OPERATIVE STEPS IN OPEN APPENDICECTOMY

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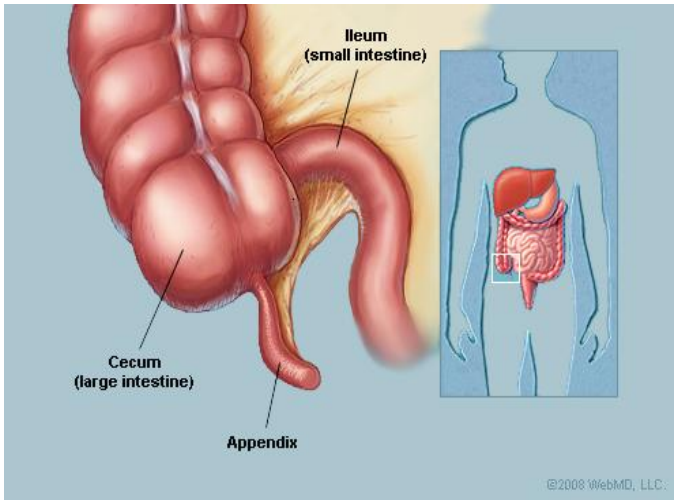
SURGICAL ANATOMY

- Congenital Anomalies-Rare



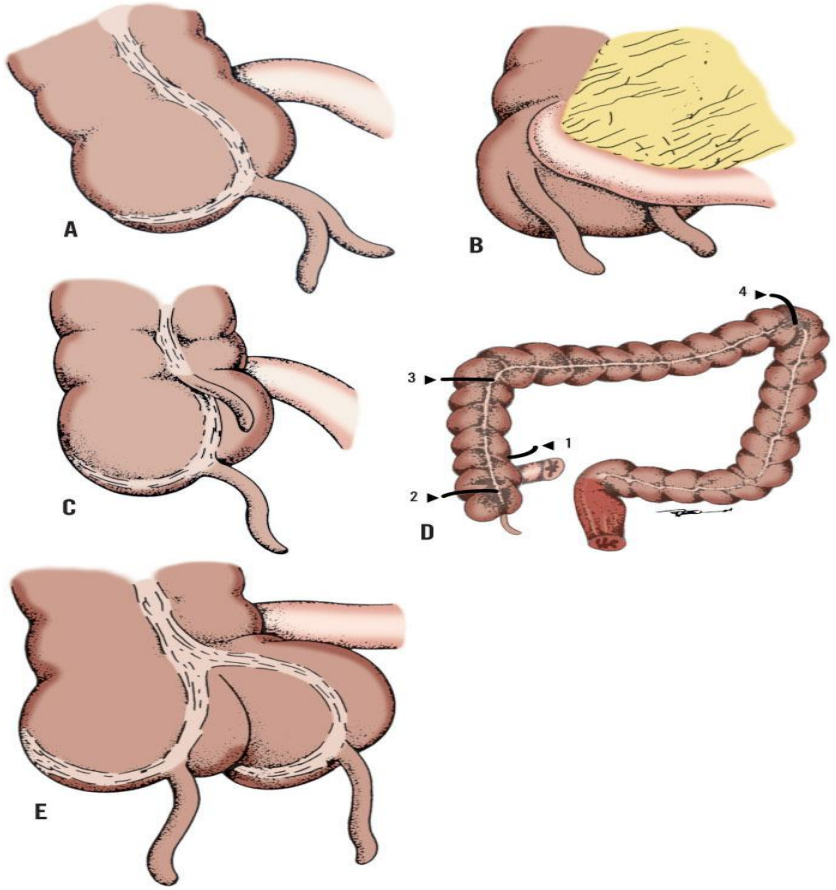
- Ectopic appendix
  - Malrotation
  - Lumbar area
  - Posterior cecal wall without a serosa

- Absence of Appendix
  - Failure to form in 8th week/same rate of growth as caecum but lacks demarcation or more commonly due to appendiculocolic neglected intussusception
  - Should be diagnosed with care

- Left sided appendix
  - Situs inversus
  - Non-rotation
  - “Wandering cecum”
  - Excessively long appendix

If appendix & cecum are not visualized in the RIF, search must be made in the right paravertebral gutter and subhepatic space

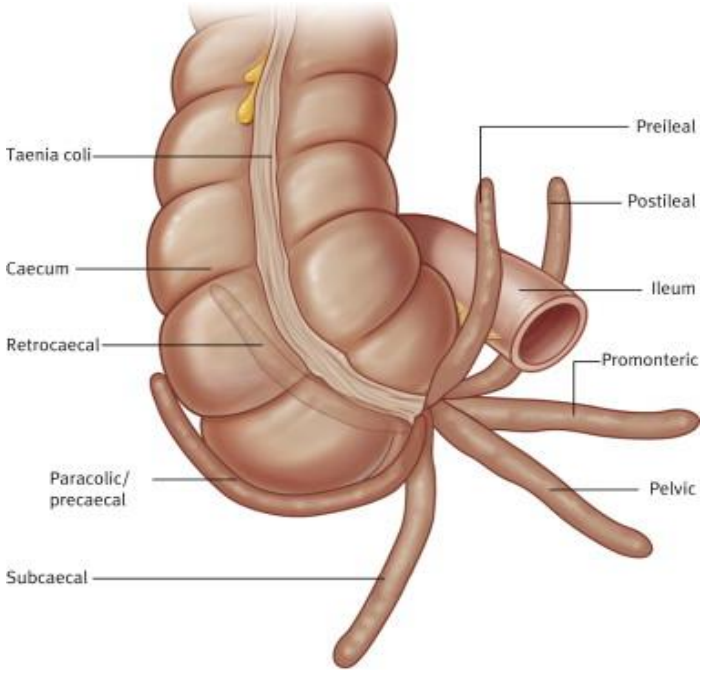
- Duplication(Cave & Wallbridge Classification)
  - Double barelled
  - ‘Bird Type’ paired
  - Taenia coli type

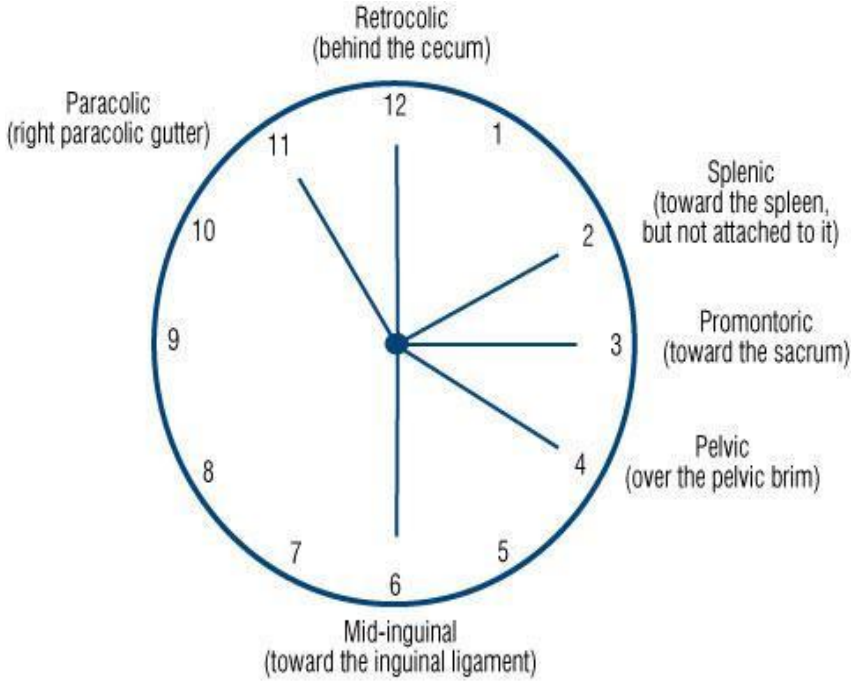


POSITIONS

- Retrocecal/retrocolic
- Pelvic
- Subcecal(Down and right)
- Ileocecal(Upward & left anterior to ileum)
- Ileocecal(Upward & left posterior to ileum)

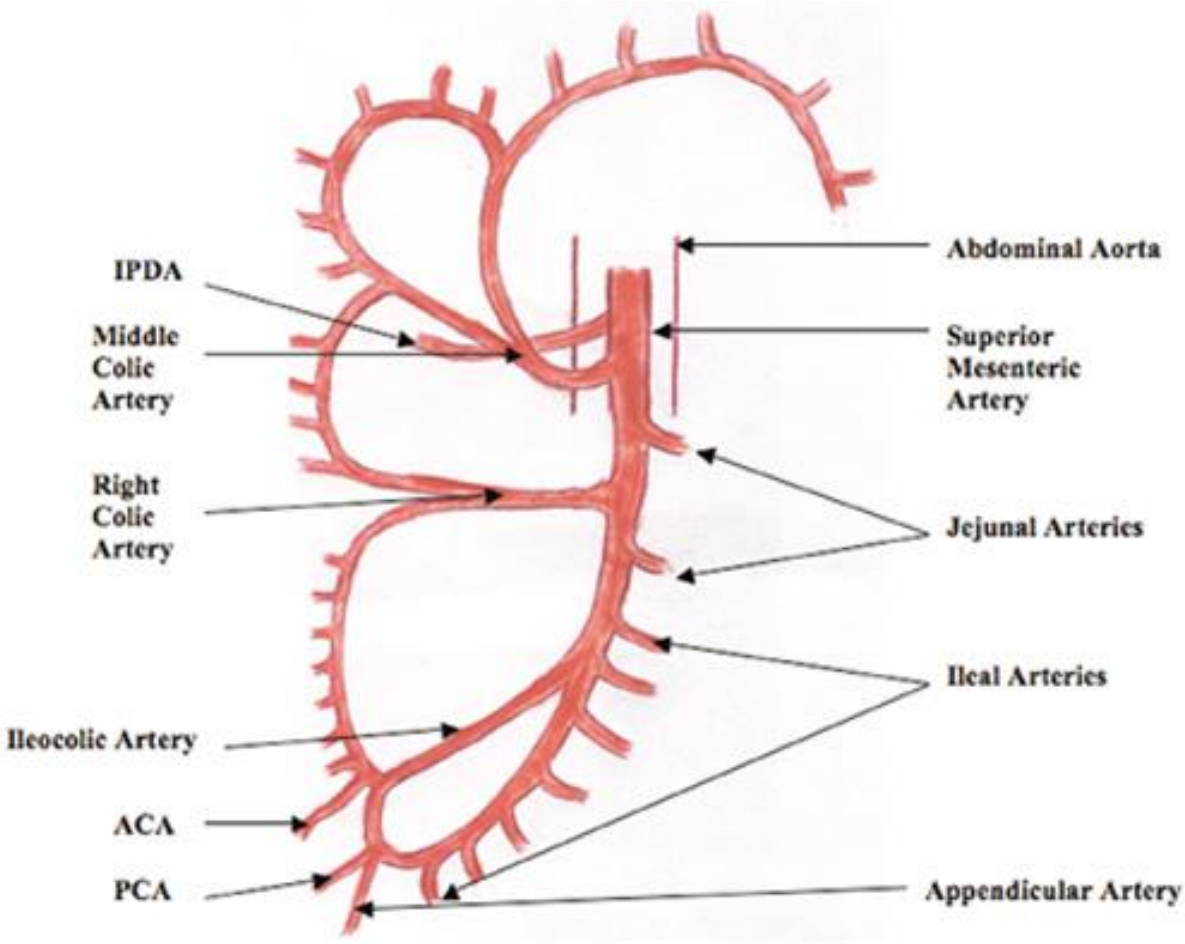
POSITIONS





VASCULAR SUPPLY

- Appendicular artery contained in the mesentry which is an extension of the peritoneal fold from the terminal ileum
- Ileo-colic artery→ ileal branch→ appendicular artery
- Variations occur in the origin
- Veins follow the arteries


IPDA
Middle Colic Artery
Right Colic Artery
Ileocolic Artery
ACA
PCA
Abdominal Aorta
Superior Mesenteric Artery
Jejunal Arteries
Ileal Arteries
Appendicular Artery

INDICATIONS

- Acute Appendicitis unless contraindicated
- Perforated Appendicitis
- Appendicular mass(selective cases)
- Appendicular abscess
- Recurrent acute appendicitis

PRE-OPERATIVE PREPARATION

- Restoration of fluid balance if any
- Well hydrated manifested by adequate urine output
- Antipyeretics if GA contemplated
- Antibiotics
- Nasogastric tube if indicated

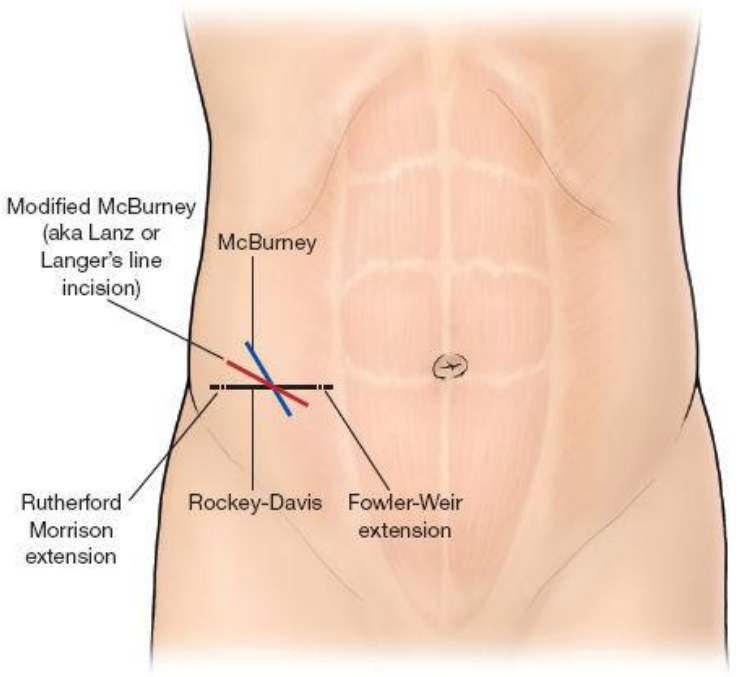
- Anaesthesia
  - GA
  - RA
  - LA
- Position
  - Supine
- Skin preparation

INCISIONS

- **McBurney's**
  - Right angle to a line joining ASIS and Umbilicus at 2/3rd the distance from the umbilicus,1/3rd above and 2/3rd below the line
  - Avoid too medial/too lateral
- **Lanz**
  - Transverse skin crease 2cm below umbilicus centered over the mid-clavicular, mid-inguinal line
- **Midline**
- **Rockey-Davis**
- **Rutherford Morrison extension**
- **Fowler-Weir extension**

- No fixed point for incision

- Can be centered over the maximum point of tenderness or a mass palpated after induction of anesthesia

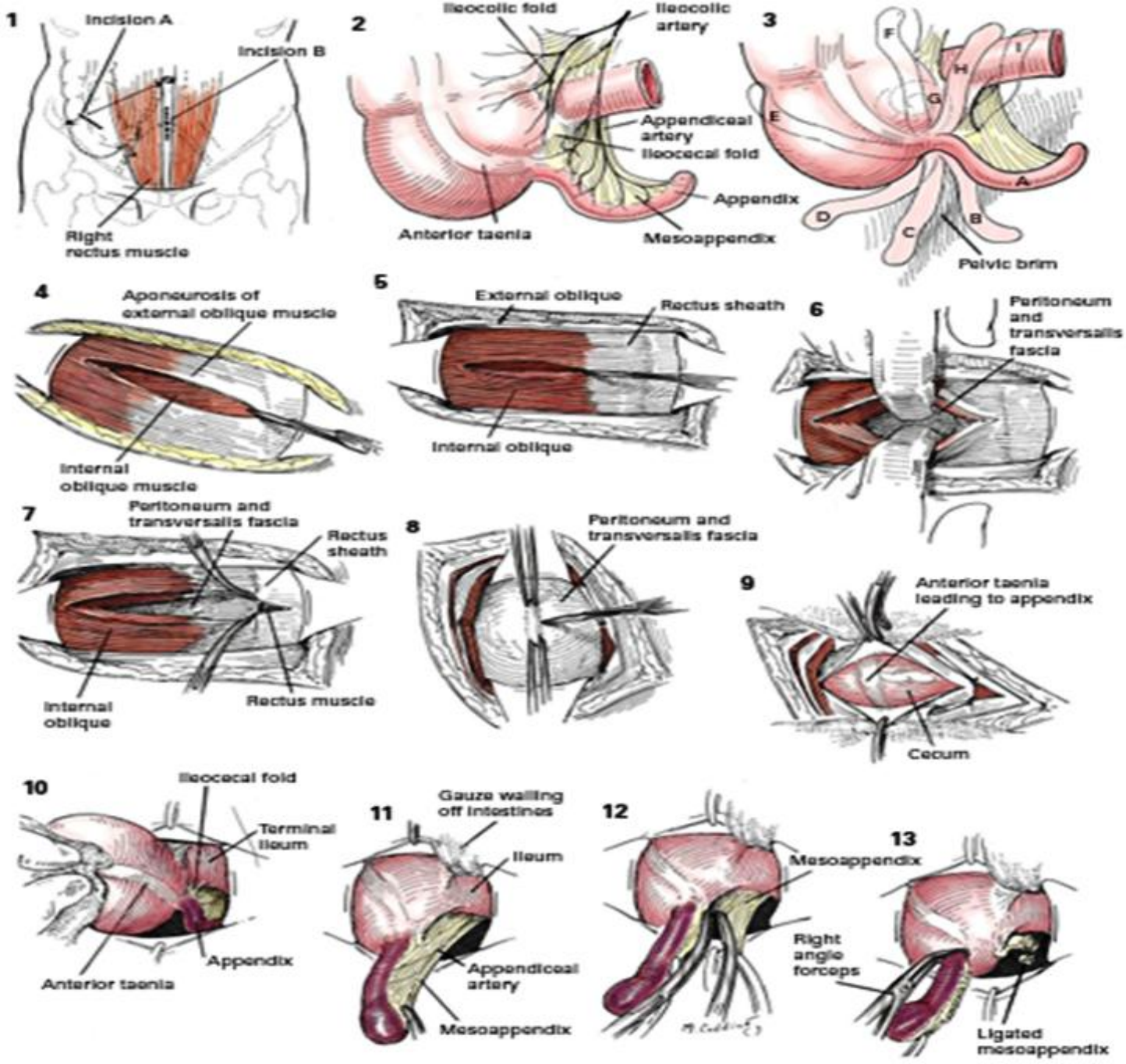


Steps

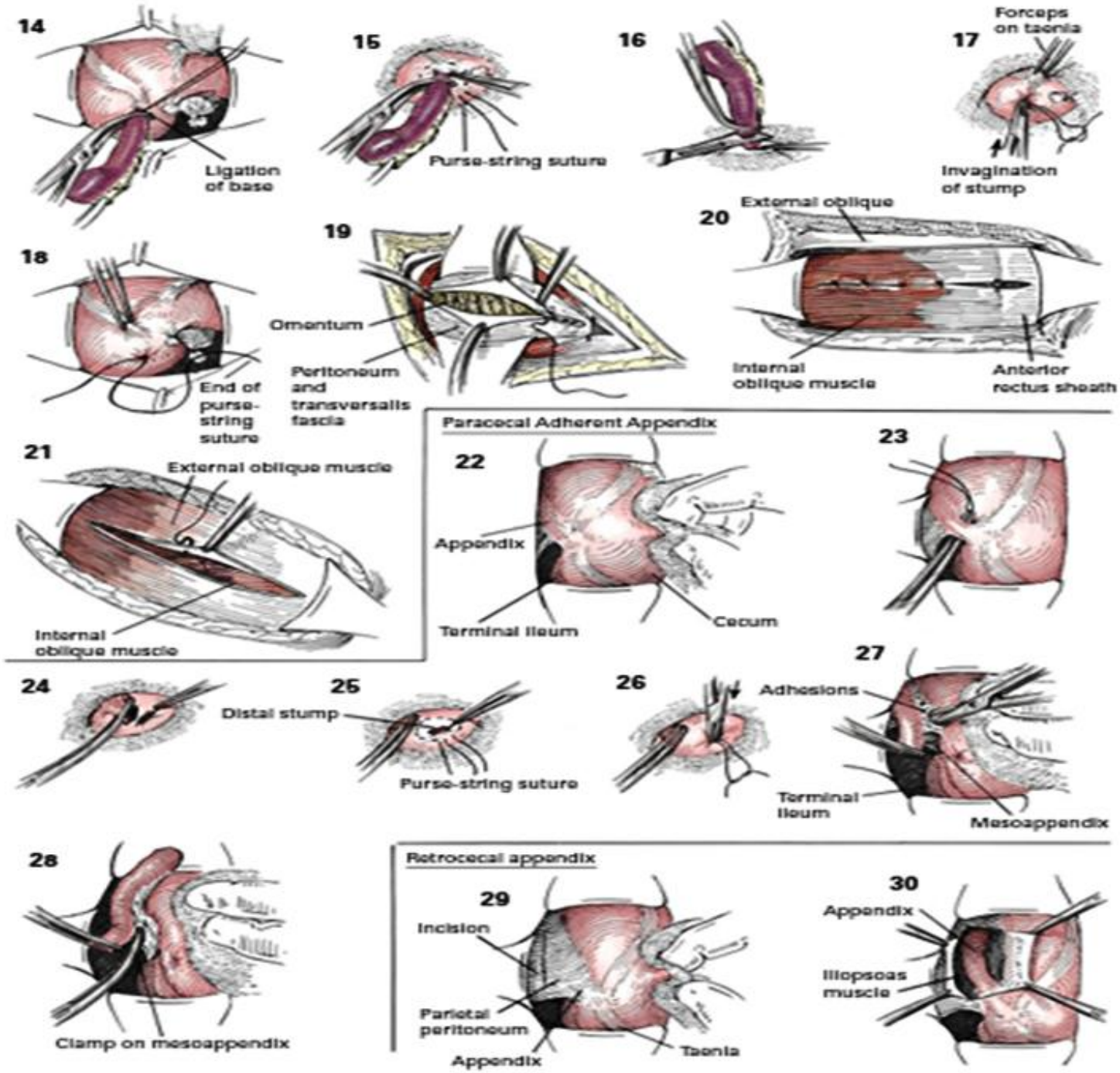
- Skin incision is deepened upto External oblique Aponeurosis after opening the subcutaneous tissue and Fascia Camper & Scarpa
- EOA split along the line of its fibres by sharp dissection or cautery from lateral border of rectus to the flanks
- EOA held aside with retractors and Internal oblique and Transversus abdominis split along its line of fibres
- Transversalis fascia divided and peritoneum picked up by the surgeon first between hemostats followed by the assistant
- Operators drops the original bite and picks up close to the assistant and compresses the peritoneum to free the underlying intestine

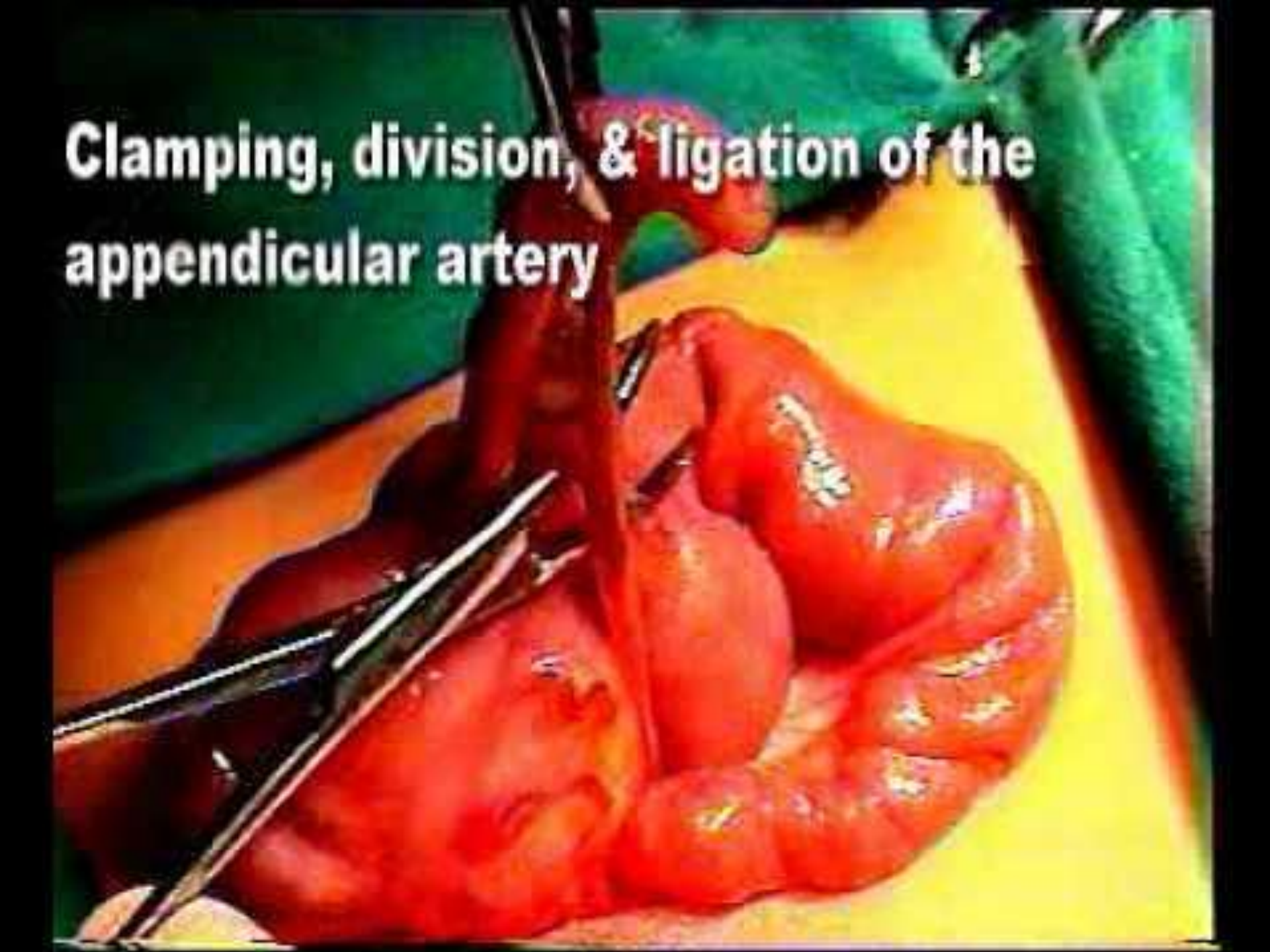
- An important maneuver to safeguard the underlying bowel and must be always done before opening the peritoneum
- Peritoneum clamped to moist sponges surrounding the wound
- Retractors inserted into the peritoneum and other instruments taken off
- Identification of cecum by seeing the taenia coli
- Cecum is held in a moist gauze and delivered into the wound
- Appendix base is identified by the convergence of all 3 taenia
- Peritoneal attachments of the cecum may require division to facilitate removal of appendix

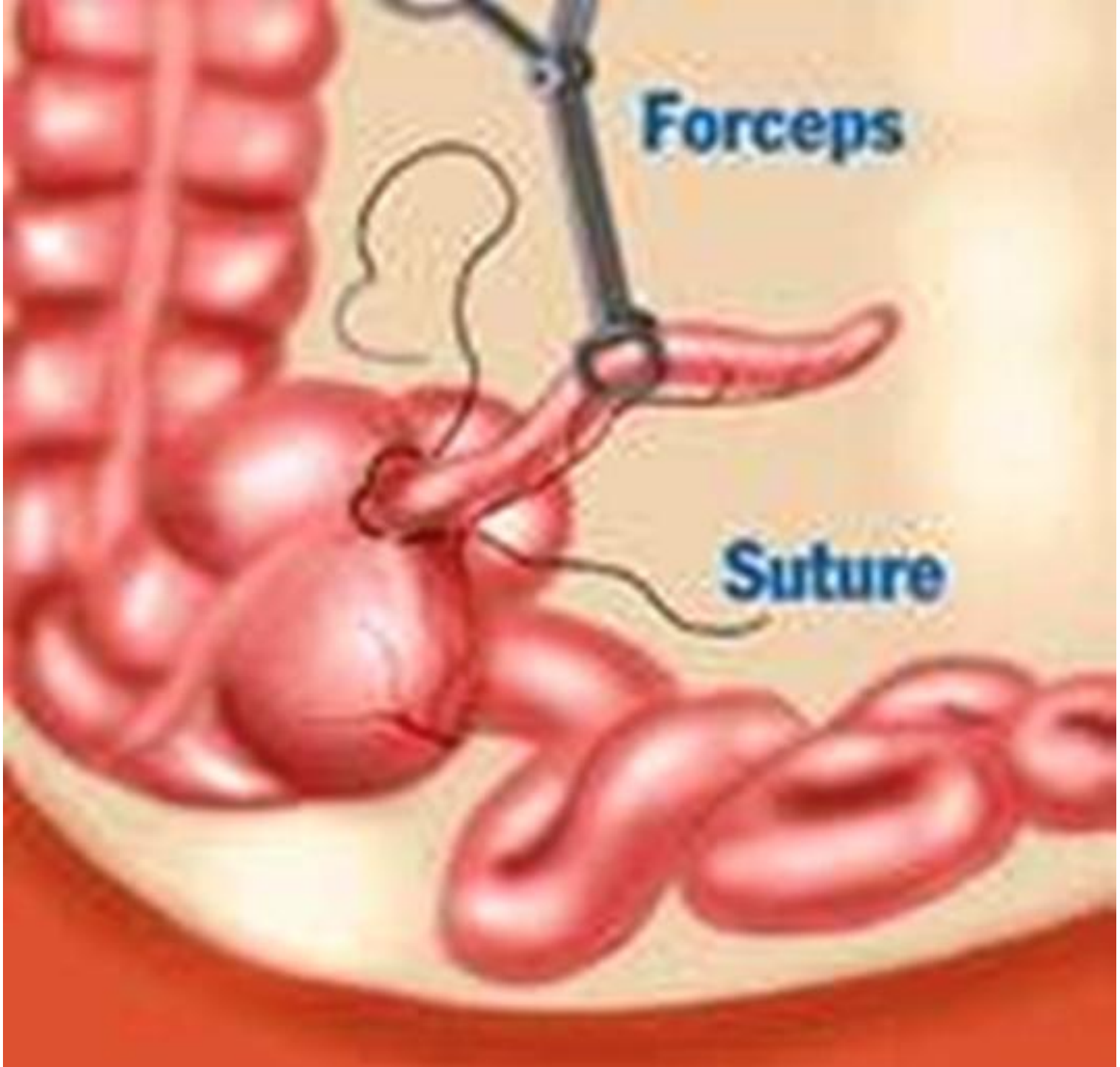
- Filmy adhesions over the appendix can be seperated by blunt dissection whereas thicker adhesions require division under vision
- Babcock clamps are applied over the base and the tip just to encircle the appendix but not crushing the lumen
- Appendix is removed in ante-grade fashion from tip to the base
- The mesentery of the appendix is divided between clamps and the vessels are ligated/transfixed/cauterized and appendix skeletonised upto the base


1
Incision A
Incision B
Right rectus muscle
2
Ileocolic fold
Ileocolic artery
Appendiceal artery
Ileocecal fold
Appendix
Anterior taenia
Mesoappendix
3
F
H
I
G
E
A
D
C
B
Pelvic brim
4
Aponeurosis of external oblique muscle
Internal oblique muscle
5
External oblique
Rectus sheath
Internal oblique
6
Peritoneum and transversalis fascia
7
Peritoneum and transversalis fascia
Rectus sheath
Internal oblique
Rectus muscle
8
Peritoneum and transversalis fascia
9
Anterior taenia leading to appendix
Cecum
10
Ileocecal fold
Terminal ileum
Appendix
Anterior taenia
11
Gauze walling off intestines
Ileum
Appendiceal artery
Mesoappendix
12
Mesoappendix
Right angle forceps
13
Ligated mesoappendix

- Appendix is crushed using right angled artery forceps/hemostats near the base
- The forceps is moved 1cm towards the tip of the appendix
- Appendix is ligated (doubly/singly)proximal to the first crush with heavy absorbable suture which is held in a clamp and removed close to the second clamp or using a stapler
- Stump must not be more than 3mm
- Exposed mucosa may be cauterized to minimize theoritical risk of mucocoele
- Stump inversion by purse string suture-not advised nowadays
- Hemostasis to be checked and area irrigated with warm saline


14
Ligation of base
15
Purse-string suture
16
17
Forceps on taenia
Invagination of stump
18
End of purse-string suture
19
Omentum
Peritoneum and transversalis fascia
20
External oblique
Internal oblique muscle
Anterior rectus sheath
Paracecal Adherent Appendix
21
External oblique muscle
Internal oblique muscle
22
Appendix
Terminal ileum
Cecum
23
24
25
Distal stump
Purse-string suture
26
27
Adhesions
Terminal ileum
Mesoappendix
28
Clamp on mesoappendix
Retrocecal appendix
29
Incision
Parietal peritoneum
Appendix
Taenia
30
Appendix
Iliopsoas muscle


Clamping, division, & ligation of the
appendicular artery


Forceps
Suture

- After appendicectomy, a patch of omentum can be kept over the site
- Drainage may be advised in cases of localized abscess, perforation near base, secure closure of cecum is in doubt or hemostasis is poor.
- Soft and smooth silastic sump one to be preferred
- If appendix is not obviously involved in inflammation, thorough exploration for other causes to be looked for
- If the tip is not visualised or adherent, retrogade appendicectomy can be done by releasing the base first
- If the inflammation extends to the base and cecum or ileum, a ileocecectomy may be contemplated with primary anastomosis

CLOSURE

- Peritoneum and the transversalis fascia are closed with continuous absorbable sutures
- Internal oblique muscle closed with interrupted/continuous absorbable sutures
- External oblique closed with continuous absorbable sutures
- Scarpa’s fascia is closed with interrupted sutures
- Skin closed with interrupted/subcuticular sutures
- Sterile dressings are applied

References

- Skandalakis Surgical Anatomy
- Maingot's Abdominal Operations
- Bailey & Love's Short Practice of Surgery
- Zollinger's Atlas of Surgical Operations
- Fischer's Mastery of Surgery

Thank you