Acute Appendicitis

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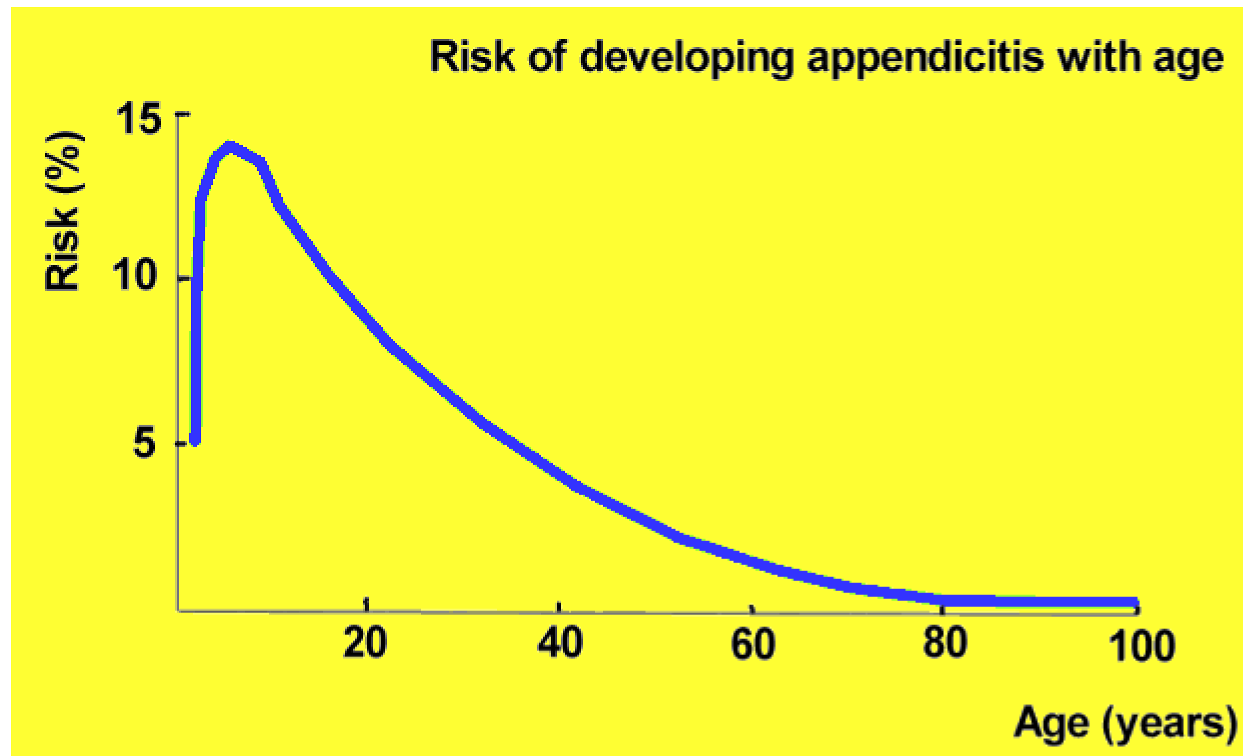
Definition

Sudden inflammation of the appendix usually caused by obstruction of the lumen resulting in invasion of the appendix wall by the gut flora

Epidemiology

- RIF pain is common – 50% of acute abdo pain
- Accounts for 2% of all hospital admissions
- 7-12% of population
- 70,000 appendicectomies per year UK
- Incidence decreasing
- M>F
- Age

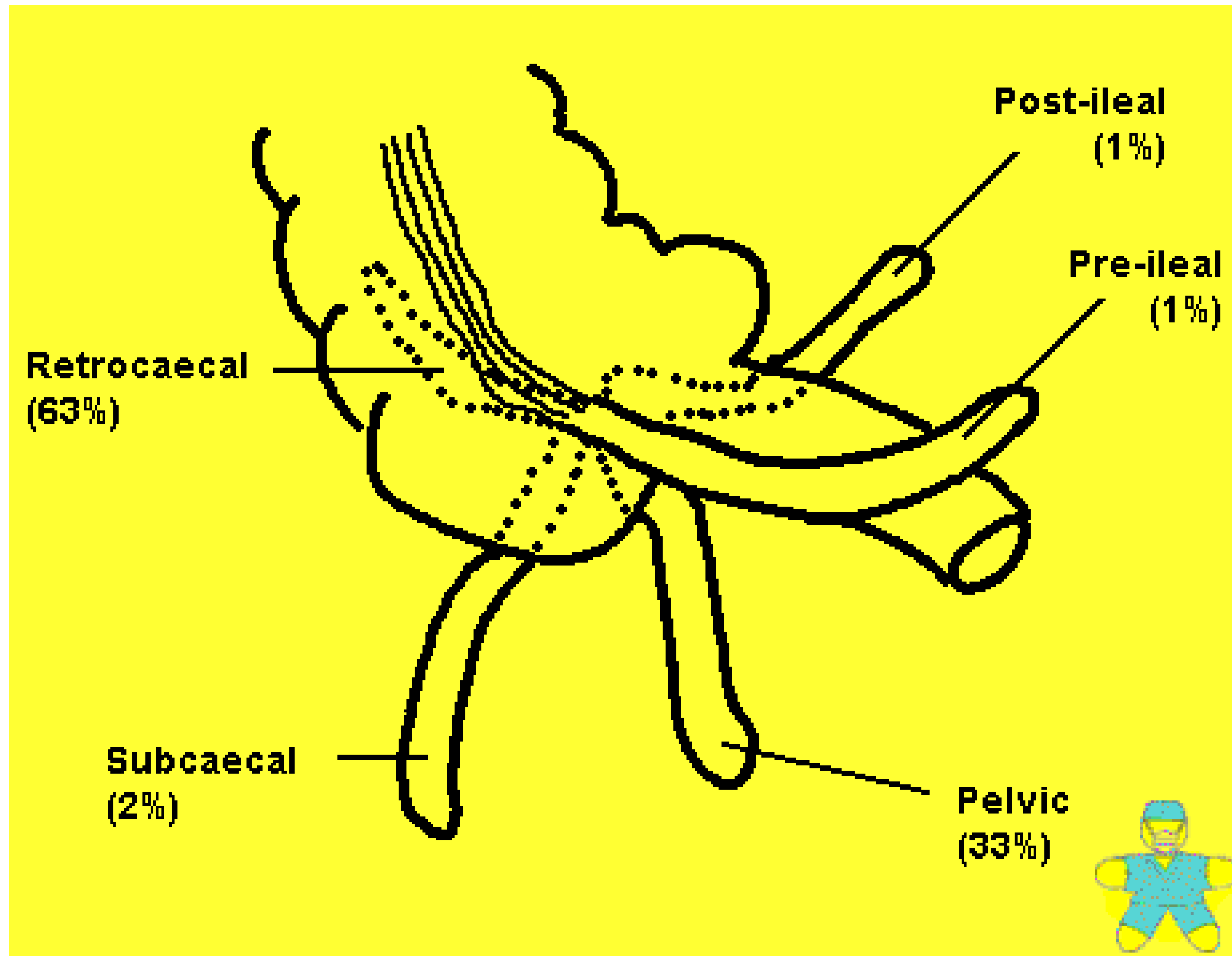
Age



Surgical Anatomy

- Only humans, some apes and wombat
- Continuation of the caecum
- Origin 2.5 cm below ileocecal valve from postero – medial aspect of caecum
- Taeni coli coalesce
- Length usu 5-10 cm (1-25cm)

Surgical Anatomy - Position



Surgical Anatomy

- Congenital absence – rare 68 cases reported
- Duplication - <100 cases
- Blood supply – appendiceal artery (end artery) – ileocolic – SMA

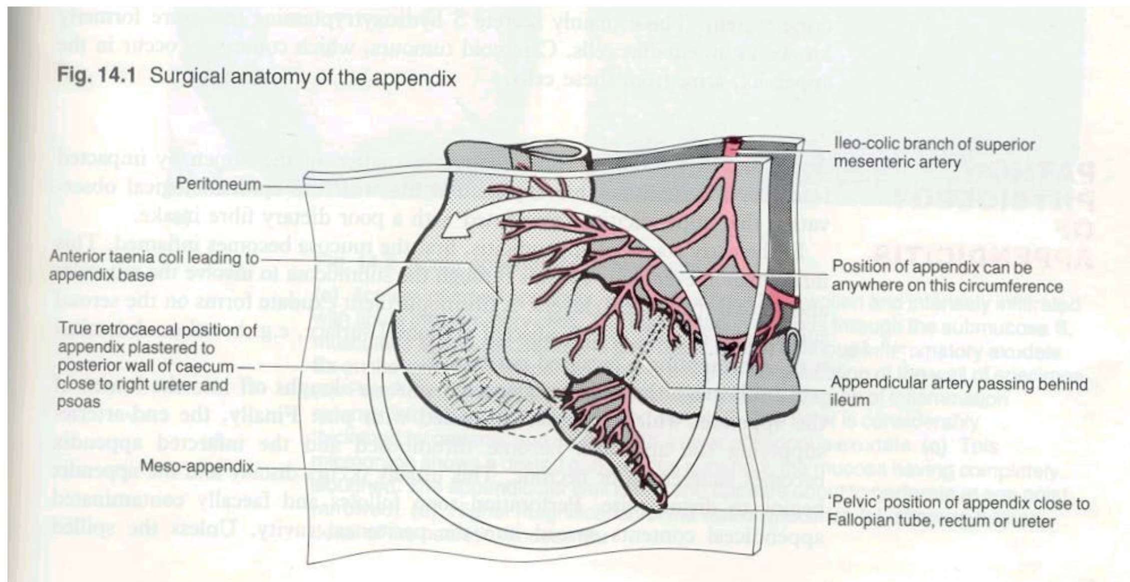


Fig. 14.1 Surgical anatomy of the appendix

Pathology

- Obstruction of the lumen
  - Submucosal lymphoid hyperplasia
  - Faecolith / faecal stasis
  - Inspissated barium
  - Vegetable/fruit seeds
  - Worms (Entrobius vermicularis
  - Tumours of caecum/appendix

Pathology

- Secondary infection
- Continued mucous production
- Mucus → PUS
- Distension of appendix → visceral pain
- ↑ pressure → blocks lymph and venous drainage → oedema
- Irritates parietal peritoneum → Localised more severe Pain
- Ellipsoidal infarcts in antimesenteric border → perforation

Clinical Features - Symptoms

- Typical – periumbilical/epig pain that shifts to RIF (50%)
- Afebrile/low grade fever (high in perf)
- Anorexia
- Nausea
- Constipation/Diarrhoea

Clinical features - Signs

- RIF tenderness Guarding
- Percussion tenderness (rebound)
- Tachycardia
- Brown-furred tongue
- Foul Breath
- Hyperaesthesia (Sherren′s Triangle)

Clinical Features – Special Signs

- Rovsing's sign
- Pointing sign
- Psoas's Sign (Copes)
- Obturator test

Differential diagnosis

- GIT
  - Gastroenteritis
  - Mesenteric adenitis
  - Intestinal obstruction
  - Meckle's diverticulitis
  - Terminal ileitis (Crohn's, Yersinia enterocolytica)
  - Ca Caecum
  - Sigmoid diverticulitis
  - Acute typhlitis
  - (Cholecystitis, Perf ulcer)

Differential diagnosis

- Gynae
  - Salpingitis
  - Ectopic gestation
  - Rt Ovarian torsion
  - Ruptured ovarian follicle (Mittelschmerz)

- Urinary tract
  - Renal colic
  - Pyelonephritis
  - Testicular torsion

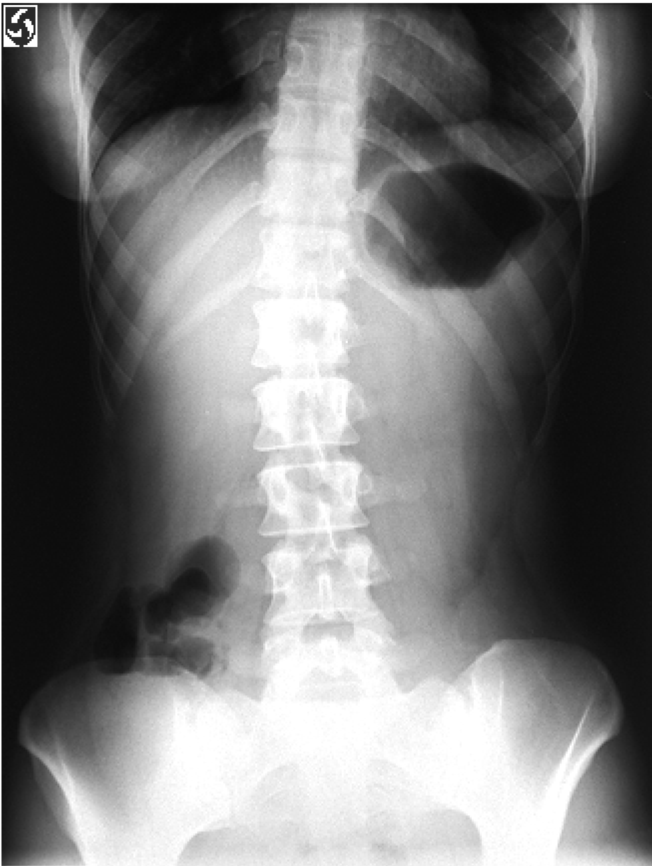
Differential diagnosis

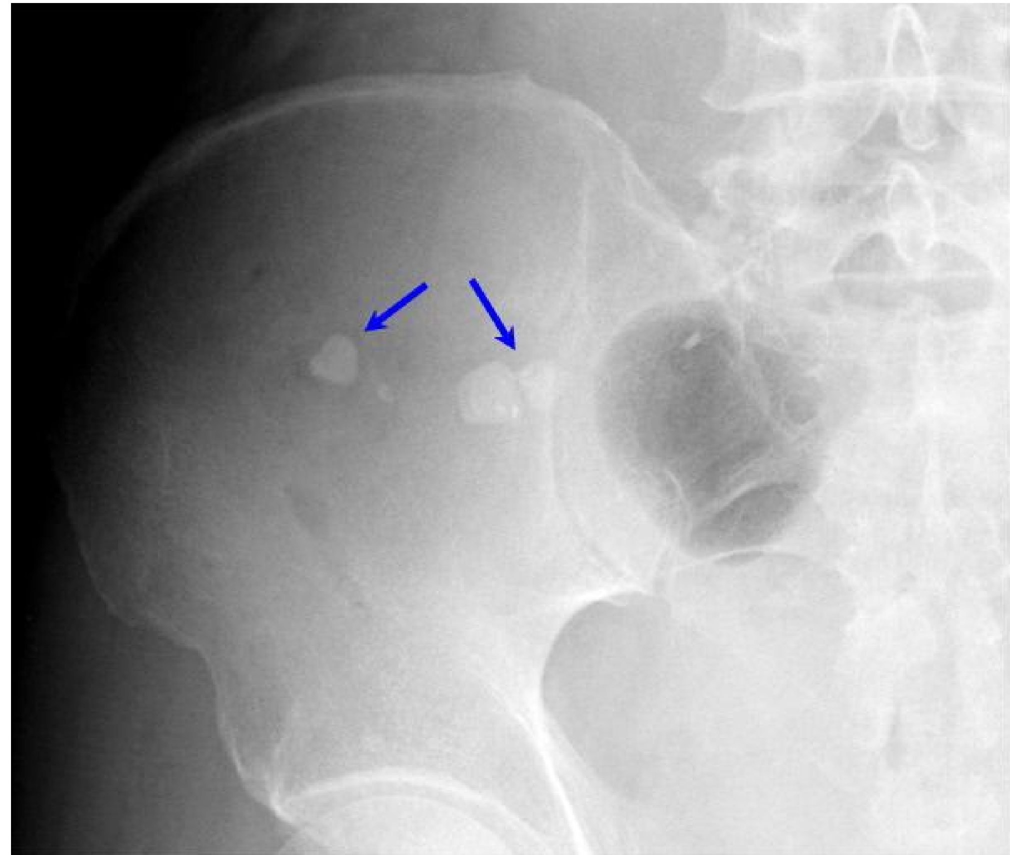
- Others
  - Referred pain (Pneumonia, pleurisy)
  - Preherpitic neuralgia
  - Porphyria
  - Henoch Schonlein syndrome
  - Pancreatitis
  - Rectus sheath haematoma

Investigations

- Dx is a clinical one
- WCC – 70% - 90% - elevated WCC. Neutrophilia
- CRP
- Urinalysis – pyuria/haematuria (do not exclude appendicitis)
- HIT
- AXR – limited value

Abdominal X-ray



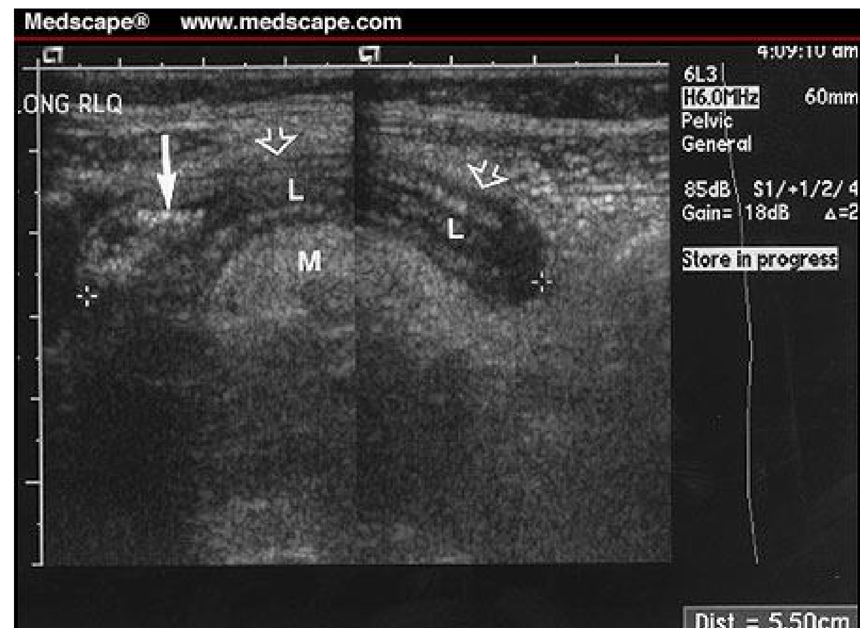


Graded compression Ultrasound

- Depends on the technique and experience
- Thin pts better
- Normal appendix
  - a blind-ended, tubular structure with a maximum wall thickness of 2 mm with an outer diameter of 6 mm,
  - No peristalsis
  - Originates from the base of the cecum

Graded compression Ultrasound

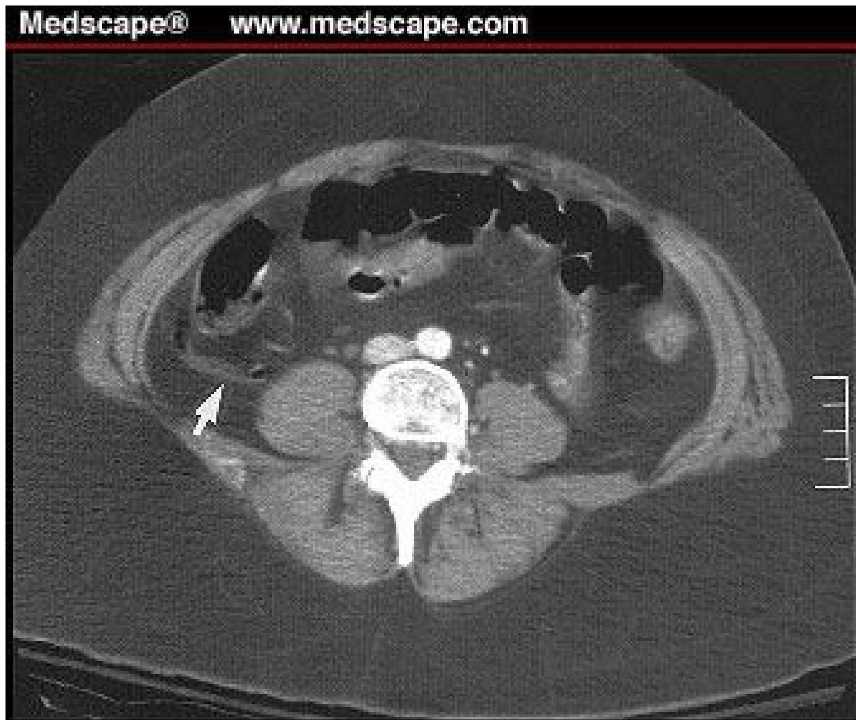
- Thickened wall >3 mm
- Diameter >6 or 7 mm
- Noncompressible
- Appendolith
- Circumferential color flow
- Echogenic mesentery
- Free fluid
- Abscess

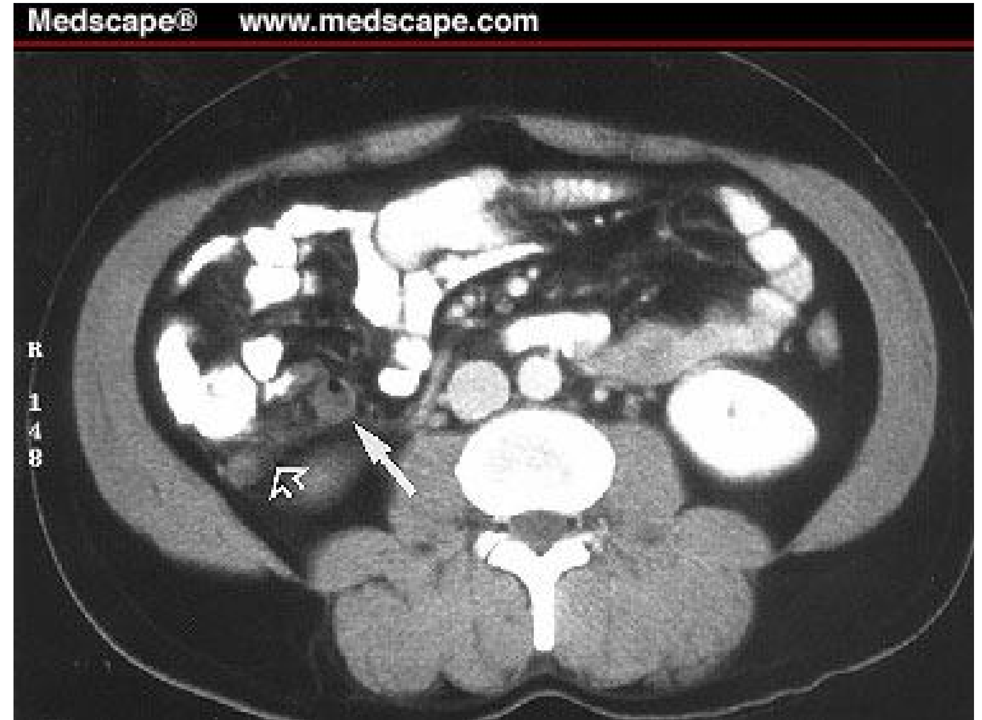


CT

- variable degree of distension (diameter 6–40 mm)
- wall thickness of 1–3 mm.
- Wall - asymmetrically thickened enhances with intravenous contrast medium.
- periappendiceal inflammatory mass
- Thickening and enhancement with intravenous contrast - adjacent wall of the cecum or ileum

CT





Scoring systems

- Alvarado Score
- Samuel Score (Paediatric)

Alvarado Score

Feature	Score
Abdominal pain that migrates to the RIF	1
Anorexia / ketnouria	1
Nausea/vomiting	1
Tenderness in RIF	2
Rebound tenderness	1
Temperature > 37.3	1
WCC >10,000/µL	2
Neutrophilia	1

Delayed diagnosis

- **Pregnant females** – similar incidence. ↑gestational age ass c` ↓ dx accuracy ↑ perf risk
- **Very young children** – lack of history + non-specific symptoms. Underdeveloped omentum
- **Elderly** – often overlooked – ass ↑mortality
- **Major mental illness** – impaired capacity, difficulty accessing healthcare, misdiagnosis

Management

- Patients c` appendicitis – should be prepared for theatre
- Patients c` atypical features – further imaging / observation / Dx - Laparoscopy
- Meta-analysis – combination of a strong inflamm response (WCC CRP); signs of peritoneal irritation; migratory pain →HIGH predictive power
- Open vs Laparoscopy

Management

LA	OA
Decreased wound infection rate	Cheaper
Earlier return to normal life	Shorter operating time
Shorter Hospital stay	
Can assess the rest of the abdominal cavity with ease	
? Associated with increased intra-abdominal infections	
More beneficial in obese, females and employed pts	

Open Appendicectomy

- Incission (transverse, Mc Burney's point)
- Open in layers. (muscle split along its fibres)
- Check for fluid (+/-c&S)
- Identify caecum and exteriorized – follow taeniae to appendix
- Mesoappendix divided + ligated
- Clamp appendix 5mm above caecum and ligated
- Cauterise residual mucosa +/- purse string (not req)
- Return caecum, wash with warm saline
- Close in layers

Laparoscopic Appendicectomy

- Usu 3 ports. 1 umbilical, 1 suprapubic (12mm) and 1 rt periumb region (anatomy) (5mm)
- Pneumoperitoneum (10-14mmHg)
- Appendix is grasped and retracted up to expose mesoappendix → divided →ligated
- Appendix transacted and delivered in endobag
- Peritoneal irrigation
- Closure of fascia and skin

POSTOP

- IV fluids till oral fluids are tolerated
- Antiemetic
- Analgesia
- Early ambulation
- Home once oral diet tolerated

Antibiotics

- Should be used routine in emergency appendicectomies
- Single use preop is enough after non-perf appendicectomy
- No need for oral after finishing IV (even after perf)

Appendiceal masses

- Typically present late
- Palpable tender mass in RIF
- Should be treated conservatively - IV fluids + antibiotics (resolves or forms abscess) – abscess (drained open or percutaneous)
- Interval appendicectomy may be considered but no longer recommended

Complications

- Death is rare
- Perforated appendix - ~30% complication rate
- Wound infection +/-dehiscence
- Intra-abdominal abscess
- Cecal fistulas
- Small bowel obstruction (adhesions) (esp after perf)
- Ileus
- Stump appendicitis (ass with long appendiceal stump)

Follow up

- Most are discharged within 48hrs
- Normal activities within few weeks (earlier for LA)
- Rountine outpatient review is not common practice
- 1% have appendiceal tumours - carcinoid
- Tumours >1cm – consider rt hemicolectomy

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