ACUTE APPENDICITIS

Dr. Muhammad Shamim
Assistant Professor, BMU

ETIOLOGY

1. Sex Ô Males > females.
2. Social status Ô Upper & middle classes.
3. Diet Ô ↑ meat, & ↓ cellulose.
4. Familial susceptibility.
5. Obstruction of lumen Ô Fecolith, stricture, foreign body, round worm, or thread worms.
6. Obstruction of orifice Ô Carcinoma of cecum.
7. Abuse of purgatives.
8. Bacteria Ô A mixture of E coli, enterococci, nonhemolytic streptococci, anaerobic streptococci, Cl welchii, & bacteroides.

PATHOLOGY

- Inflammation usually begins in mucosa, & less often in lymph follicles.
- Progressing inflammatory response leads to luminal obstruction.
- Continued mucus secretion & exudation increase intraluminal pressure, obstructing lymphatic drainage Ô
  - Edema & mucosal ulceration develop with bacterial translocation to the submucosa Ô
  - Resolution may occur at this point either spontaneously or in response to antibiotic therapy.

- With further distension, venous obstruction & ischemia ensues Ô Bacterial invasion occurs thru the muscularis propria & submucosa Ô
  - Ischemic necrosis of wall produces gangrenous appendicitis, with free bacterial contamination of the peritoneal cavity.
  - Greater omentum & loops of small bowel become adherent to appendix, resulting in a phlegmonous mass or appendicular abscess.
  - Inflammation resolves leaving a distended mucus-filled organ, mucocele of the appendix.
- Peritonitis occurs as a result of;
  - free migration of bacteria thru an ischemic appendicular wall,
  - thru frank perforation of a gangrenous appendix or
  - delayed perforation of an appendix abscess.

Factors favoring peritonitis

1. *Extremes of age.*
2. *Immunosuppression.*
3. *Diabetes mellitus.*
4. *Fecolith obstruction of the appendix lumen.*
5. *Free-lying pelvic appendix.*
6. *Previous abdominal surgery.*

Outcome of acute appendicitis

1. *Resolution*
2. *Ulceration*
3. *Suppuration*
4. *Fibrosis*
5. *Gangrene*
6. *Phlegmonous mass*
7. *Appendicular abscess*
8. *Mucocele of the appendix*
9. *General peritonitis*

CLINICAL FEATURES

- Age incidence Ô Increasingly common during childhood & adolescence;
  - maximum incidence is between 20 & 30 years.
- 2 types
  - Acute catarrhal (non-obstructive) appendicitis
  - Obstructive appendicitis

Non-obstructive Appendicitis

Symptoms

1. *Abdominal pain which shift*
   - *Initially, there is poorly localized colicky abdominal pain; frequently first noticed in the periumbilical region, in epigastrium, or it may be generalized.*
   - *After a few hours, pain becomes intense, constant, & shift to the point where inflamed appendix irritates parietal peritoneum (usually in right iliac fossa).*
2. *Gastric function upset*
   1. *Anorexia, nausea, & infrequent vomiting.*
   2. *Usually constipation is present, but occasionally diarrhea occur.*

Signs

- **General signs**
  1. Pyrexia Ô 99-100°F.
  2. Tachycardia Ô 80-90 per minute.
  3. Tongue Ô White & furred.
  4. A special fetor oris.

- **Local signs**
  1. Pointing sign.
  2. Cough sign.
  3. Localized tenderness.
  4. Rebound tenderness.
  5. Muscle guarding & rigidity.
  6. Rovsing's sign.
  7. Psoas sign.
  8. Obturator sign.

Obstructive Acute Appendicitis

- Sequence of clinical events occur much more quickly:
  - Onset is abrupt, & there may be severe generalized abdominal colic from start. However, the pain shifts in the usual way.
  - Vomiting is common.
  - Temperature can be normal.
  - Local signs are as mentioned above.

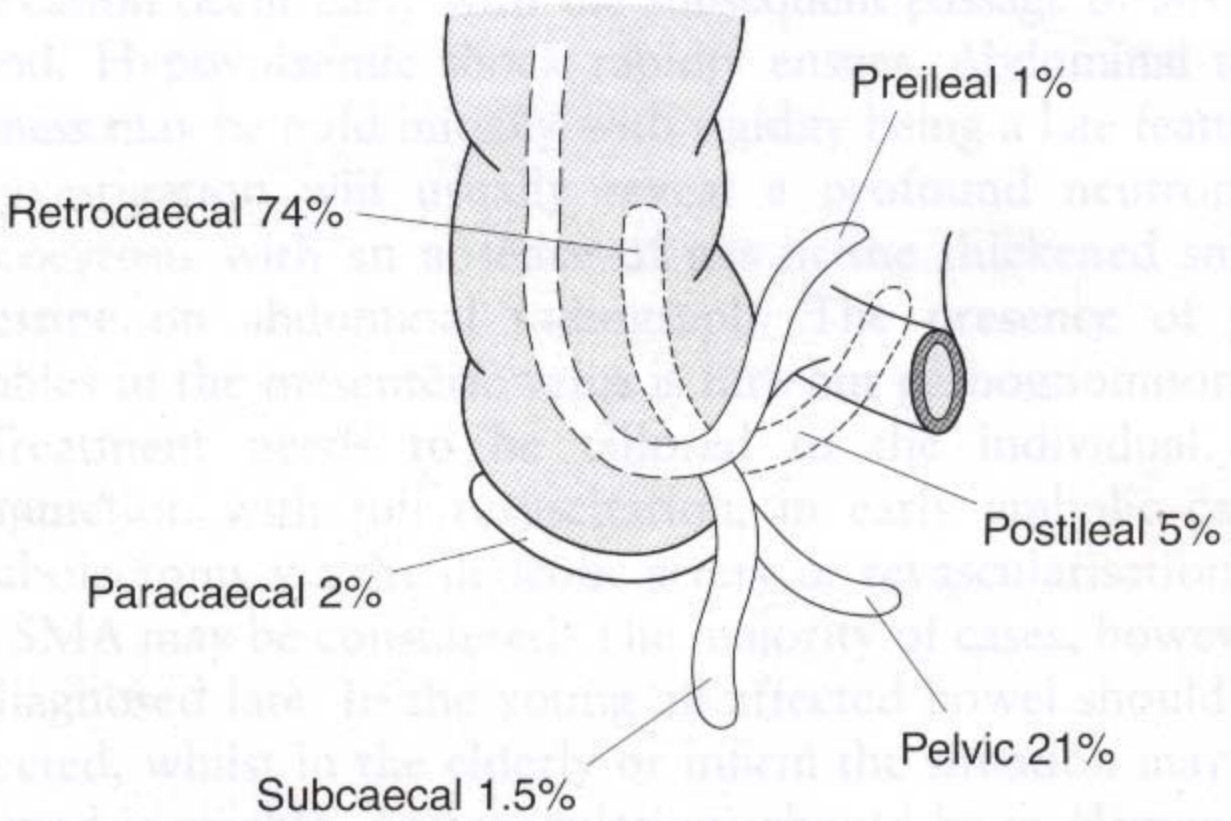

Fig. 59.1 The various positions of the appendix (*after Sir Cecil Wakeley, London, formerly PRCS*).

Special features according to position

- *Retrocecal appendicitis*
  - *Abdominal tenderness & rigidity are often absent.*
  - *Deep tenderness is present in loin.*
  - *Rigidity of quadratus lumborum.*
  - *Psoas sign.*
- *Postileal appendicitis*
  - *Pain may not shift.*
  - *Diarrhea.*
  - *Marked retching.*
  - *Tenderness is ill-defined, though it may be present immediately to right of umbilicus.*
- *Subhepatic appendicitis*
  - *Tenderness is present in subhepatic region.*

- *Pelvic appendicitis*
  - *Early diarrhea.*
  - *Complete absence of abdominal tenderness & rigidity.*
  - *Per rectal examination Ô Tenderness in rectovesical pouch or pouch of Douglas, esp. on right side.*
  - *Psoas sign.*
  - *Obturator internus sign.*
  - *Frequency of micturition.*

DIFFERENTIAL DIAGNOSIS

Children

1. Gastroenteritis
2. Mesenteric adenitis
3. Meckel's diverticulitis
4. Intussusception
5. Henoch-Schönlein purpura
6. Lobar pneumonia & pleurisy

Elderly

1. Diverticulitis
2. Intestinal obstruction
3. Cecal carcinoma
4. Torsion appendix epiploicae
5. Mesenteric infarction
6. Aortic aneurysm

Adult

1. Terminal ileitis
2. Ureteric colic
3. Perforated peptic ulcer
4. Acute cholecystitis
5. Acute pancreatitis
6. Rectus sheath hematoma
7. Right-sided acute pyelonephritis

Adult female

1. Mittelschmerz
2. Salpingitis
3. Pylonephritis
4. Ectopic pregnancy
5. Torsion/ rupture of an ovarian cyst
6. Endometriosis

Adult male

1. Torsion of testis

INVESTIGATIONS

- Blood C/P
  - Moderate leukocytosis (10,000-16,000 WBCs per mm^3).
- Urine D/R
  - May show a few RBCs.
- Urinary pregnancy test
  - It should be done in women of reproductive years, to exclude other pathologies.

- X-ray studies
  - Plain abdominal x-ray
    - Localized right lower quadrant ileus, or fecolith.
  - X-ray with barium enema
    - A filling defect in cecum indicates appendicitis.

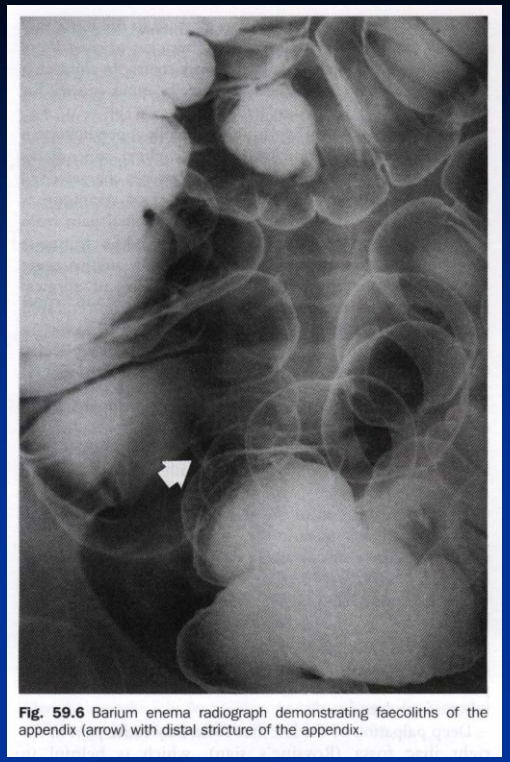

Fig. 59.6 Barium enema radiograph demonstrating faecoliths of the appendix (arrow) with distal stricture of the appendix.

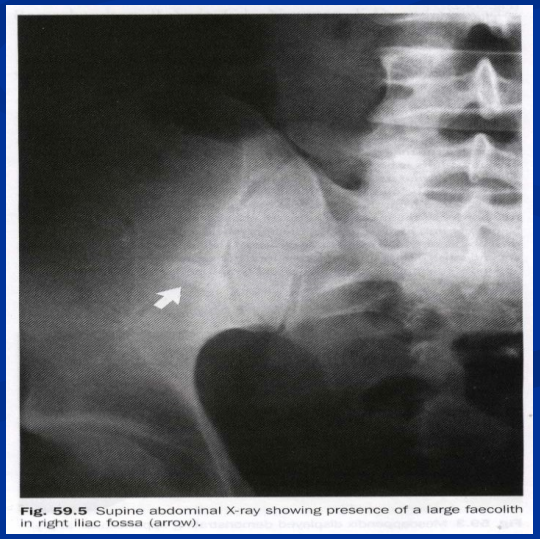

Fig. 59.5 Supine abdominal X-ray showing presence of a large faecolith in right iliac fossa (arrow).

- Ultrasound abdomen & pelvis
  - Pelvic ultrasound is of value in excluding tubal or ovarian disease.
  - Abdominal ultrasound has a diagnostic accuracy of appendicitis in excess of 90%.
- CT scan

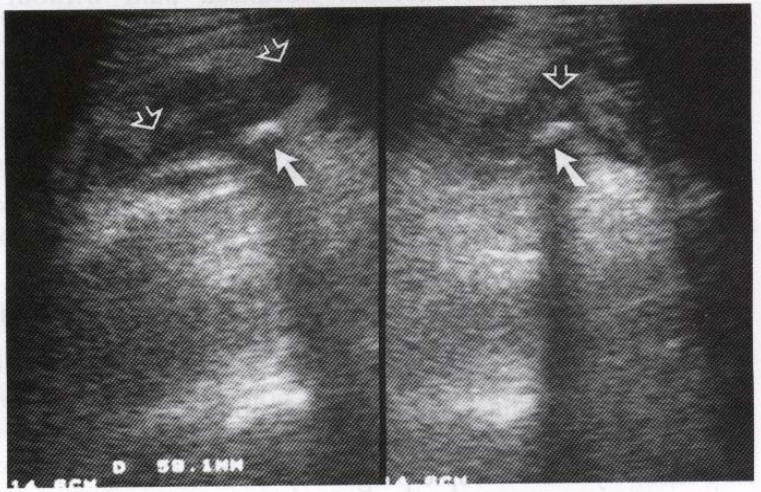

Fig. 59.11 Abdominal ultrasound examination showing features of acute appendicitis, distended oedmatous appendix (open arrows), longitudinal scan (left) and transverse scan (right). A faecolith is seen (closed arrow) (*courtesy of Dr Michael Behan, Dublin, Ireland*).

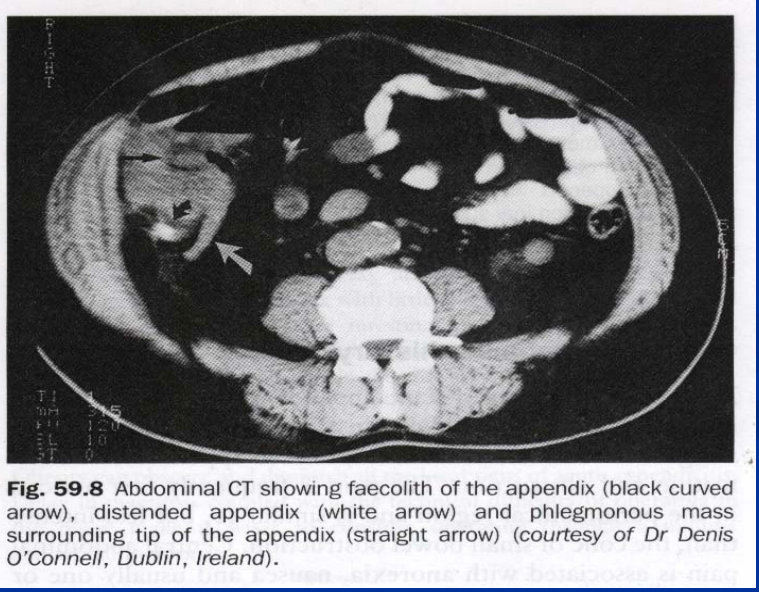

Fig. 59.8 Abdominal CT showing faecolith of the appendix (black curved arrow), distended appendix (white arrow) and phlegmonous mass surrounding tip of the appendix (straight arrow) (*courtesy of Dr Denis O'Connell, Dublin, Ireland*).

TREATMENT

Appendicectomy

- *Conventional appendicectomy*
  - *Gridiron incision*
  - *Paramedian incision*
  - *Rutherford Morrison's incision*
  - *Transverse skin crease (Lanz) incision*
  - *Lower midline incision*
- *Laparoscopic appendicectomy*

Complications of appendicectomy

Early

- Ileus.
- Wound sepsis.
- Residual abscess (local, pelvic, paracolic, subphrenic).
- Intestinal obstruction (adhesions).
- Fecal fistula.
- Pylephlebitis.
- Postoperative thrombosis & embolism.
- Actinomycosis.
- Pulmonary complications.

Late

- Intestinal obstruction from adhesions.
- Incisional hernia.
- Right inguinal hernia following gridiron incision.
- Sterility in female from frozen pelvis.

Thank you!