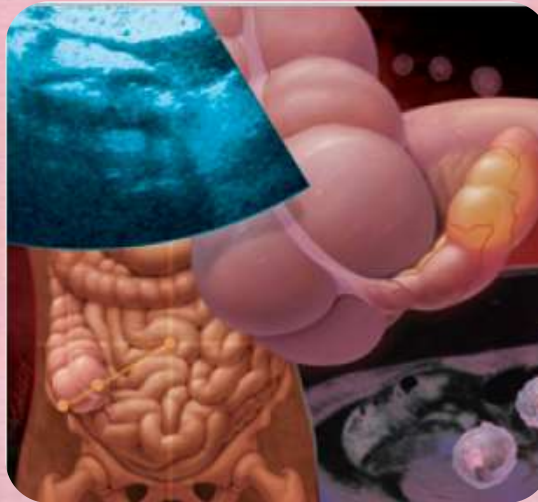
APPENDISITIS AKUT



dr. Mochamad Aleq Sander, M.Kes., Sp.B., FINACS

Sertifikasi dosen: 12107102411578

Bagian SMF Ilmu Bedah – RS UMM

Fakultas Kedokteran – Universitas Muhammadiyah Malang

Doa belajar

رَضِيْتُ بِاللهِ رَبًّا وَبِالإِسْلَامِ دِيْنًا وَبِمُحَمَّدٍ نَبِيًّا وَرَسُوْلًا
رَبِّ زِدْنِيْ عِلْمًا وَارْزُقْنِيْ فَهْمًا

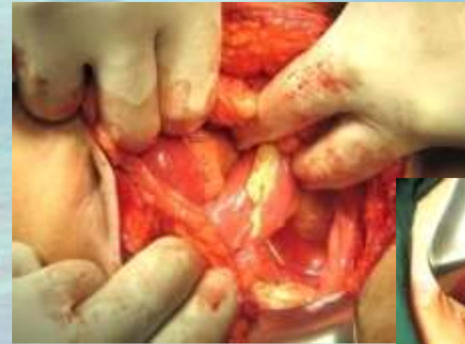
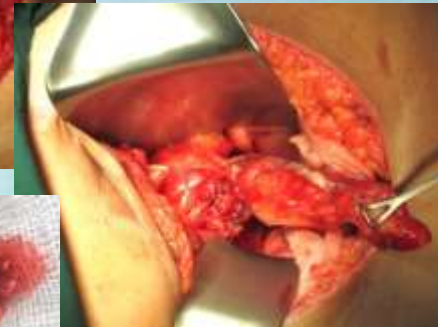
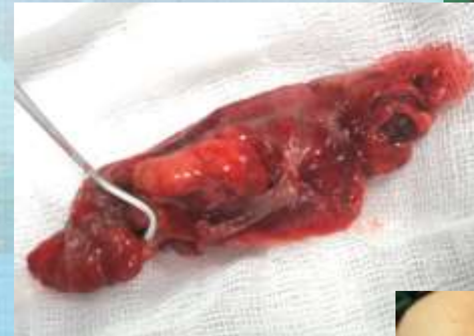
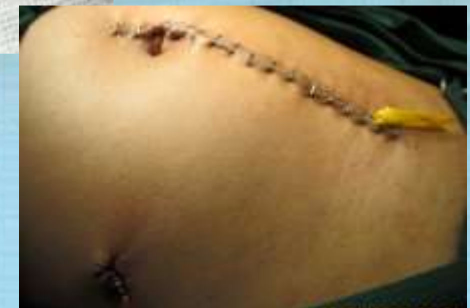
اللَّهُمَّ لاَ سَهْلَ إِلاَّ مَا جَعَلْتَهُ سَهْلاً وَأَنْتَ تَجْعَلُ الحَزْنَ إِذَا شِئْتَ سَهْلاً

VISI MISI - FK UMM

Fakultas	PS
Pada tahun 2026, menjadi Fakultas Kedokteran **terkemuka berbasis IPTEKS dan menghasilkan lulusan yang profesional dan Islami**	**PPD** : Pada tahun 2026, menjadi Program Studi Pendidikan Dokter **terkemuka berbasis IPTEKS dan menghasilkan lulusan yang profesional, Islami dan unggul di bidang kedokteranindustri.**
	PSPD : Pada tahun 2026, menjadi Program Studi Profesi Dokter **terkemuka berbasis IPTEKS dan menghasilkan dokter yang profesional, Islami dan unggul di bidang kedokteranindustri.**

Permasalahan: Contoh Kasus

- ♀ 20 thn dtg ke IGD, nyeri perut kanan bawah, diberi analgetik spasmolitik o/ dokter, keluhan berkurang, Px pulang.
- Hari ke-2 nyeri hebat seluruh perut, panas badan tinggi, tanda2 peritonitis.
- Menjalani operasi laparotomi appendektomi ⇨ DO: abses 200cc, fibrin interloop usus, perforasi appendiks di 1/3 tengah, fecolit di 1/3 proksimal

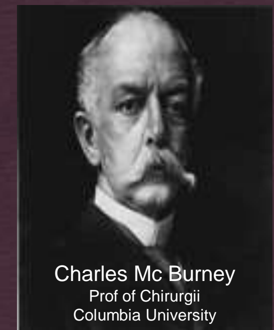
Para dokter sering mempergunakan

obat-obatan yg tidak diketahui cara bekerjanya, untuk penyakit yg tidak diketahuinya, dan ditujukan kepada pasien yg sama sekali tidak dikenalnya.

Voltaire

SEJARAH

- **1736**, Claudius Amyand ⇨ Op appendix & hernia pd ♂ 11 th
- **1824**, Louyer-Villermay ⇨ 2 kasus otopsi
- **1827**, Francois Melier ⇨ 7 kasus otopsi
- **1839**, Bright & Addison ⇨ Gx appendicitis in *"Elements of practical medicine"*
- **1848**, Hancock ⇨ insisi drainase
- **1886**, Kronlein ⇨ Appendectomy pertama
- **1889**, Charles McBurney ⇨ Early Laparotomy, publikasi: *"New York Medical Journal"*
- **1894**, Charles McBurney ⇨ Insisi McBurney's
- **1982**, Semm ⇨ Laparoscopic Appendectomy


Charles Mc Burney
Prof of Chirurgii
Columbia University

KING'S College LONDON

Barts and The London Children's Hospital

HISTORY OF APPENDICITIS & ITS SURGICAL MANAGEMENT

SALLY KAMALEDEEN & SALAH KAMALEDEEN

DANUBE PAEDIATRIC SURGERY SYMPOSIUM, VIENNA 2010

APPENDICITIS AKUT

- **Definisi ⇨ Inflamasi akut apendiks vermiformis**
- **Insiden di US ⇨ 70.000 kasus/tahun**
- **Insiden tertinggi ⇨ dekade II - III**
- **Patologi:**
  - **- Obstruksi faecolith / appendicolith (65%)**
  - **- Hiperplasia limfoid (35%)**
- **Klinis ⇨ nyeri RLQ, distensi abd, nausea-vomiting, febris, peritonitis**

KARAKTERISTIK PASIEN APENDISITIS AKUT DI RUMAH SAKIT UMUM UNIVERSITAS MUHAMMADIYAH MALANG PERIODE 2015-2018

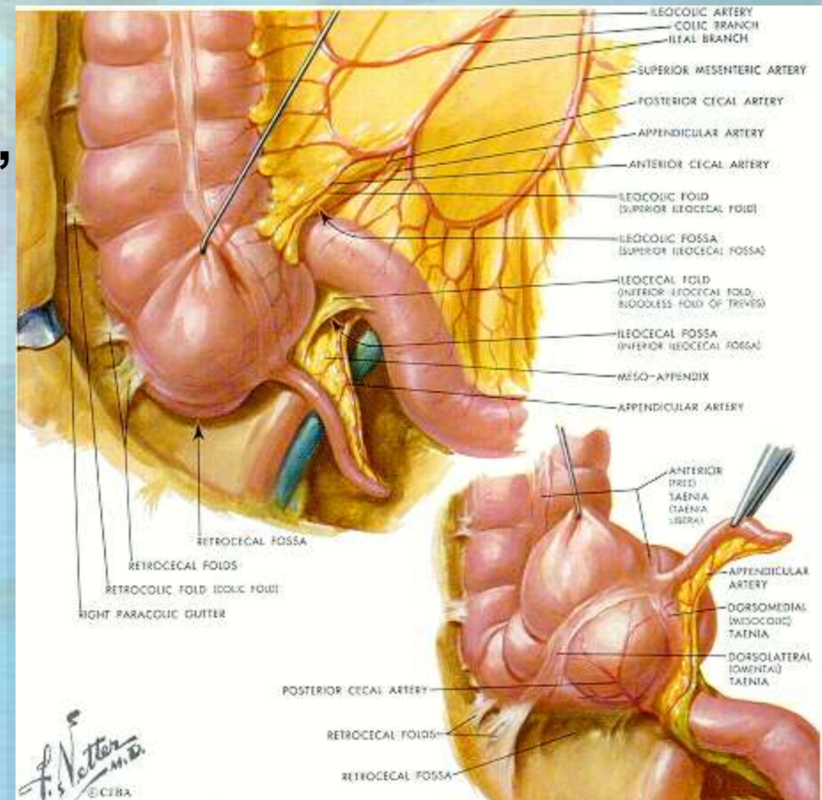
Kesimpulan

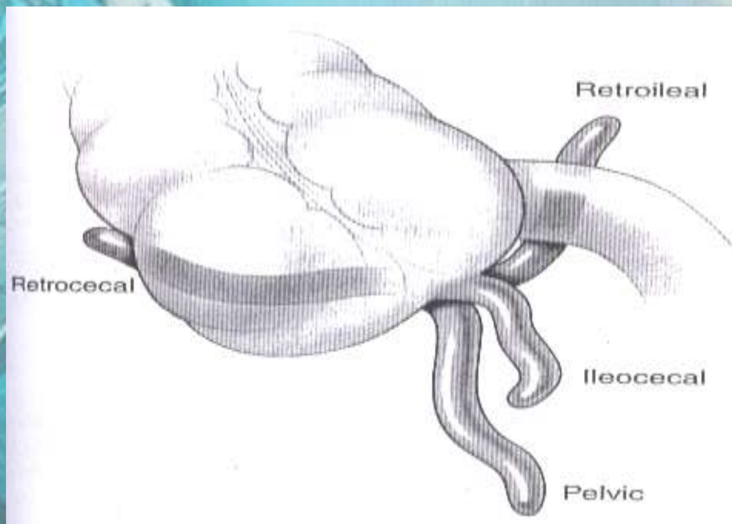
- 1. Usia terbanyak penderita apendisitis akut adalah pada rentang usia 11-30 tahun yaitu sebesar 72,1%. Jenis kelamin terbanyak adalah perempuan (68,6%), sedangkan status layanan pasien terbanyak adalah BPJS yaitu 58,9%.
- 2. Penatalaksanaan atau teknik operasi apendisitis akut terbanyak adalah menggunakan teknik apendektomi simple yaitu 53,1%.

dr. Moch. Aleq Sander, M.Kes, Sp.B, FINACS, Dewi P., Ananda AR, 2022.

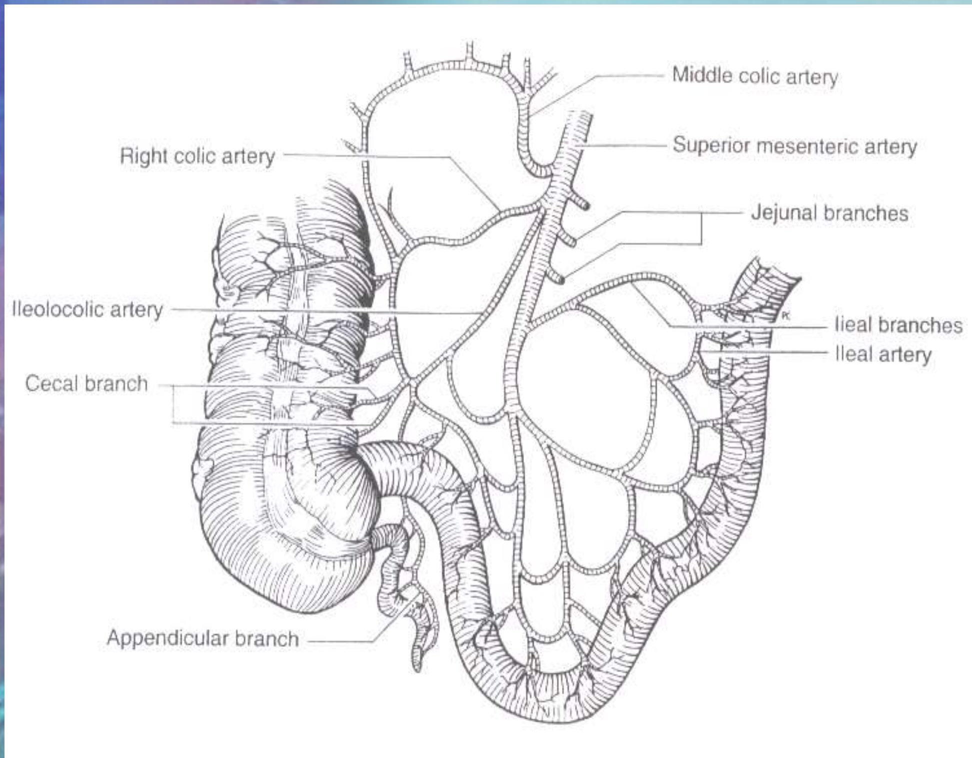
ANATOMI

- Embriologi ⇨ minggu ke-8
- Bagian dari sekum
- Organ rudimenter, dangkal & tipis
- Panjang ⇨ 2,5 - 25 cm ; rata2 ⇨ 6-9 cm
- Lokasi ⇨ pertemuan 3 taenia koli
- Letak ⇨ ante/retrocecal, retroileal,
  pelvic, ileocecal

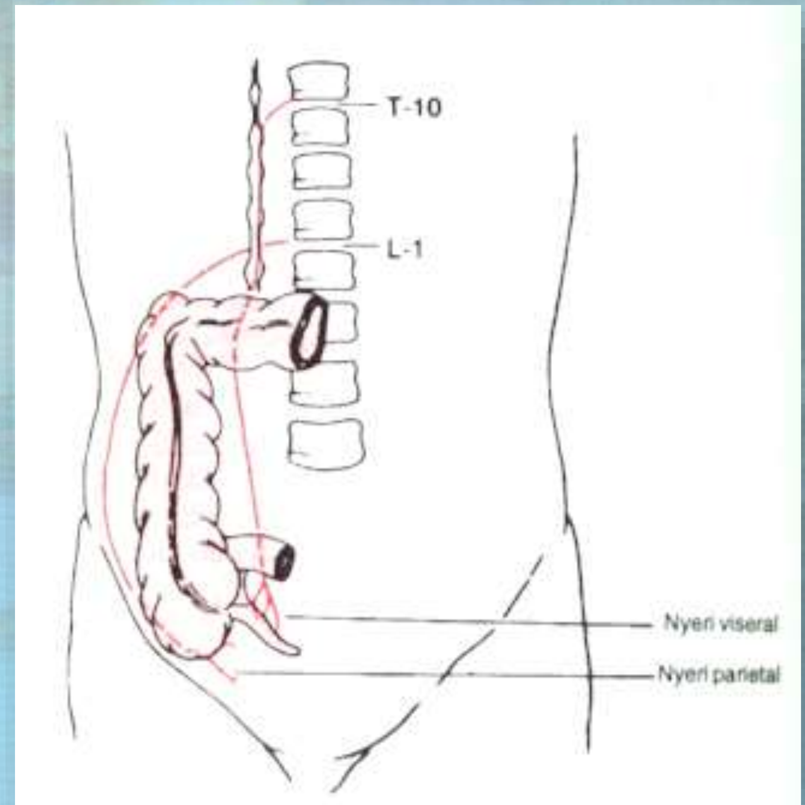




ALIRAN DARAH APENDIKS

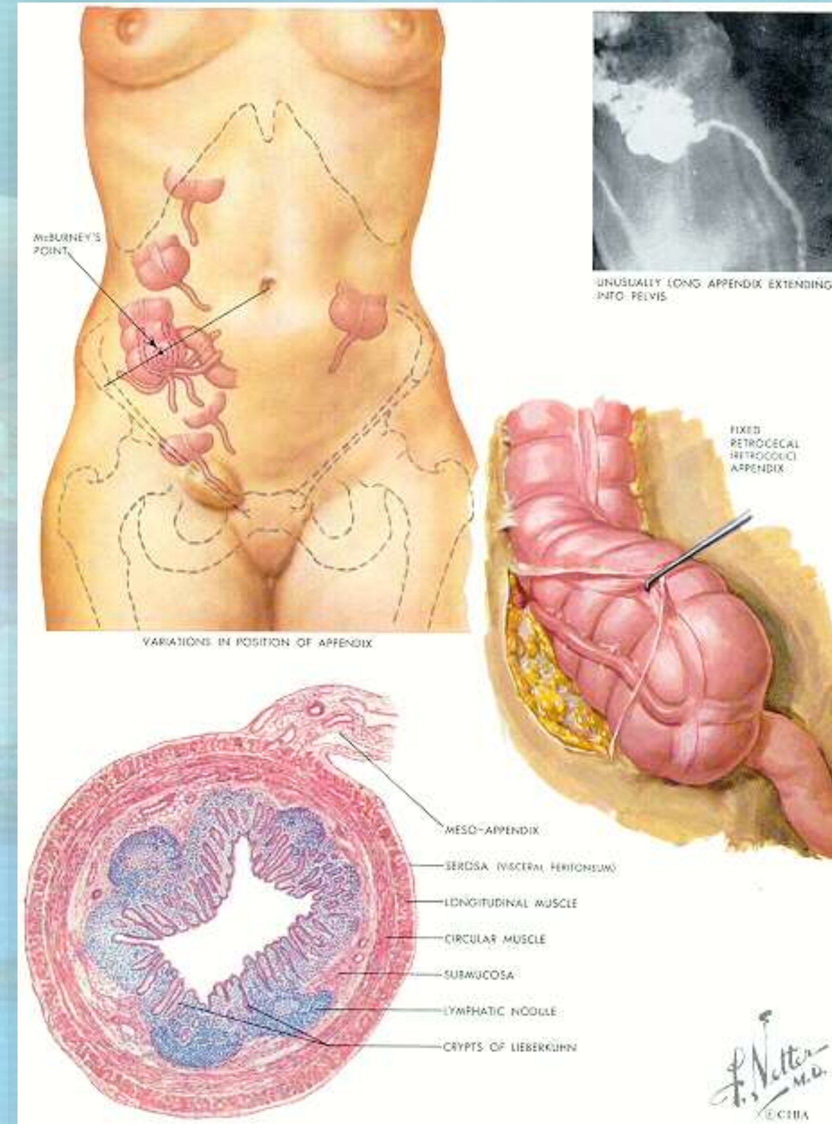


PERSYARAFAN APENDIKS

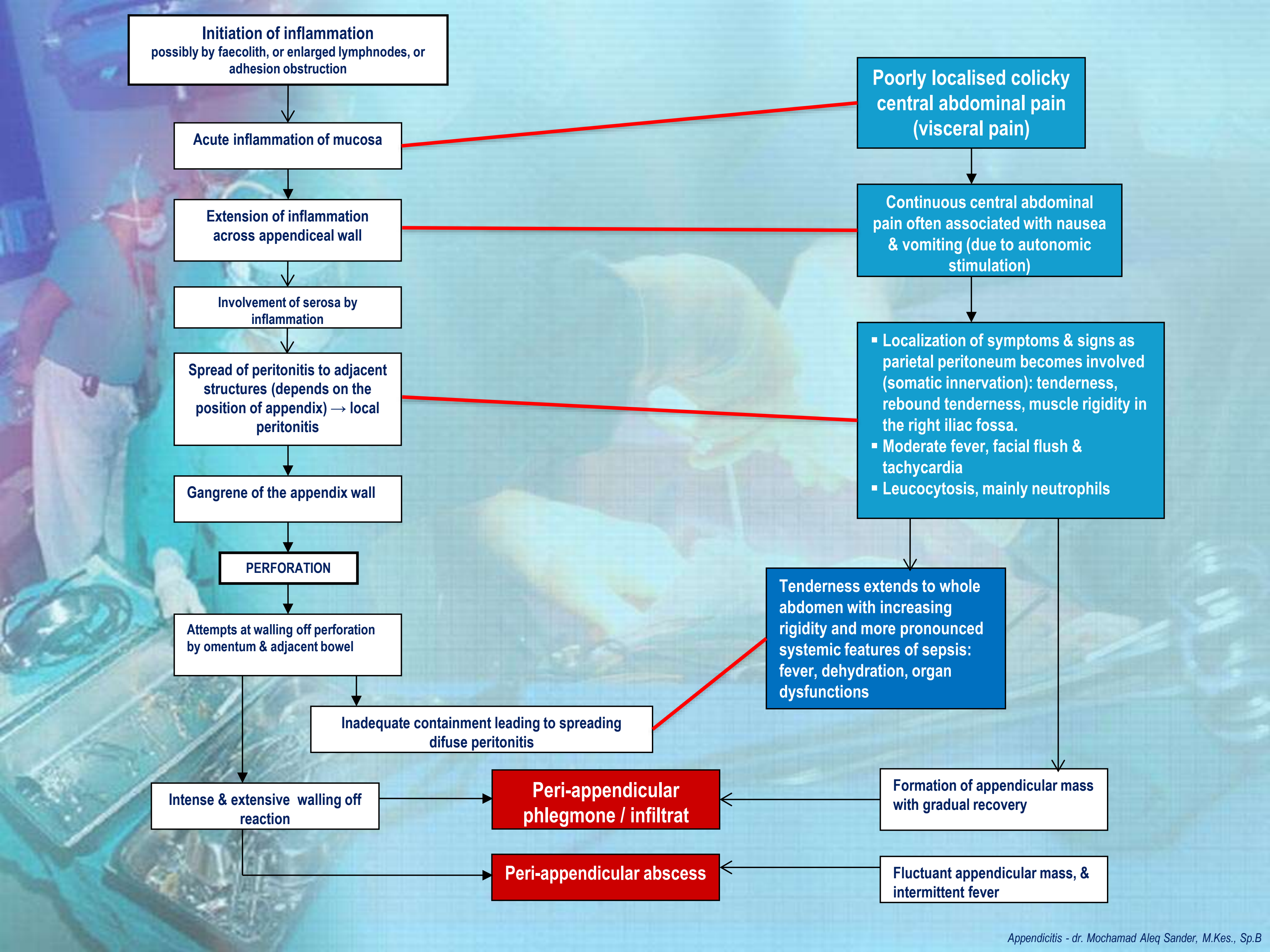


FISIOLOGI

- Organ Imunologi ⇨ IgA ⇨ **GALT** (gut associated lymphoid tissue)
- Arah & posisi ⇨ sgt bervariasi
- Lapisan ⇨ = usus lain

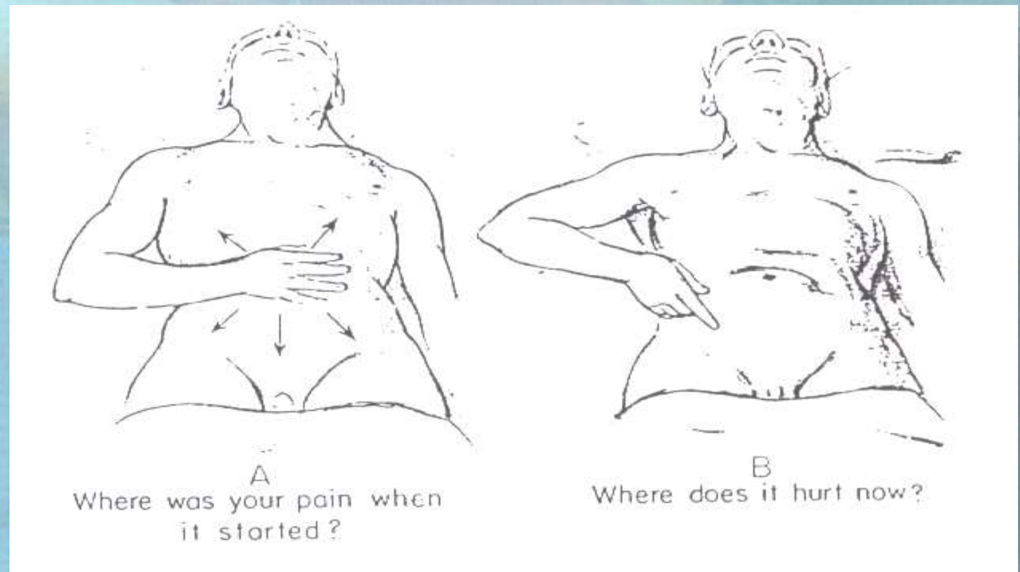


PATOFISIOLOGI


Initiation of inflammation
possibly by faecolith, or enlarged lymphnodes, or adhesion obstruction
Acute inflammation of mucosa
Extension of inflammation across appendiceal wall
Involvement of serosa by inflammation
Spread of peritonitis to adjacent structures (depends on the position of appendix) → local peritonitis
Gangrene of the appendix wall
PERFORATION
Attempts at walling off perforation by omentum & adjacent bowel
Inadequate containment leading to spreading difuse peritonitis
Intense & extensive walling off reaction
Peri-appendicular phlegmone / infiltrat
Peri-appendicular abscess
Poorly localised colicky central abdominal pain (visceral pain)
Continuous central abdominal pain often associated with nausea & vomiting (due to autonomic stimulation)
Localization of symptoms & signs as parietal peritoneum becomes involved (somatic innervation): tenderness, rebound tenderness, muscle rigidity in the right iliac fossa.
Moderate fever, facial flush & tachycardia
Leucocytosis, mainly neutrophils
Tenderness extends to whole abdomen with increasing rigidity and more pronounced systemic features of sepsis: fever, dehydration, organ dysfunctions
Formation of appendicular mass with gradual recovery
Fluctuant appendicular mass, & intermittent fever

GEJALA KLINIS

- Mula ⇨ nyeri ulu hati, anoreksia, nausea, vomiting
- Nyeri kemudian berpindah ke abdomen kanan bawah (RLQ) ⇨ ***Ligart's sign***
- Makin lama nyeri makin ↑ (terlokalisir) ⇨ bertambah nyeri pada pergerakan, berjalan, atau batuk



PEMERIKSAAN FISIK

- Suhu tubuh sedikit ↑ /subfebris (bila tanpa perforasi)
- Peristaltik normal / sedikit ↓
- RLQ ⇨ nyeri tekan (+), nyeri lepas (+)
- Peritonitis:

    1. Lokal ⇨ NT (+) RLQ, defans muscular (+) RLQ
    2. Difus ⇨ NT (+) & DM (+) seluruh abdomen

- DRE/RT ⇨ nyeri tekan jam 10-11 ⇨ appendicitis

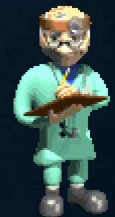
    nyeri tekan jam 9-12 ⇨ peritonitis lokal

    bila nyeri seluruh lingkaran ⇨ peritonitis difus

Nyeri rangsangan peritoneum tidak langsung

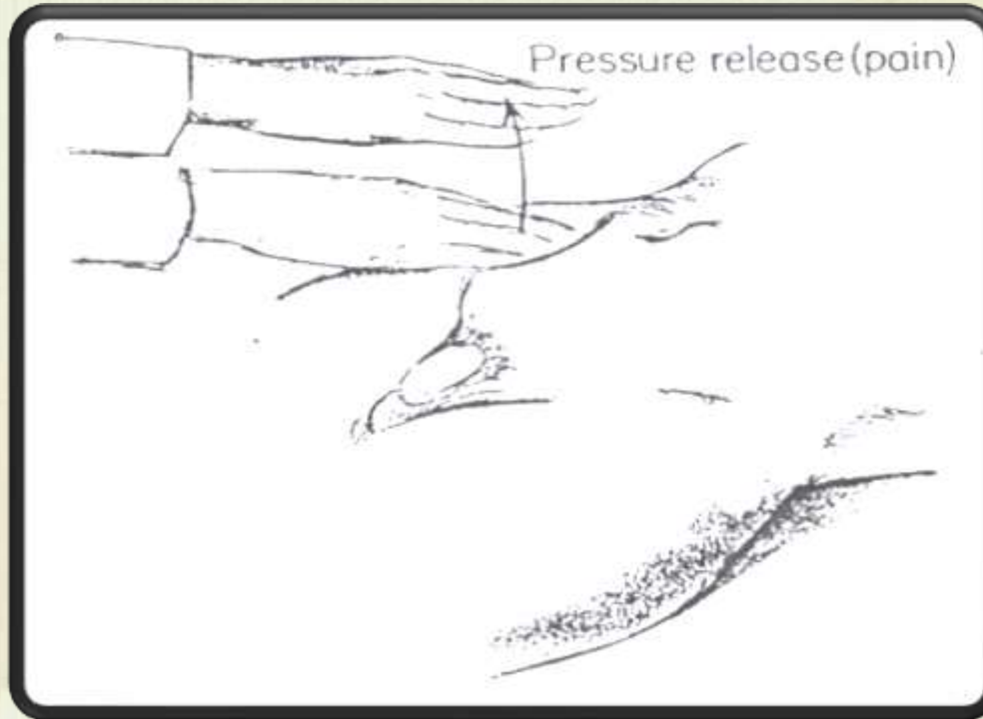
1. **Mc Burney Pain Sign** ⇨ nyeri tekan daerah Mc Burney
2. **Rovsing Sign** ⇨ nyeri RLQ saat abdomen kontra Mc Burney ditekan
3. **Blumberg Sign** (Rebound Fenomena) ⇨ nyeri RLQ saat tekanan pd kontra Mc Burney dilepaskan
4. **Psoas Sign** ⇨ nyeri RLQ saat otot psoas mayor ditegangkan dgn cara:
   - ***a.*** ***Aktif*** (Px posisi SUPINE & ekstremitas inferior Dx posisi ekstensi/lurus ⇨ Px diminta u/ memfleksikan ekstremitas tsb mll hip joint)
   - ***b.*** ***Pasif*** (Px posisi LLD & ekstremitas inferior Dx posisi lurus ⇨ pemeriksa mengekstensikan ekstremitas tsb mll hip joint ke arah belakang)

4. **Obturator Sign** ⇨ nyeri RLQ saat otot obturator ditegangkan dgn cara memfleksikan femur Dx mll hip joint & di endorotasikan
5. **Tenhorn Sign** ⇨ testis Dx ditarik --- Px merasa nyeri di RLQ
6. **Ligart Sign** ⇨ nyeri berpindah dari epigastrium ke RLQ
7. **Dunphy Sign** ⇨ nyeri RLQ saat batuk



PEMERIKSAAN FISIK

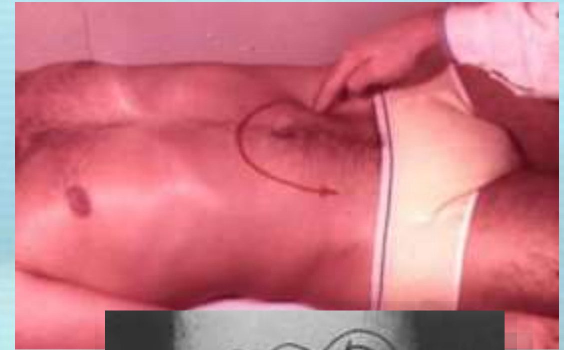
McBurney Sign

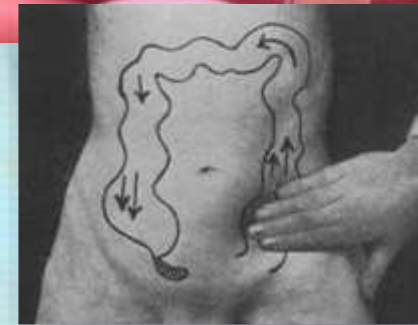


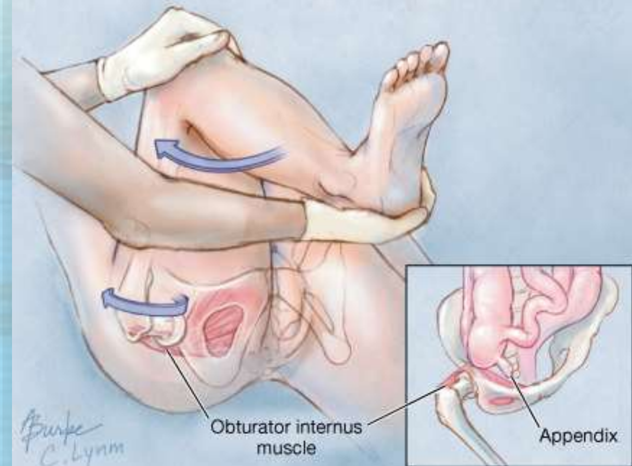
- Nyeri tekan = *tenderness*
- Nyeri lepas = *rebound tenderness*
- Defans muskuler = *muscular guarding*

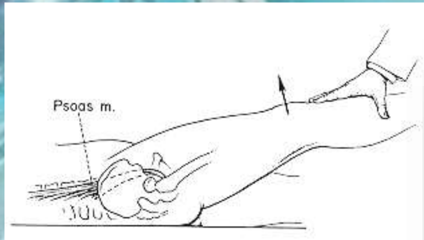
PEMERIKSAAN FISIK

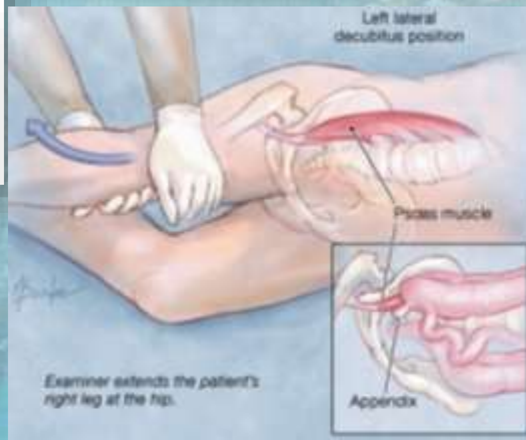
- Rovsing's sign
- Obturator sign
- Psoas sign





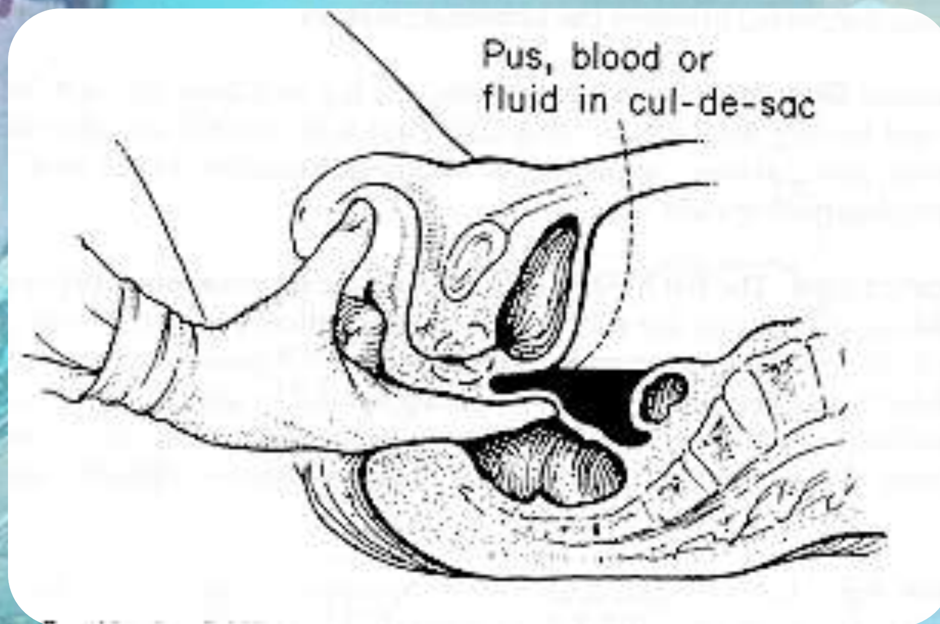


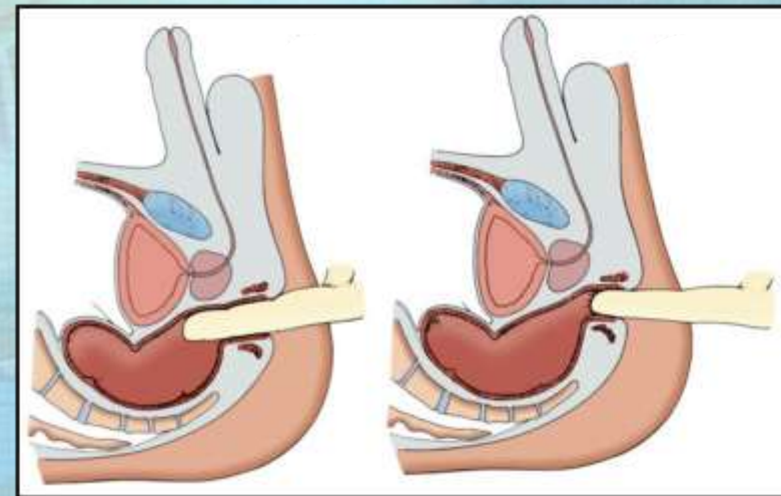




PEMERIKSAAN FISIK

- Colok dubur (RT / DRE)⇨ jangan terlewatkan!!!





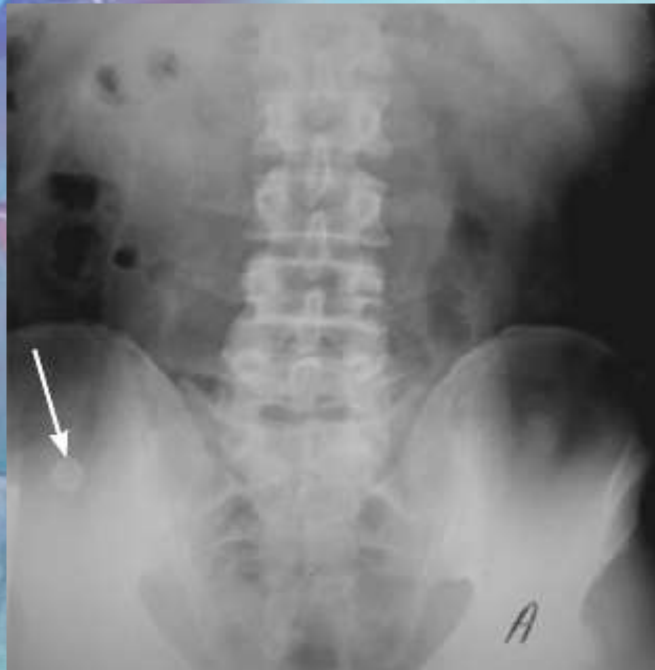
LABORATORIUM

- Leukosit ⇨ 10.000 -18.000/mm^3, tetapi bisa normal
- 75% pasien ⇨ Diff count dominan neutrofil
- Urine normal ⇨ kecuali letak apendiks retrosekal / pelvik: eritrosit/leukosit urine (+)

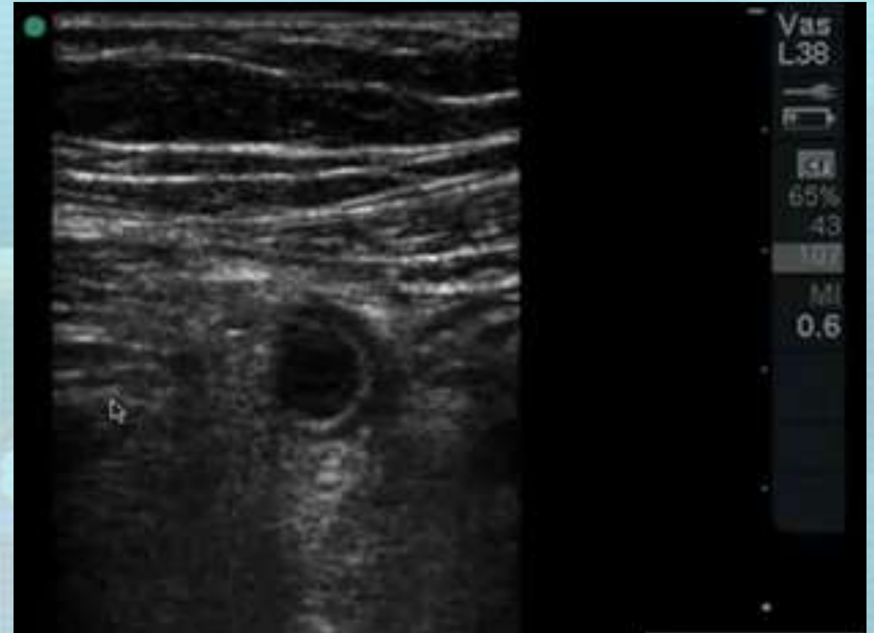
PEMERIKSAAN PENUNJANG

- X-ray abd. ⇨ tidak khas, jarang membantu Dx
  ⇨ tampak apendicolith
  ⇨ *Air-fluid level* ⇨ ileus lokal
  ⇨ Udara bebas (*free air*) ⇨ perforasi
- Barium enema ⇨ = appendicogram
  ⇨ appendiks tidak terisi kontras
  (hanya u/ kasus appendicitis kronis)
- USG ⇨ dilatasi lumen & dinding tebal
  ⇨ u/ ♀ membantu mencari kelainan ginekologi
- CT-Scan ⇨ *Gold Standar* (Norton et al)

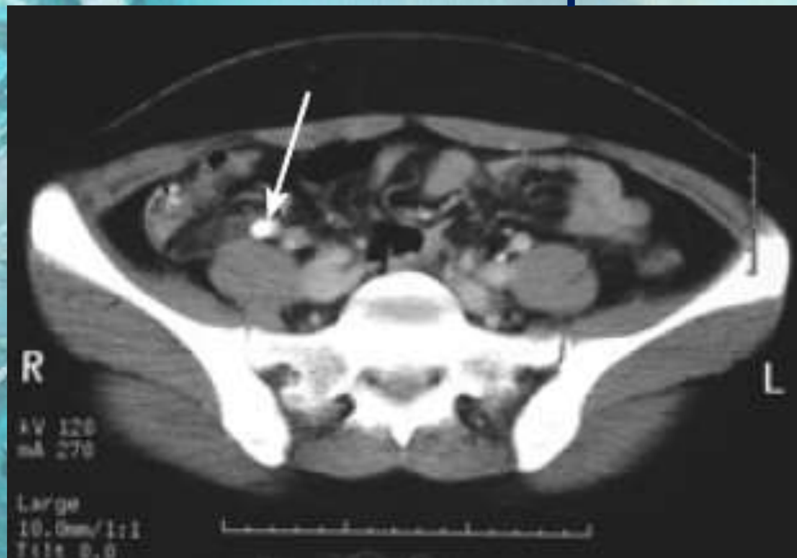
Foto Polos Abdomen



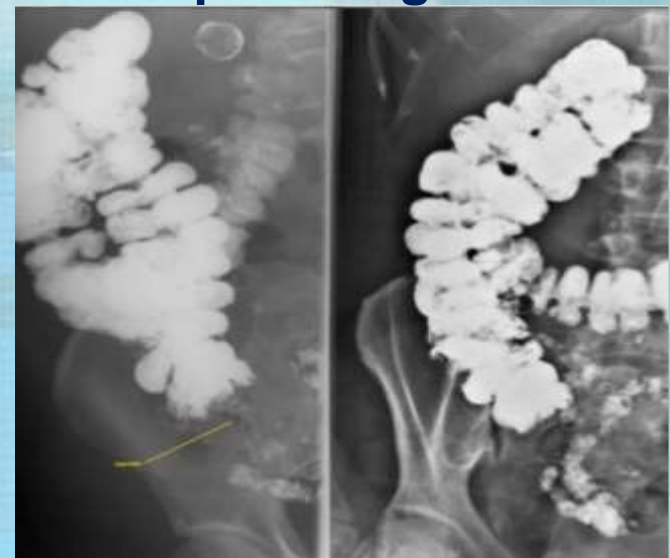
USG Appendiks



CT Scan abdomen/pelvik



Apendicogram



Alvarado score

Yang Dinilai		Skor
Gejala	Nyeri beralih (Ligart's sign) Anoreksia Nausea/Vomiting	1 1 1
Tanda	Nyeri tekan fossa iliaka Dx Nyeri lepas Kenaikkan temperature	2 1 1
Laboratorium	Leukositosis Neutrofil bergeser kekiri	2 1
	Skor Total	10

1. **A** = appendicitis pain point
2. **L** = lekositosis
3. **V** = vomiting
4. **A** = anorexia
5. **R** = rebound tenderness fenomena
6. **A** = abdominal migrate pain
7. **D** = degree of cecius
8. **O** = observation of hemogram

Bila:

Skor 1-4 ⇨ Tidak dipertimbangkan mengalami apendisitis akut

Skor 5-6 ⇨ Dipertimbangkan kemungkinan Dx apendisitis akut tetapi tidak perlu tindakan operasi segera /dinilai ulang ⇨ Dx: Observasi nyeri RLQ

Skor 7-8 ⇨ Dipertimbangkan kemungkinan (suspect) apendisitis akut

Skor 9-10 ⇨ Hampir definitif apendisitis akut & dibutuhkan tindakan bedah

DIAGNOSIS BANDING

1. Acute Mesenteric Adenitis
   - Anak-anak
   - Nyeri diffuse
   - Observasi ⇨ *self limited disease*

2. Acute Gastroenteritis
   - Diare, mual, muntah
   - Nyeri tidak terlokalisir

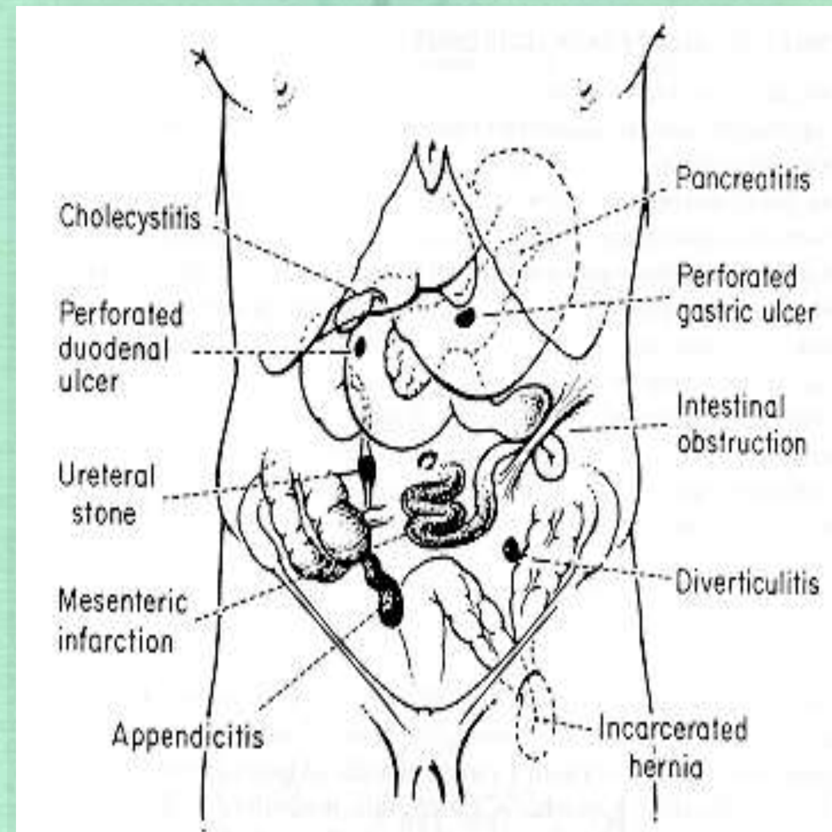
3. Meckel's Diverticulitis

4. Intussusception
   - Umur <2 th
   - Kolik, BAB bercampur darah
   - Massa seperti sosis di RLQ

5. Perforated Peptic Ulcer

6. Colonic Lesions

7. Epiploic Appendicitis



8. Crohn's Enteritis

- Demam
- Nyeri perut kanan bawah
- Leukositosis
- Diare
- Anoreksia
- Mual, muntah

8. Urinary Tract Infection

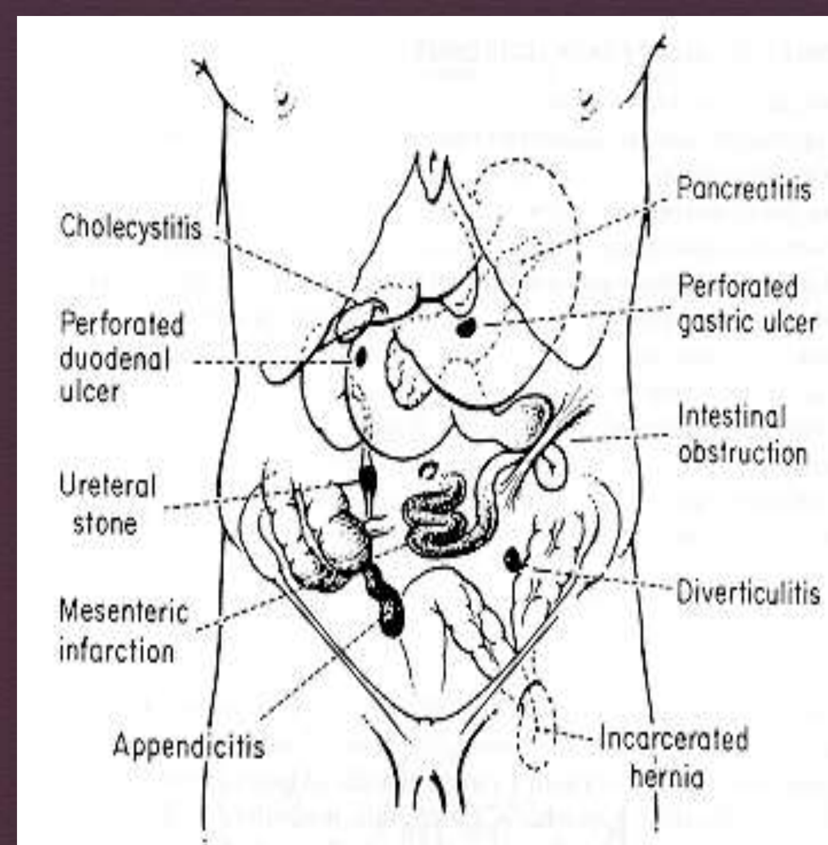
- Nyeri CVA
- Pyuria
- Bakteriuria

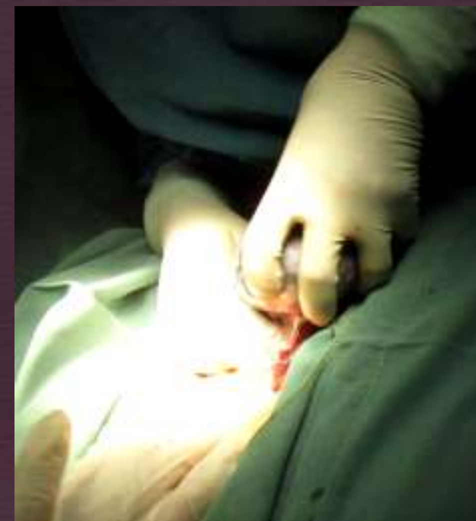
9. Ureteral Stone

- Nyeri
- Hematuria
- Demam
- Leukositosis

10. Gynecologic Disorders

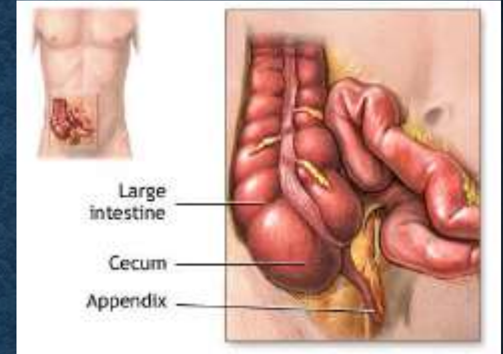
- Pelvic Inflammatory Disease
- Ruptured Graafian Follicle
- Ruptured Ectopic Pregnancy
- Twisted Ovarian Cyst





PENATALAKSANAAN

- Terapi pilihan satu-satunya ⇨ apendektomi



- Pre-op:
  - Puasa
  - AB profilaksis
  - H_2 blocker
  - Rehidrasi
  - Analgetika ----- ????

- Jenis operasi tgt derajat komplikasi:
  - Apendisitis akut ⇨ appendektomi simpel / Laparoskopik
  - Apendisitis kronis ⇨ appendektomi simpel / Laparoskopik
  - Apendisitis abses ⇨ laparotomi
  - Apendisitis perforata ⇨ laparotomi
  - PAI / PAP / PAA ⇨ laparotomi

- Jenis insisi appendektomi simpel:
  - Mc Burney incision = Gridiron's incision (oblique)
  - Rocky-Davis incision = Lantz's incision (transverse)

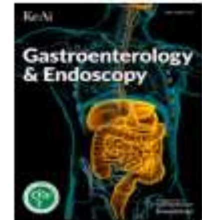
Gastroenterology & Endoscopy 2 (2024) 56–59

KeAi
CHINESE ROOTS
GLOBAL IMPACT

Contents lists available at ScienceDirect

Gastroenterology & Endoscopy

journal homepage: www.keaipublishing.com/en/journals/gastroenterology-and-endoscopy



Research Article

Comparison of pain between laparoscopic appendectomy vs open appendectomy in patients with acute appendicitis

Mochamad Aleq Sander [a,*], Probo Yudha Pratama Putra [b]

[a] *Department of Surgery, Medical Faculty University of Muhammadiyah Malang, Malang, Indonesia*
[b] *Department of Medicine, Medical Faculty University of Muhammadiyah Malang, Malang, Indonesia*

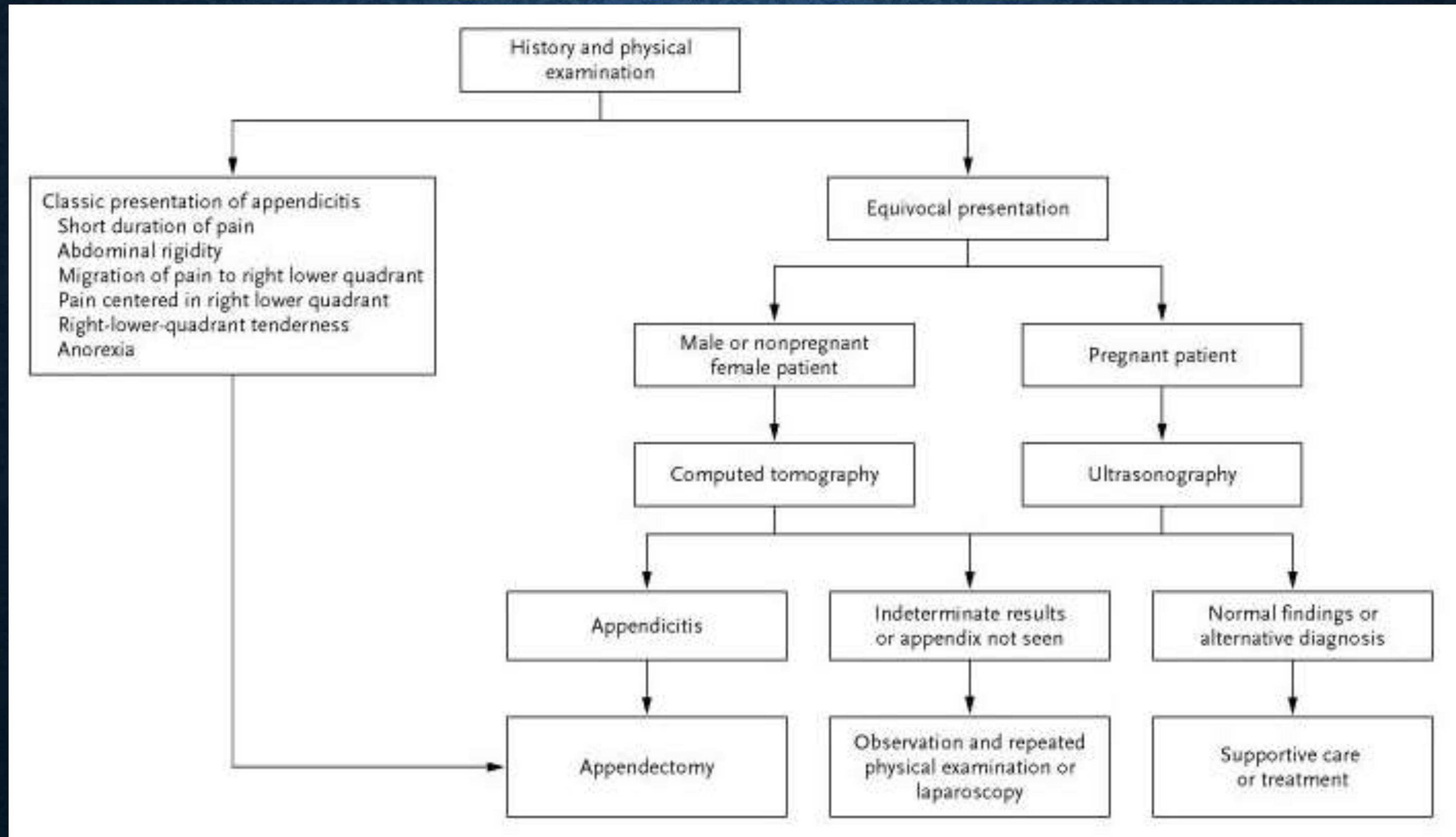
A R T I C L E I N F O

Keywords:
Appendicitis acute
Laparoscopic appendectomy
Open appendectomy
Pain

A B S T R A C T

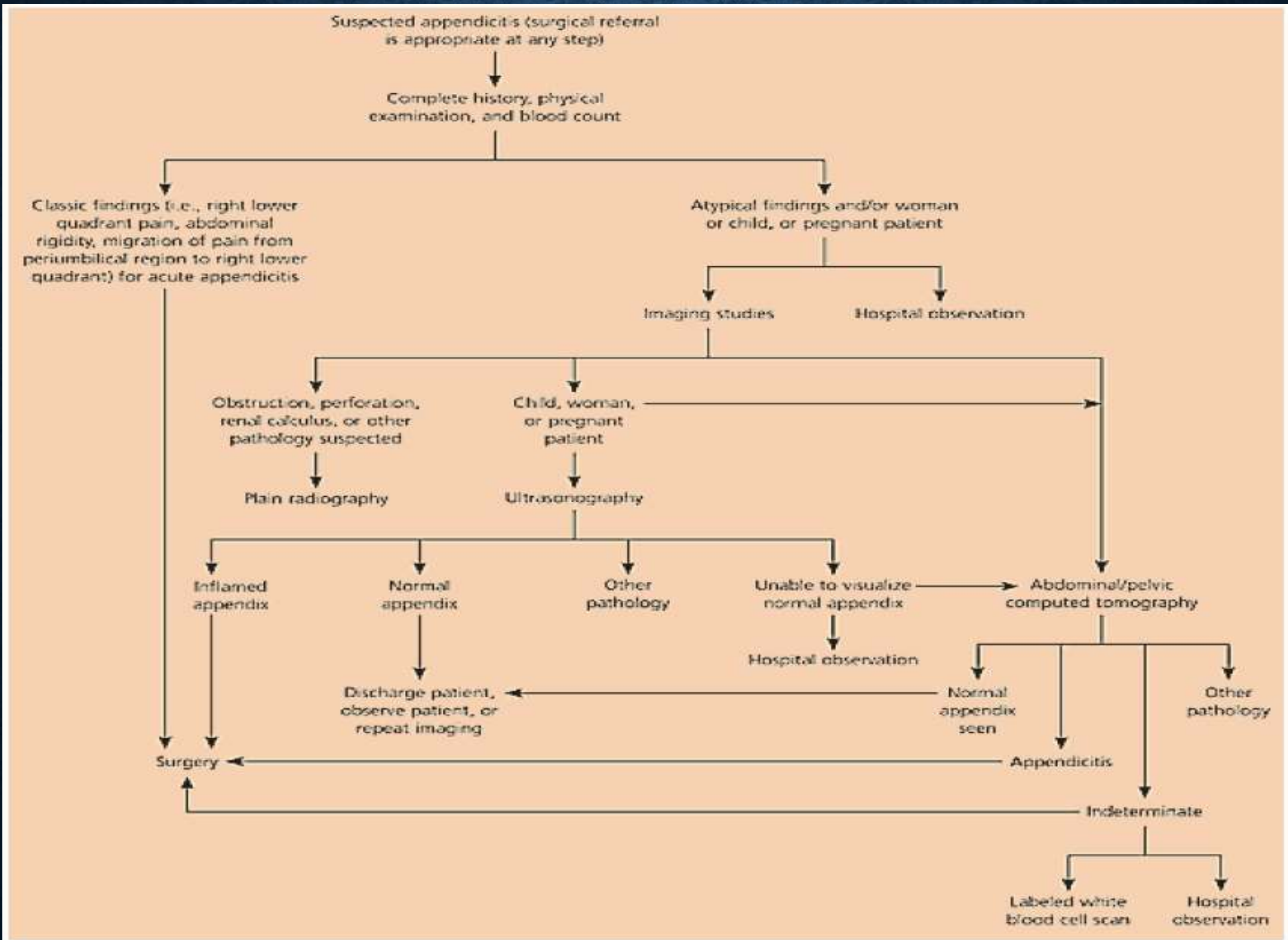
Introduction: Pain is almost the main problem after surgery, effective pain management is crucial for recovery, since poorly managed pain can have detrimental effects on a patient's physical functioning, mental health, interpersonal connections, and productivity.
Objective: Our study compares LA and OA to evaluate post-operative pain in 42 h using the Visual Analouge Scale (VAS) with the goal decreasing the requirement for opioids to address postoperative pain.
Methods: A retrospective analysis of patients with an appendicitis diagnosis who were admitted to the Department of General Surgery at General Hospital University of Muhammadiyah Malang between January 2018 and June 2019. 258 individuals with acute appendicitis, with 137 undergoing open appendectomy (OA) and 121 undergoing laparoscopic appendectomy (LA).
Result: We reported patients who obtained OA surgery experienced significant pain on first day, compared with patients who underwent LA operation, who reported light pain ($P = 0.000$). On second day Thirteen patients who underwent OA surgery reported a reduction in pain levels from moderate to mild ($P = 0.000$). Patients who underwent LA procedure, 59 participants had a significant reduction of pain level, 54 patients reduced from mild to no pain. and moderate pain to light pain reported in 5 patients, whereas the remaining 62 had no change level of pain ($P = 0.000$).
Conclusion: In terms of post-operative pain, the LA operation is a reliable surgical technique and is preferable to an OA appendectomy.

ALGORITMA PENATALAKSANAAN APENDISITIS AKUT



Erik K. Paulson, M.D., Matthew F. Kalady, M.D., and Theodore N. Pappas, M.D. – New England Medical Journal

ALGORITMA PENATALAKSANAAN APENDISITIS AKUT

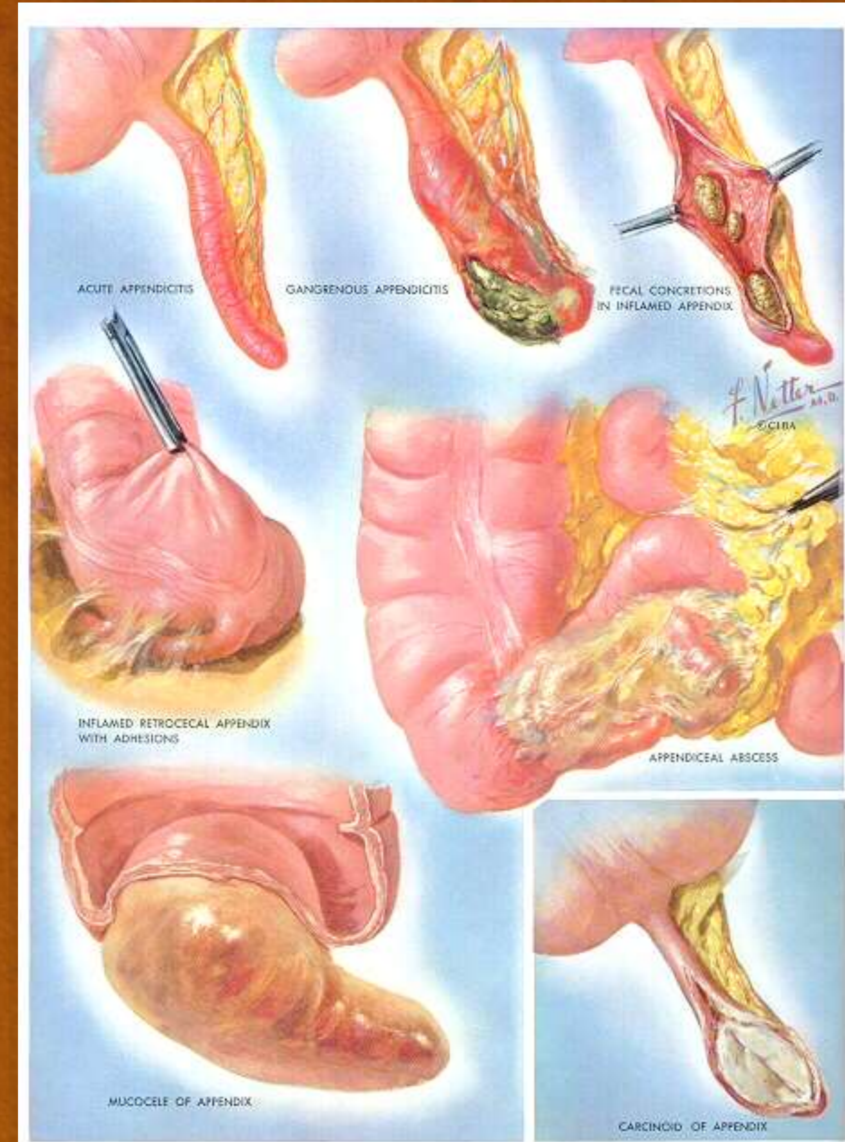


Soomro N, Hamdy A (2018) Appendix and Diagnostic Mystery: Subhepatic Appendicitis. J Clin Case Rep Trials. Vol: 1, Issu: 1 (18-20)

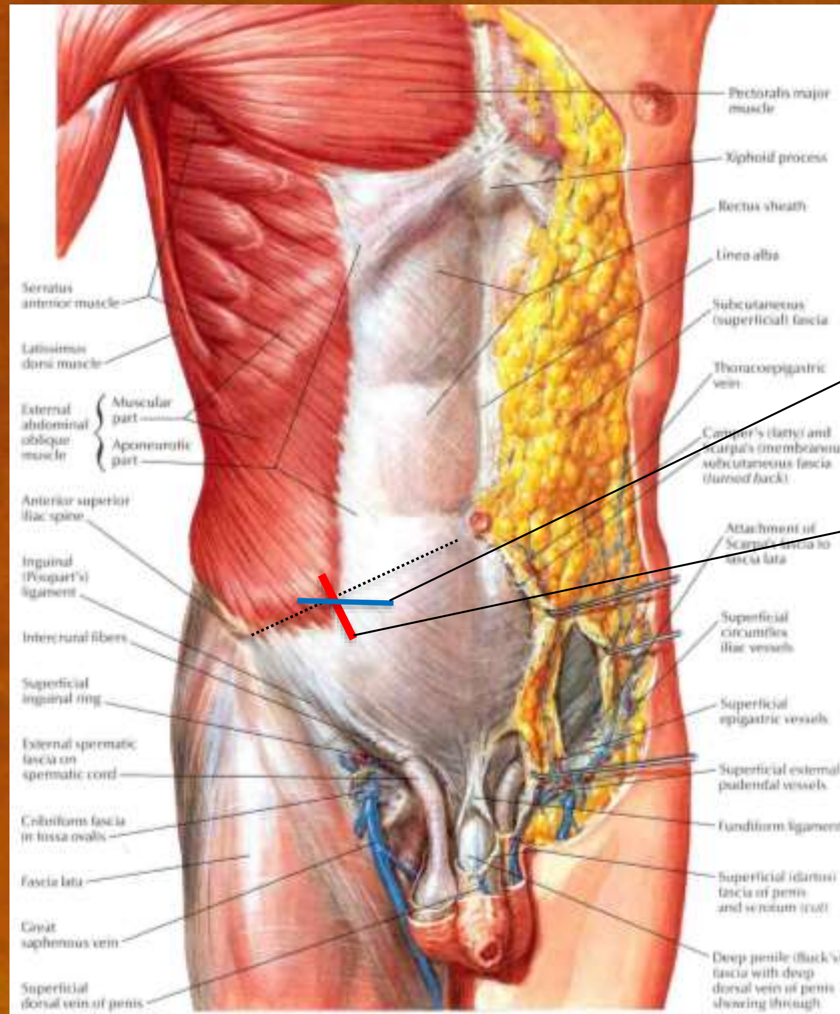
KOMPLIKASI

- Bakteria mencapai peritoneum dan pembuluh darah ⇨ gangren, perforasi, abses, peritonitis (mortalitas 5%)

- < 12 jam ⇨ 94 % simpel
- < 36 jam ⇨ 2 % ruptur
- Meningkat 5%/12 jam

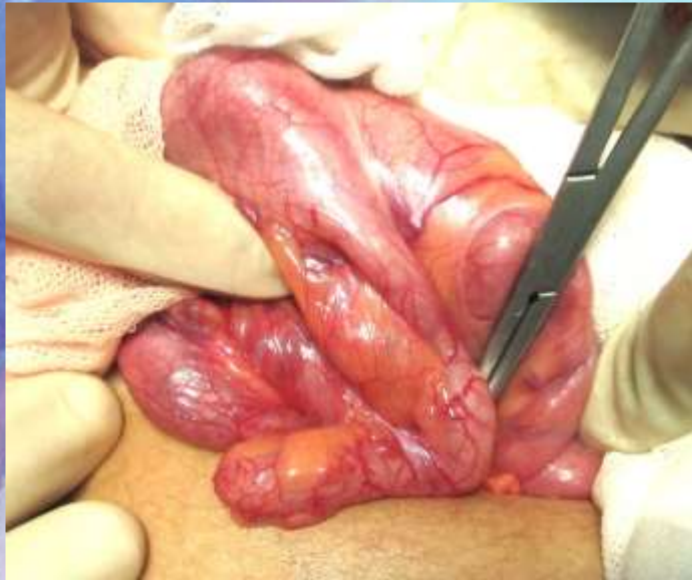


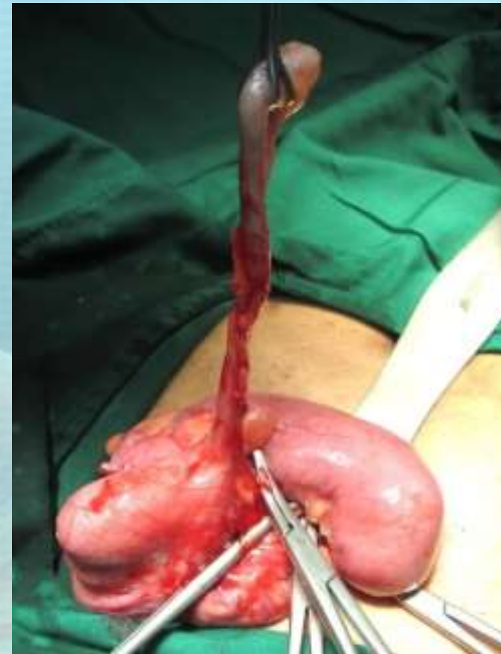
APPENDEKTOMI SIMPLE



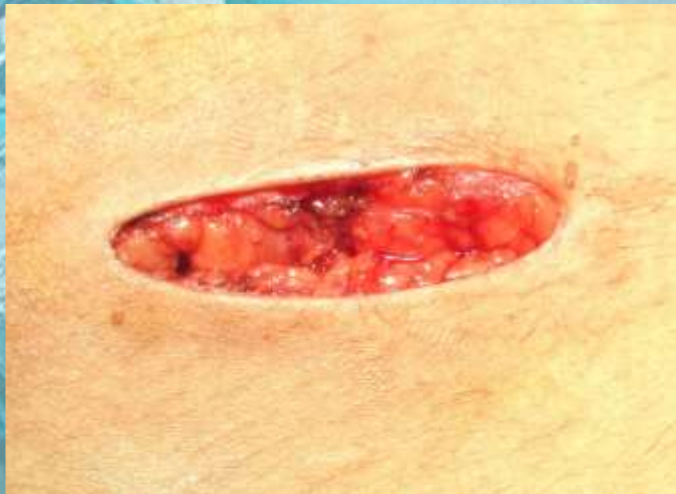
Lantz's incision

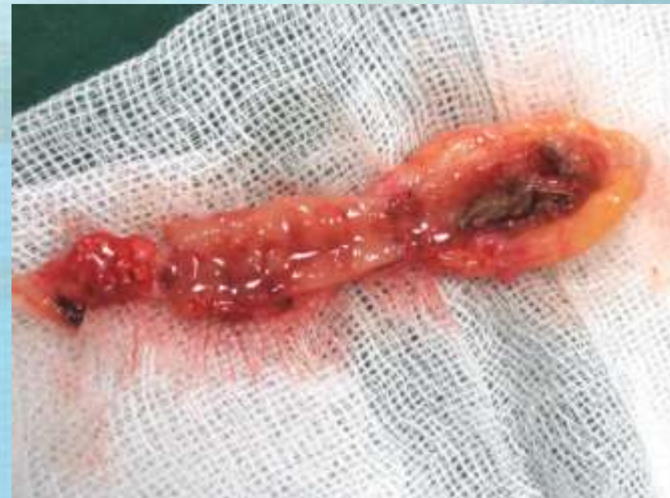
Mc Burney's incision (Gridiron's incision)

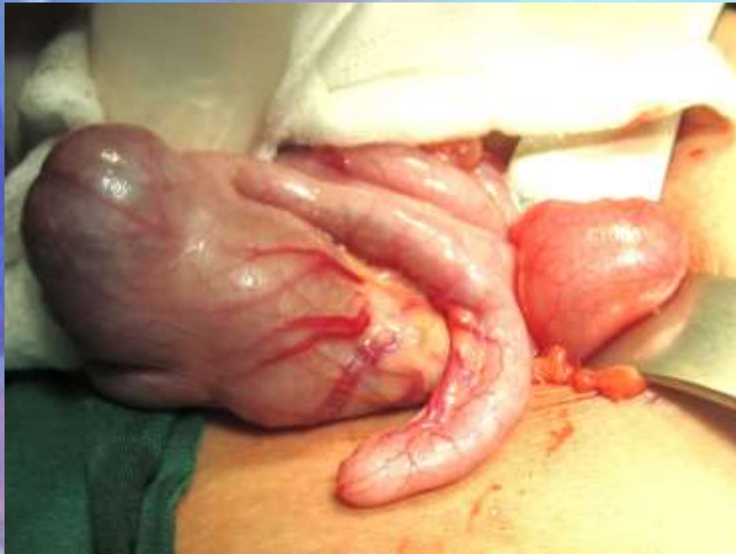


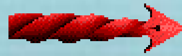


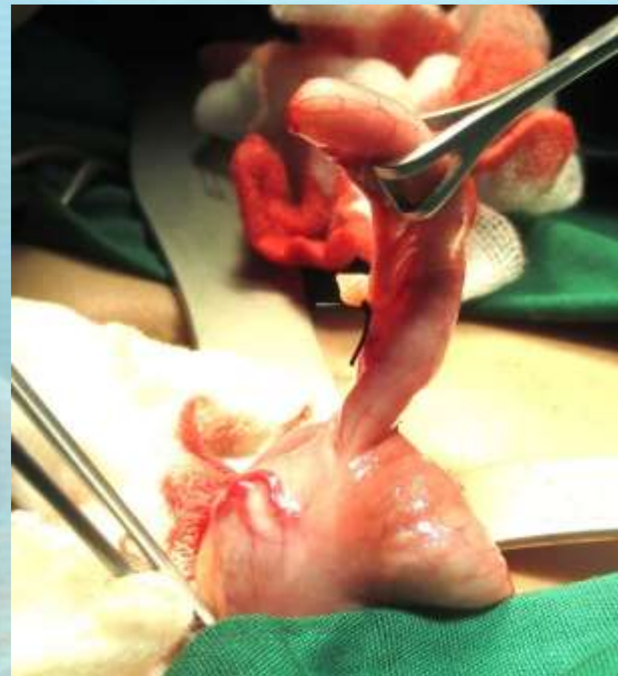
APPENDICITIS AKUT



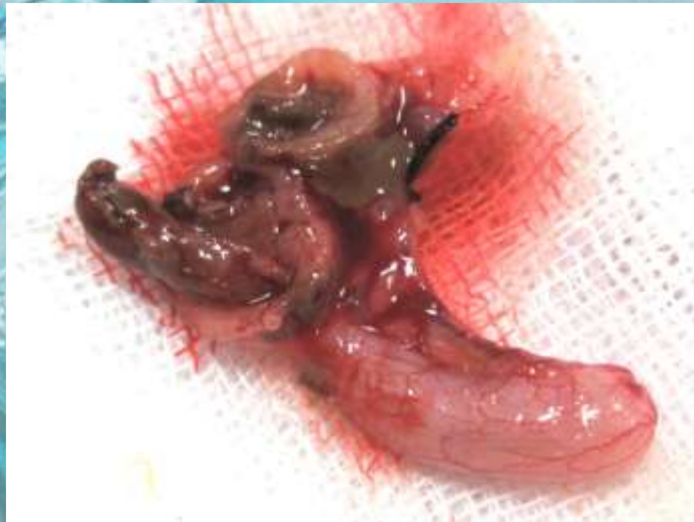


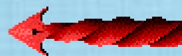


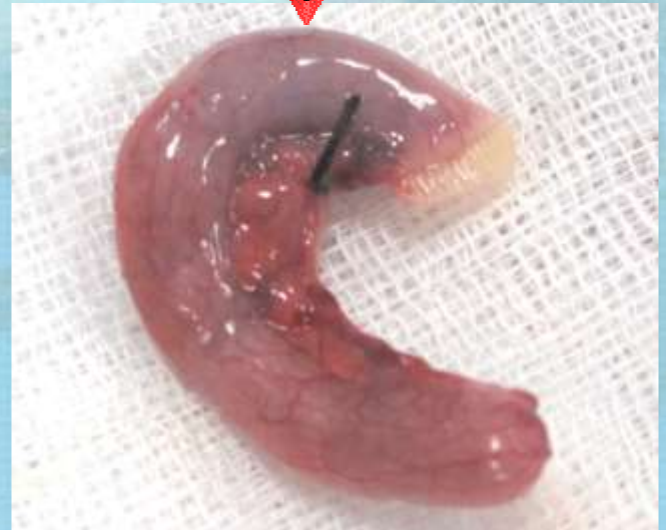




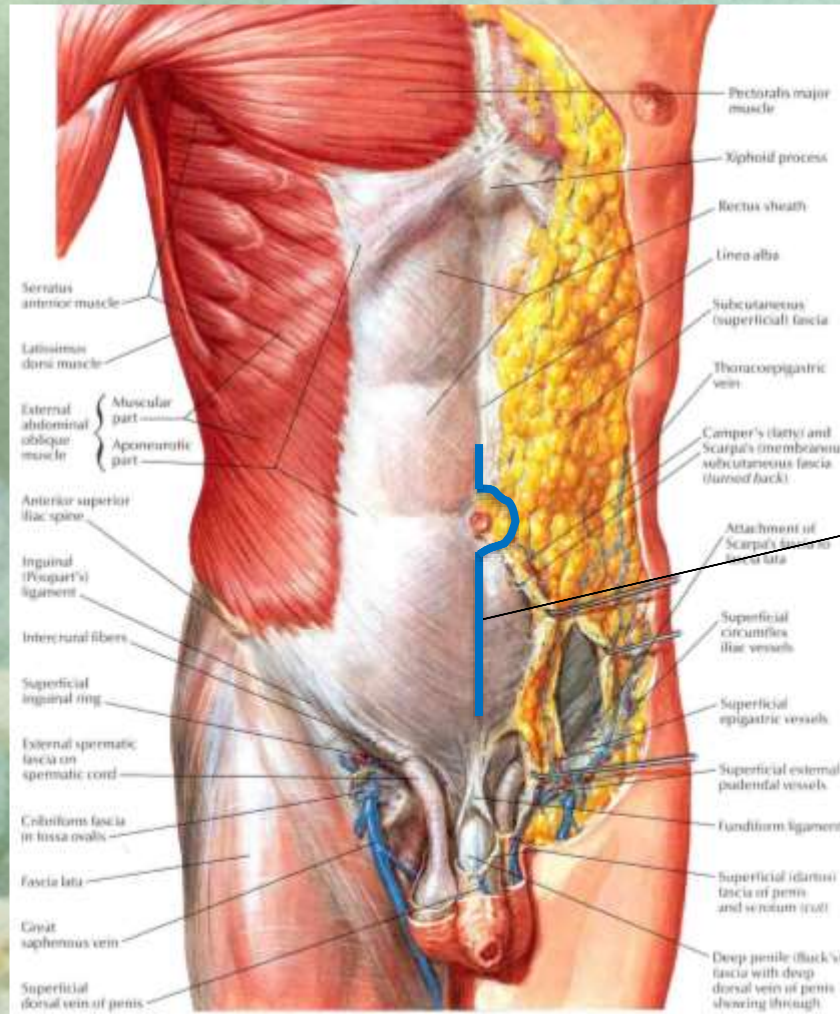
APPENDICITIS AKUT





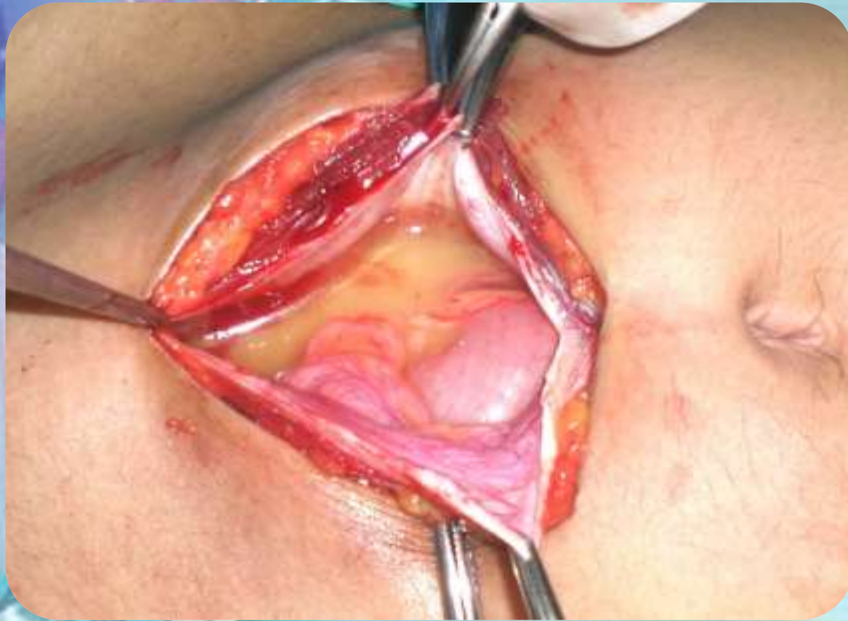


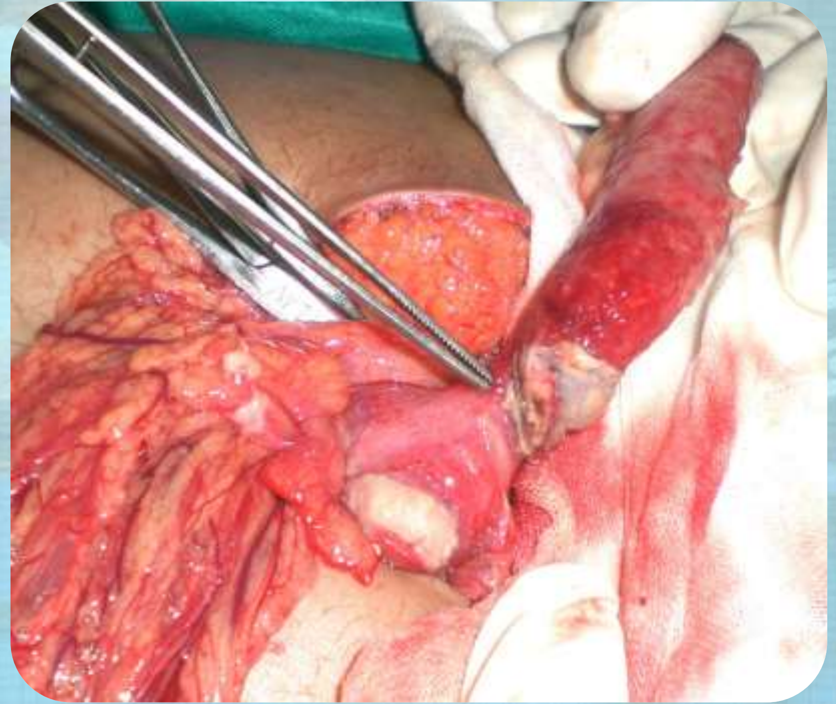
APPENDEKTOMI LAPAROTOMY



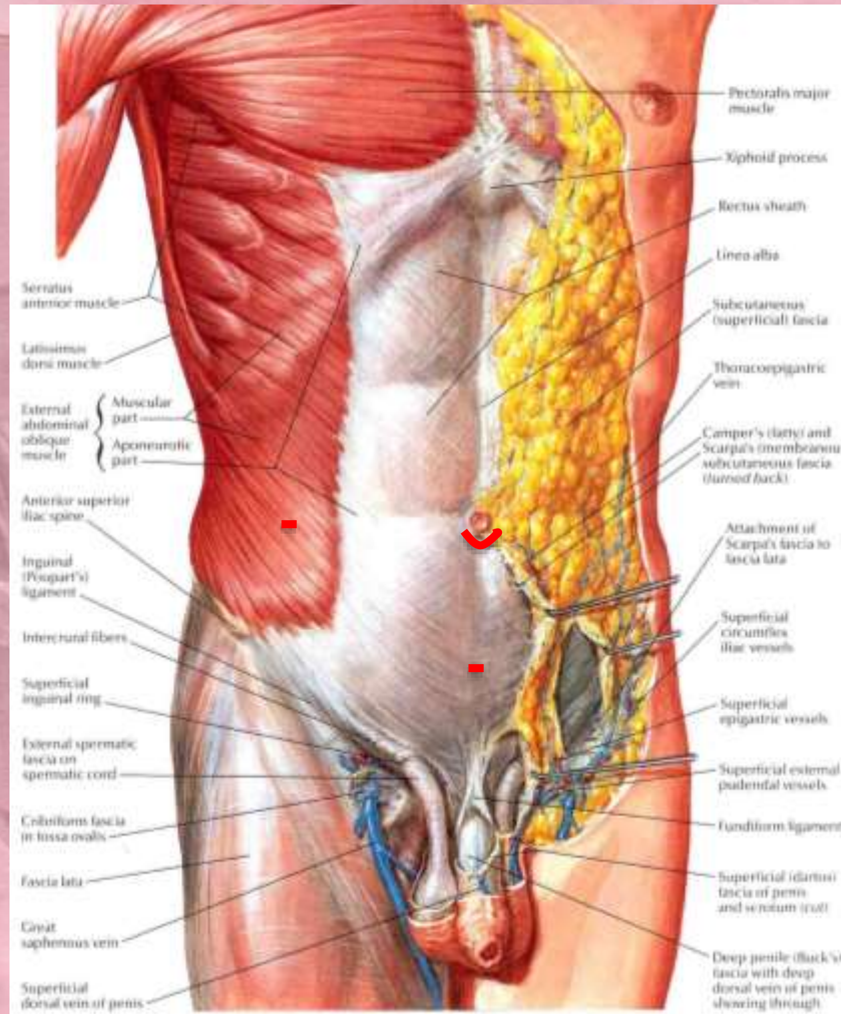
Midline,s incision

PERITONITIS DIFUS ec APPENDICITIS PERFORASI

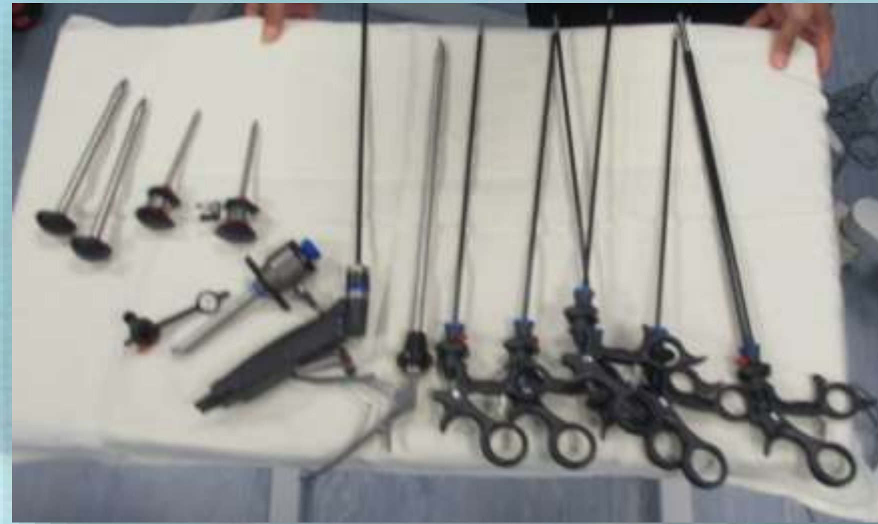


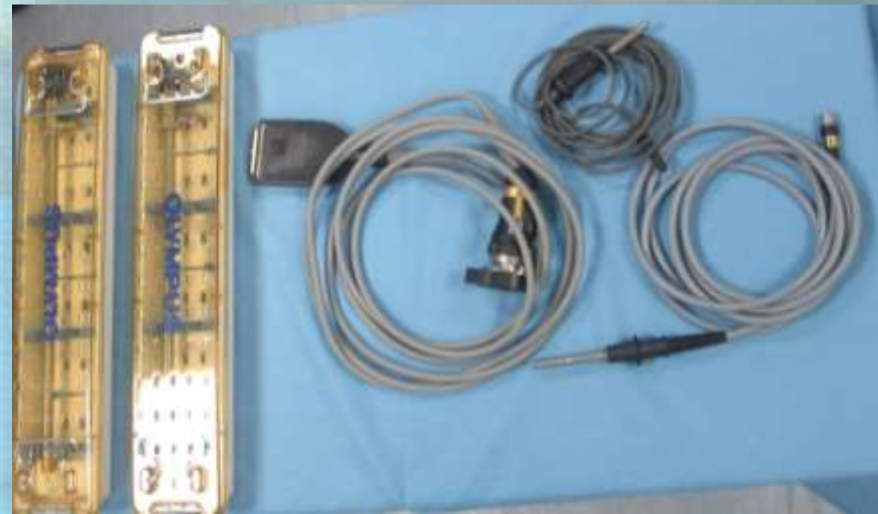


APPENDEKTOMI LAPAROSKOPIK



PERALATAN LAPAROSKOPIK



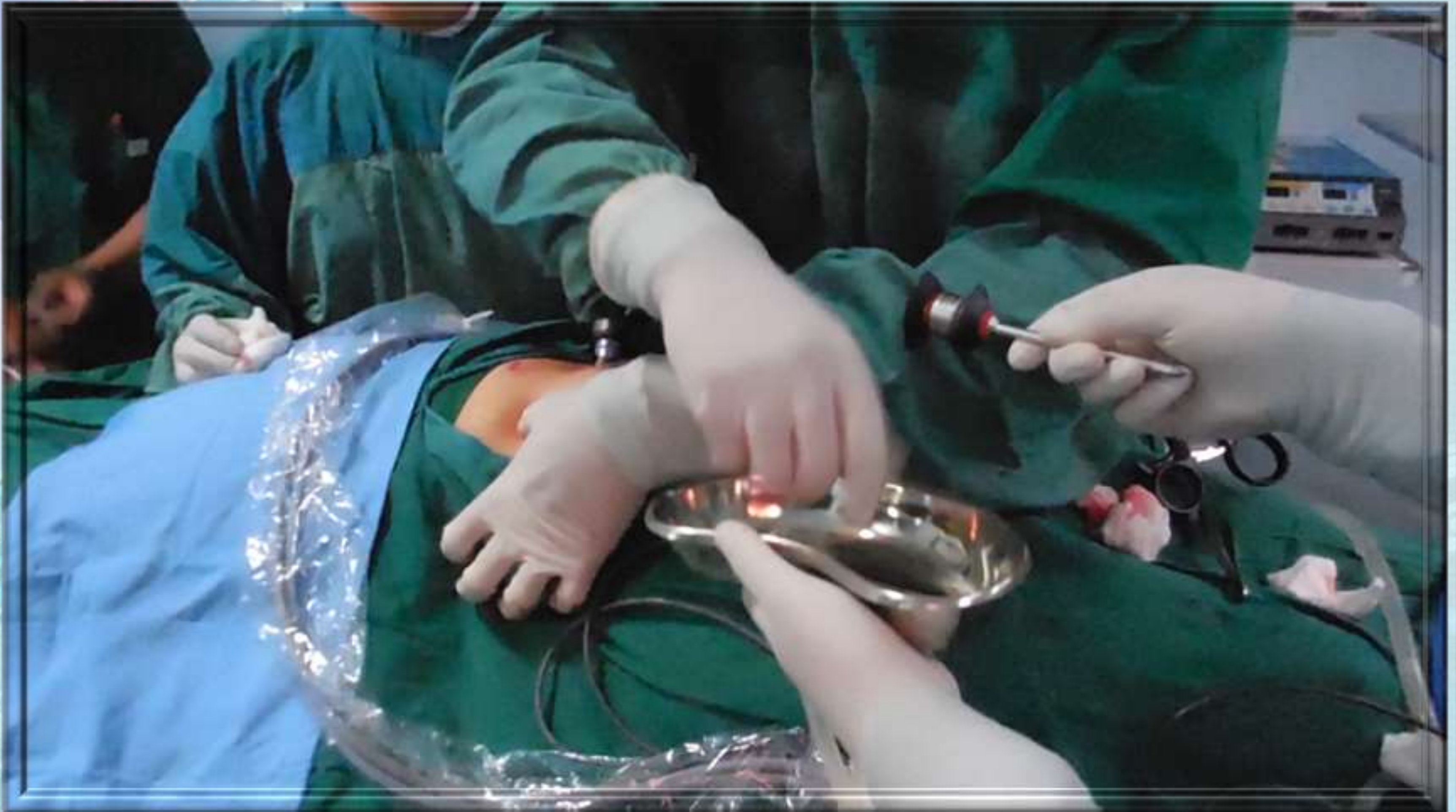


- Insisi ke-1 (1 cm) ⇨ smile incision infraumbilikal
- Tujuan: a. Insersi veres needle ⇨ u/ mengisi CO_2 intra abdomen (pneumoperitoneum)
  b. Insersi laparoscope ⇨ u/ melihat organ intra abdomen

- Insersi Trocar 10mm dgn teknik “blind”
- Tujuan: u/ memasukkan laparoscope (video camera)

❑ Insisi ke-2 (0,5 cm) ⇨ suprapubic

- Insisi ke-3 (0,5 cm) ⇨ RLQ sejajar umbilicus



NO TIME OUT
NO SCALPEL

PROGNOSIS

- Mortalitas ⇨ 0,1% pada apendisitis akut, 3% bila ruptur, 15% bila ruptur pada geriatri
- Etiologi ✞ ⇨ sepsis tak terkontrol, emboli paru, aspirasi
- Komplikasi yang mungkin terjadi:
  - Akut ⇨ infeksi luka operasi
  - Kronis⇨ perlengketan, ileus obstruksi, hernia

MATUR SUWUN