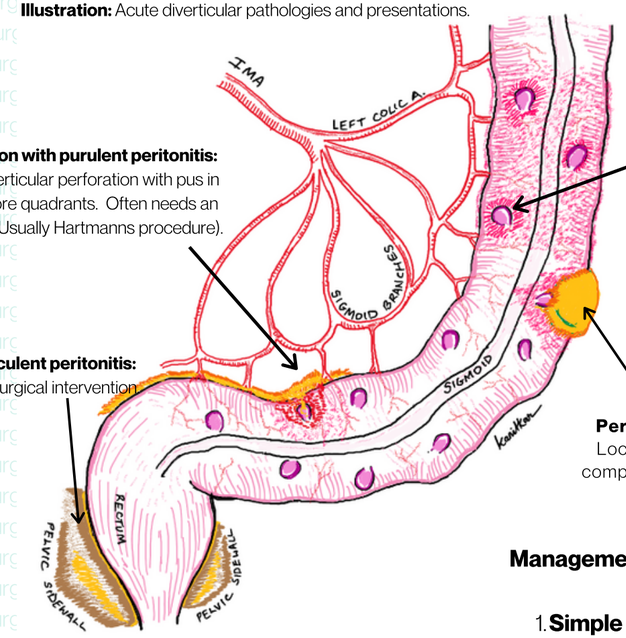
AN INTERESTING CASE

DIVERTICULITIS

"Colonic diverticula are protrusions of mucosa at points of weakness in the colon's muscular wall where the vessels enter. They are not 'true' diverticula, but rather protrusions of the mucosa.
The Western diet leads to less bulky stools.
Small, hard stools require greater intraluminal pressures. These high pressures produce the diverticula"
(Schein's common sense emergency abdominal surgery)

They are **most common** in the SIGMOID COLON

Illustration: Acute diverticular pathologies and presentations.



Perforation with purulent peritonitis: Acute diverticular perforation with pus in two or more quadrants. Often needs an operation (Usually Hartmanns procedure).

Perforation with faeculent peritonitis: High mortality despite surgical intervention

Acute uncomplicated diverticulitis: Acute inflammation of the diverticulum following obstruction by a small faecolith or a food particle such as a seed.

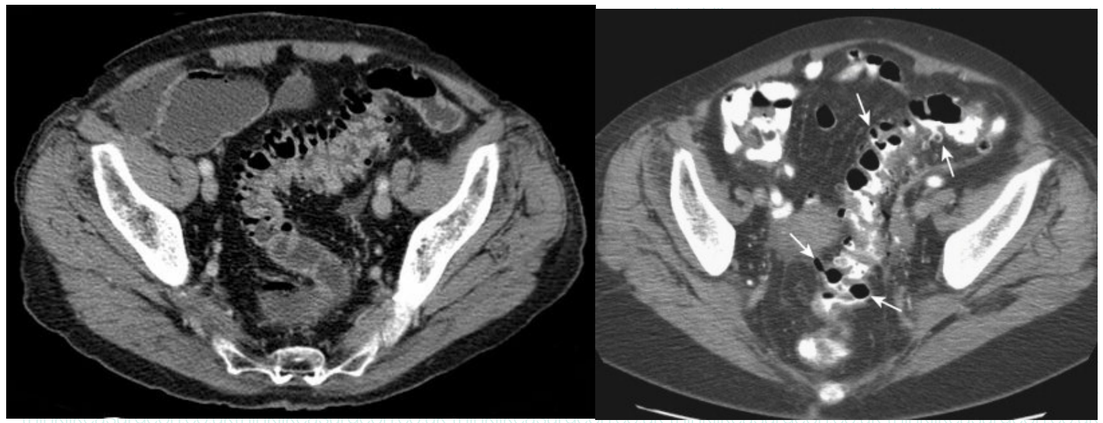
Perforation with local abscess: Localised abscess formation after complicated diverticulitis. Consider IR drainage (If amenable).

Presentation - Can be due to:

1. **Diverticulitis** - LLQ pain + Altered bowel habits (constipation or diarrhoea) +/- PR bleeding.
2. Diverticular **bleed** - Altered bowel habits (Recent constipation or even diarrhoea) + PR bleeding.
3. Diverticular **perforation** - Peritonitic +/- Septic
4. Chronic diverticulitis - **FIstula** (commonly Colo-Vesical or Colo-Vaginal) and diverticular **stricture** with large bowel obstruction
5. Diverticular **Abscess -** Previous diverticulitis with sepsis.

Investigation of choice -

- CT AP + I.V contrast (Diverticulitis/complications) and CT mesenteric angiogram (Diverticular bleed)
- Colonoscopy to rule out malignancy, as it can co-exist with diverticulitis. (After resolution of acute episode - 6/52)



Images: Left - CT AP with I.V contrast showing Sigmoid diverticULOSIS and **Right -** Sigmoid DiverticULITIS

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Differential diagnoses are very important.

1. THINK **Ischaemic colitis** (IHD, AF, Immunosuppression)
2. THINK **Infective colitis** (Recent antibiotics/ immunocompromised) - Send stool C/S urgently
3. THINK **IBD** (F/H/O Crohns Colitis/Ulcerative Colitis)
4. THINK **Colonic cancer (**Family history, age,Wall thickening on CT)

Complications - May needHDU/ITU escalation

1. Acute -
   - Local - Perforation, Bleeding and abscess formation
   - Peritonitis (Purulent or faeculent)
2. Chronic -
   - Stricture & large bowel obstruction
   - Fistulas (Colo-Vesical / Colo-Vaginal/ Coloenteric)

Management of Acute Diverticulitis (Based on presentation)

1. **Simple** diverticulitis - No Antibiotics, Antibiotics if septic or immunocompromised
2. Diverticular **bleed** -
   - Stool chart
   - Stop anticoagulants +/- PRBC transfusion
   - IR Embolisation
3. Complicated diverticulitis
   a. **Abscess/collection**
      i. Conservative management with antibiotics, if<5cm or multiple small.
      ii. IR drainage, if >5cm, accessible, well formed in progressively septic patient
      iii. Laparoscopic or open washout required if failed conservative or IR drainage..
   b. **Purulent/Faecal peritonitis**
      i. Purulent peritonitis - Emergency Laparoscopy/Laparotomy + lavage OR Hartmanns procedure
      ii. Faeculent peritonitis - Emergency Hartmanns procedure
   c. **Fistulas** are treated electively, following the **SNAP** protocol. (**S**epsis control, **N**utritional support, Assessing **A**natomy, **Pl**anning procedure)
   d. **Diverticular Stricture** can have varied presentations:
      i. Acute large bowel obstruction. Ideally patients should have a laparotomy and resection but in unfit patients, olonic stent can be considered.
      ii. Chronic large bowel obstruction- Need to exclude cancer by colonoscopy + biopsy before planning resection.

WORTH A READ - EAES

Radiopaedia

AN INTERESTING CASE

LARGE BOWEL OBSTRUCTION

Most common causes of large bowel obstruction (L.B.O) are Neoplasia, Diverticular disease and volvulus.

Other causes include:

1. Pseudo-obstruction
2. Stricture (IBD or ischaemic)
3. Hernia
4. Faecal impaction --> stercoral perforation

Presentation - Abdominal pain + inability to pass stool/flatus

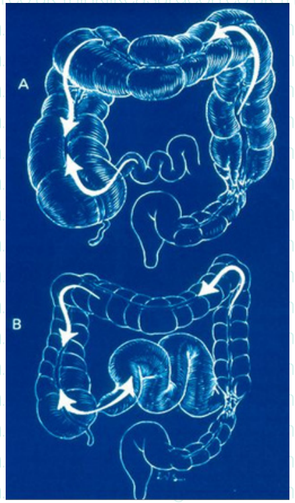
Examination -

- Distended, tympanic abdomen +/- tenderness
- DRE - palpable rectal lump, empty rectum

Investigation of choice -

Frank L.B.O can be diagnosed on Abdominal Radiograph

CT AP with I.V contrast is requested to Identify the cause of obstruction.



A. Competent ileo-caecal valve causing a **closed-loop** obstruction. Higher chances of perforation.
B. Incompetent ileo-caecal valve allowing proximal decompression of colonic contents.

Lets talk about the individual causes and how best to investigate/manage them:

Colonic malignancy - About 20% of patients present with obstruction.

1. **Presentation** - Usually have a constellation of symptoms (Abdominal distension, obstipation, pain). Enquire about red flag signs (Change in bowel habits >6/52, PR bleeding or symptoms of anaemia and Weight loss)
2. **Investigation of choice** -

- CT A.P with I.V contrast
- Request a completion chest CT
- +/- MRI liver if evidence of liver metastasis on CT A.P
- Tissue diagnosis - Colonoscopy + biopsy

3. Refer to colorectal **MDT** using this form.
4. **Management** -

- Surgical resection
- Defunctioning of the obstruction - Loop ileostomy/loop colostomy
- Decompression of the obstruction - STENTS (Palliative patients)

Image: CT AP with I.V contrast, coronal images with evidence of a Sigmoid colon malignancy causing a stricture (white arrow) and upstream dialatation of large bowel.

WORTH A READ - NICE COLORECTAL CANCER

Image: Sigmoid volvulus (Case courtesy of Dr Wael Nemattalla, Radiopaedia.org, rID: 10633)

Volvulus - Most commonly Sigmoid, volvulus (70-80%), rarely Caecal

1. **Presentation & Risk factors** - Progressive, painful abdominal distension and inability to pass flatus.

- Elderly, Debilitated patients +/- neurological conditions
- Institutionalised patients/ those on psychiatric medications
- Laxative abuse

2. **Investigation of choice** - Abdominal radiographs are diagnostic. Can consider CT A.P to assess for cause of recurrent volvulus (Malignancy) or evidence of ischaemia.
3. **Management -**

- Acute presentation - Rigid/Flexible sigmoidoscopy, decompression and flatus tube insertion.
- Recurrent presentation - Sigmoid colectomy if fit for laparotomy otherwise continue above.

Colonic Pseudo-Obstruction - OGILVIE Syndrome

Acute colonic distension in the absence of an underlying mechanical obstruction. Nonetheless can still cause bowel ischaemia (Most commonly of the caecum) and perforation.

1. **Presentation & Risk factors** - with progressive, painful/painless (If chronic) abdominal distension and constipation.

- Elderly, >60years age, more common in Males
- PMH - Diabetes, recent surgery, CKD
- Dyselectrolytemia (Low Na/K/Mg/Ca)
- Medications - Opioids mainly

2. **Investigation of choice** - Abdominal radiographs show L.B.O. CT AP with I.V contrast to assess for absence of transition point (hallmark) or ischaemia.
3. **Management** -

- Acute presentation - Rigid/Flexible sigmoidoscopy, decompression and flatus tube insertion.
- Recurrent presentation - Defunctioning Ileostomy/ Percutaneous endoscopic colostomy (P.E.C.)

Struggle with X-Ray interpretation?
Hone your skills by taking a tutorial !
Click on the brainy radiologist.

Image: Ogilvie syndrome (Case courtesy of Dr Hani Makky ALSALAM, Radiopaedia.org, rID 8193)

WORTH A READ
VOLVULUS + PSEUDO-OBSTRUCTION

Radiopaedia

AN INTERESTING CASE

GROIN HERNIAS

Inguinal hernias can be caused due to a patent processus vaginalis (Indirect) or weakness in the transversalis fascia (Direct). A femoral hernia is caused due to protrusion of intra-abdominal organs through the femoral canal.

Depending on the content of the sac and dimensions of the hernial neck, Hernias can:

- **Obstruct** - Causing upstream dilatation. Key finding on imaging - Collapsed distal limb and dilated proximal limb
- **Strangulate -** Usually follows on from an obstruction that leads to dialatation and subsequent venous and arterial cut off. As a result, Ischaemia and necrosis follow.

Approach to examining any hernia -

1. **Inspection**
   - Location
   - Size
   - Skin changes
2. **Palpation**
   - Tenderness
   - Cough impulse (Ask the patient to cough, if the hernia increases in size, it - increased risk of obstruction/strangulation)
   - Reducible or Irreducible
3. **Auscultation** - To assess contents

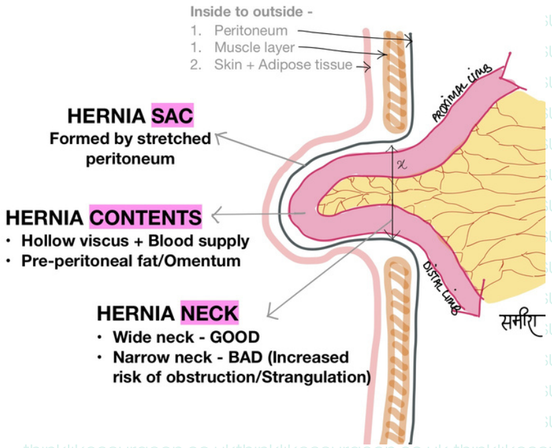


Illustration: Key features of a hernia - sac, content and neck

Type of HERNIA	GROIN HERNIAS	
	INGUINAL Most common ~70%	**FEMORAL** 6% of all groin hernias
Risk factors	• Defective collagen synthesis • Factors causing raised intra-abdominal pressures	• Females (70%)
Presentation	1. Pain 2. Obstruction	50% - Emergencies 1. Pain 2. Obstruction
Examination	ABOVE & MEDIAL to pubic tubercle	BELOW & LATERAL to pubic tubercle
Risk of obstruction/ strangulation	Narrow neck – High risk	Narrow neck – High risk
Investigation of choice	Ultrasound Groin CT AP + I.V contrast	CT AP + I.V contrast
Radiology		
Image credits	Right inguinal hernia - Case courtesy of Assoc Prof Frank Gaillard, Radiopaedia.org, rID 9323	S.B.O due to femoral hernia - Case courtesy of Dr Haji Mohammed Nazir, Radiopaedia.org, rID 79368

Table - Information taken from The British Hernia Centre - https://www.hernia.org/types/

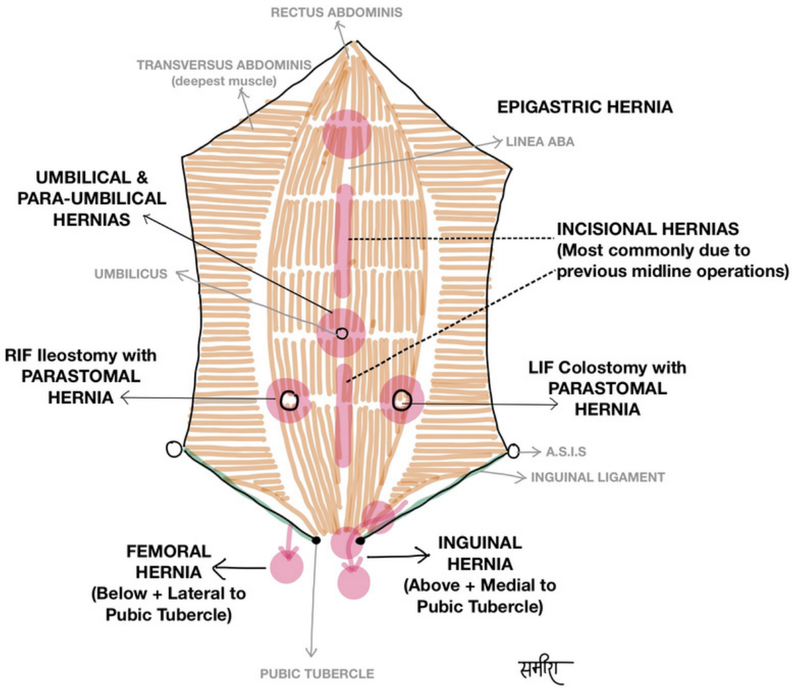


Illustration: SIX types of hernias you should familiarize yourself with. This diagram is an over simplification.

Management of hernias -

Asymptomatic and reducible hernias can be managed conservatively. Femoral hernias are commonly symptomatic. Mesh repair is the preferred method.

1. **Inguinal hernia**
   - Open/Laparoscopic mesh repair
   - Conservative management -TRUS for support
2. **Femoral hernia**
   - Open mesh repair (Low, inguinal or high approach)
   - Sutured repair if gangrenous bowel

WORTH A READ - GROIN HERNIA

AN INTERESTING CASE

UROLOGICAL EMERGENCIES

UROLITHIASIS -

Symptomatology of urinary tract stones depends on their location, size and associated infection.
Risk factors associated are:

1. General factors
- Childhood onset of stone formation
- Family history
- Solitary kidney (Stone recurrence PREVENTION is key)

2. Stone forming diseases
- Hyperparathyroidism

3. Genetic conditions
4. Drug induced stone formation
5. Anatomical and environmental risks

Presentation - Flank pain, Loin to groin pain

Investigation of choice -

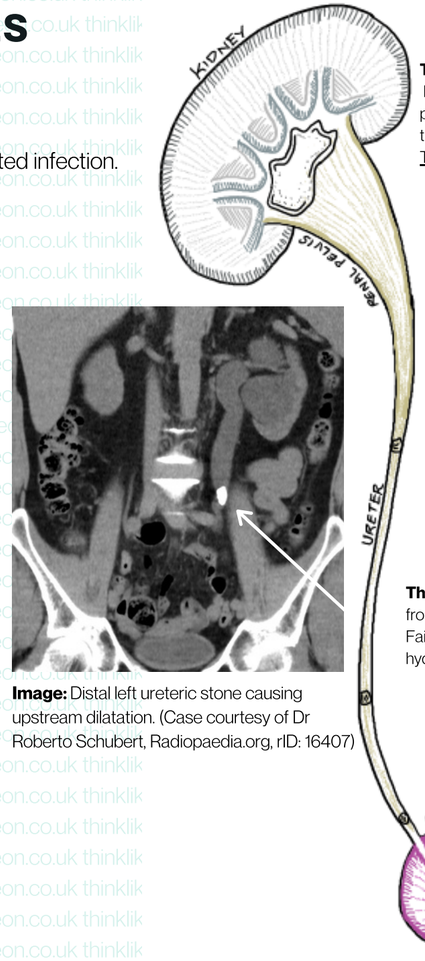
- Ultrasound KUB
- CT KUB (Non-contrast)
- Bloods - FBC, U&E, Electrolytes (Ca, Mg & PO4), Uric acid, CRP, Coagulation
- Urine dip + Culture (ALWAYS)
- Intravenous Urogram (IVU) if anatomy needs to be assessed for surgery

Management -

1. **Renal colic**
- Analgesia - NSAIDs
- If analgesic refractory - Renal decompressions or ureteroscopic stone removal
- If infected, obstructed kidney- Antibiotics and renal decompression

2. **Ureteric stones**
- Analgesia - NSAIDs
- If infected, obstructed kidney- Antibiotics and renal decompression
- Small stone - observe and review
- Stone removal - URS (Ureterorenoscopy) > SWL (Shock wave lithotripsy)

3. **Preventative measures**
- Fluid intake (2.5-3L/day)
- Nutritional advice - balanced diet
- Weight loss (aim normal BMI)



The Struvite/Renal pelvis stone: Large stone formed over a long period and takes the shape of the renal pelvis.
Treatment - Surgical removal

Image: Distal left ureteric stone causing upstream dilatation. (Case courtesy of Dr Roberto Schubert, Radiopaedia.org, rID: 16407)

The Ureteric stone: These are often in transition from the the renal pelvis and present as a colic. Failure to pass causes hydroureter and hydronephrosis.

The bladder stone: Rarely symptomatic but large stones can cause lower abdominal pain and recurrent UTI's.

Illustration: Different levels and types of stones with their presentation

PYELONEPHRITIS -

Uncomplicated - pyelonephritis in non pregnant, non-menopausal women

- **Investigation** - Urine analysis, urine culture & sensitivities and routine bloods
- **Management** - Intravenous or oral antibiotics (Based on trust formulary)

Complicated - Infection that is difficult to eradicate.

- **Risk factors** - Host factors (Diabetes or immunosuppression) or due to abnormal anatomy or function of the urinary tract (obstruction)
- **Investigation** - Urine analysis, urine culture & sensitivities and routine bloods. Consider CT KUB to look for obstruction/abscess formation
- **Management** - Intravenous or oral antibiotics (based on trust formulary) and management of urological abnormality/decompression if obstructed

Associated with urosepsis (Defined as a life threatening organ dysfunction caused by a dysregulated host response to infection from the urinary tract and/or male genital organs)

- Quick SOFA score + sepsis 6 investigation
- **Investigation** - Urine cultures & sensitivities and CT KUB to look for obstruction/abscess formation
- **Management** - Intravenous antibiotics + source control (removal of stone/ decompression/ drainage of abscess

GYNAECOLOGICAL EMERGENCIES

ECTOPIC PREGNANCY -

An ectopic pregnancy is when a fertilised egg implants itself outside of the uterus, usually in one of the fallopian tubes. Incidence is 2-3%. A Heterotopic pregnancy is where there is a viable intra-uterine pregnancy and an ectopic pregnancy.

Presentation -

- Asymptomatic
- Missed period
- Lower abdominal pain + fresh vaginal bleeding

A ruptured extopic pregnancy can lead to catastrophic intra-abdominal bleeding and haemorrhagic shock

Investigations -

1. Serum beta-HCG
2. Transvaginal ultrasound
3. MRI can be considered for equivocal diagnoses

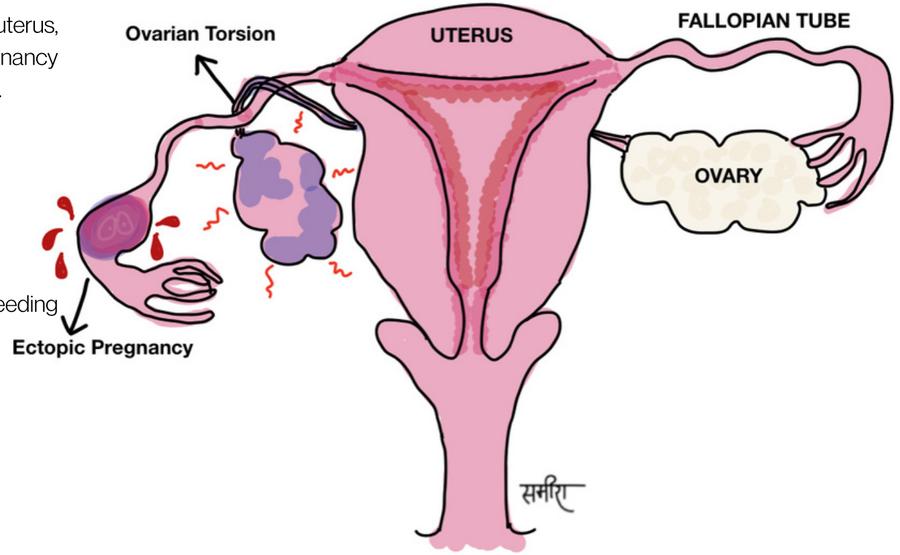
Management -

1. **Surgical management - Laparoscopic**

- Healthy contralateral tube - SalpingECTOMY
- History of fertility reducing factors - SalpingOTOMY

2. **Medical management - Systemic methotrexate**

- Cervical pregnancy
- Confirmed tubal pregnancy without intra-uterine pregnancy



Normal female reproductive anatomy and Emergencies

Illustration: Female reproductive tract and associated major emergencies


WORTH A READ - RCOG


WORTH A READ - BMJ

OVARIAN TORSION -

A twisting of the ovary and/or fallopian tube on its vascular and ligamentous supports, blocking blood flow to the ovary. It is a surgical emergency.

Presentation - Clinically, can have variable presentation. Abdominal pain is the most common symptom.

Investigations -

1. Serum beta-HCG
2. Transvaginal ultrasound with doppler flow

Management -

1. **Surgical detorsion via laparosopcy/laparotomy**

- Non-viable ovary after detorsion - Salpingo-OophorECTOMY
- Viable after detorsion - Oophoropexy

2. **Adjunct treatments**

- Oophoropexy
- Cystectomy for ovarian cysts (possibility of future cystic torsion)

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- **Radiology Masterclass** – A high-quality, world-class educational service providing free access to radiological tutorials. They also offer courses that cover the undergraduate imaging curriculum as specified by the Royal College of Radiologists. We have linked to a few of their courses throughout our book. If you want to further your radiological skills or get a certificate (for your portfolio) and CPD points, be sure to explore their website https://www.radiologymasterclass.co.uk/