KHARKIV NATIONAL MEDICAL UNIVERSITY

Department of operative surgery and topographic anatomy

Lecture # 4

TOPOGRAPHIC ANATOMY AND OPERATIVE SURGERY OF THE ABDOMEN.

SURGICAL ANATOMY OF HERNIA

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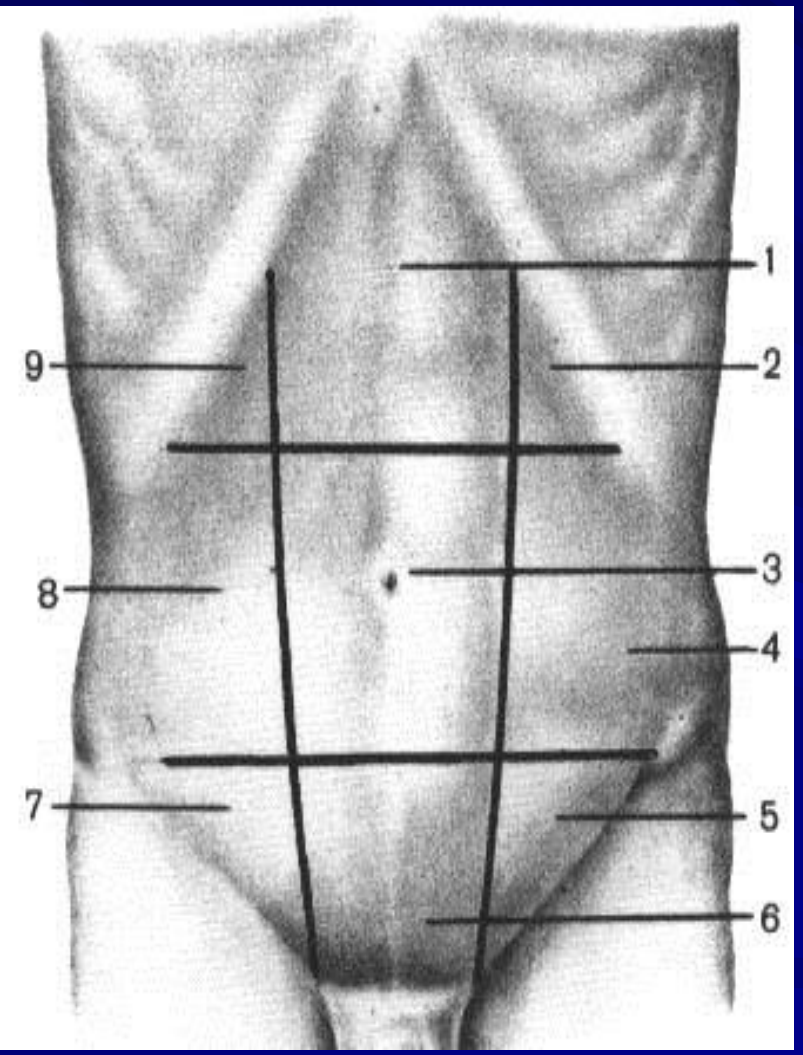
Borders of the abdominal wall



• Upper – xiphoid process, rib arches;

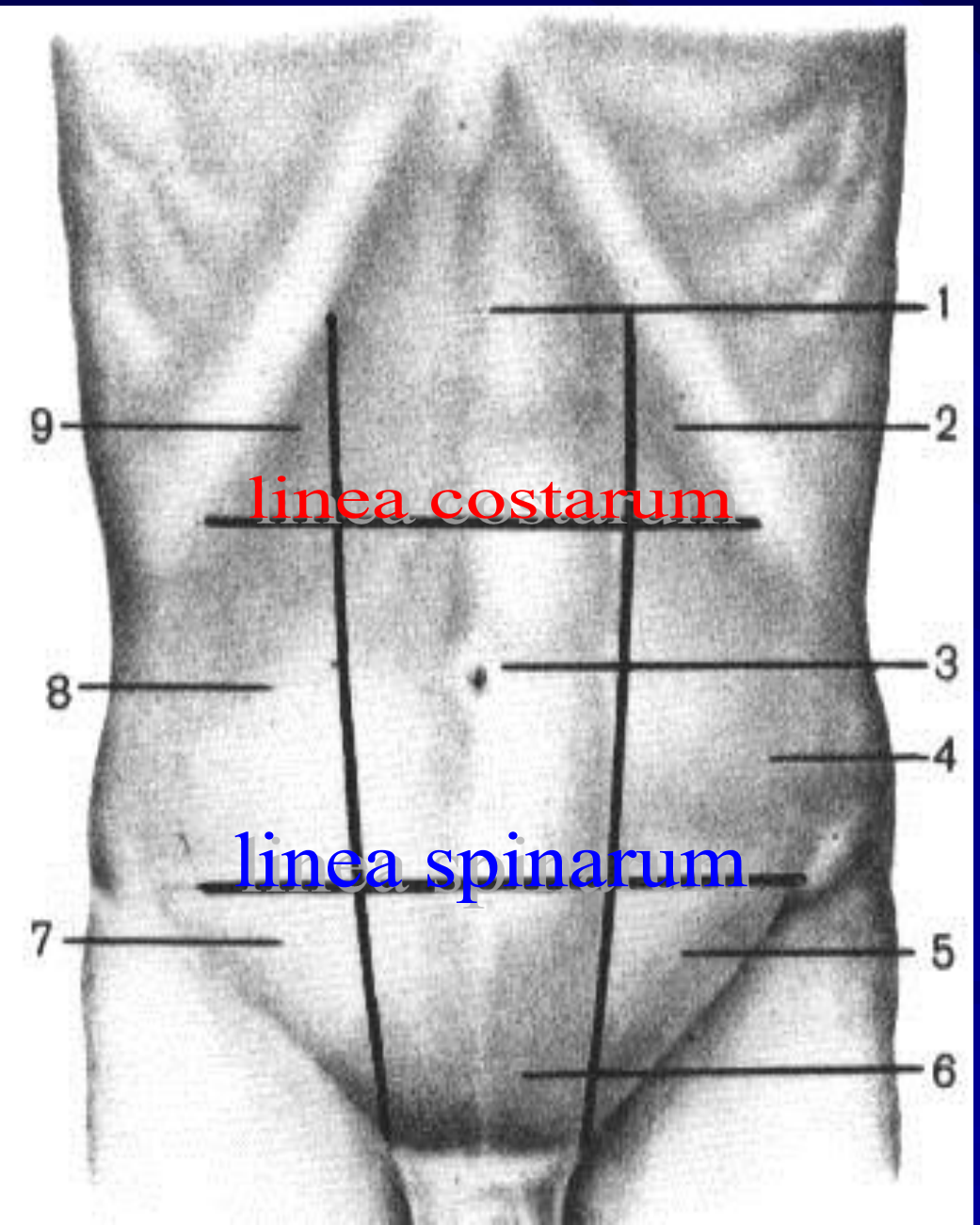
• Lower - inguinal ligament, the upper edge of the symphysis and the iliac crest, pubic tubercles;

• Laterally - the lines coming from the front end of the XI rib (line Lesgaft) vertically down to the iliac crest.

Linea costarum connects ends of the X ribs.
Linea spinarum connects both upper anterior spines of ilium.
Pararectal lines - two vertical lines conducted along the outward edge of m. rectus abdominis to the tuberclum pubicum.

There are nine regions of the abdominal wall.

REGIONS OF THE ABDOMINAL WALL



Epigastrium

1- regio epigastrica propria;
2, 9 – regio hypochndriacae

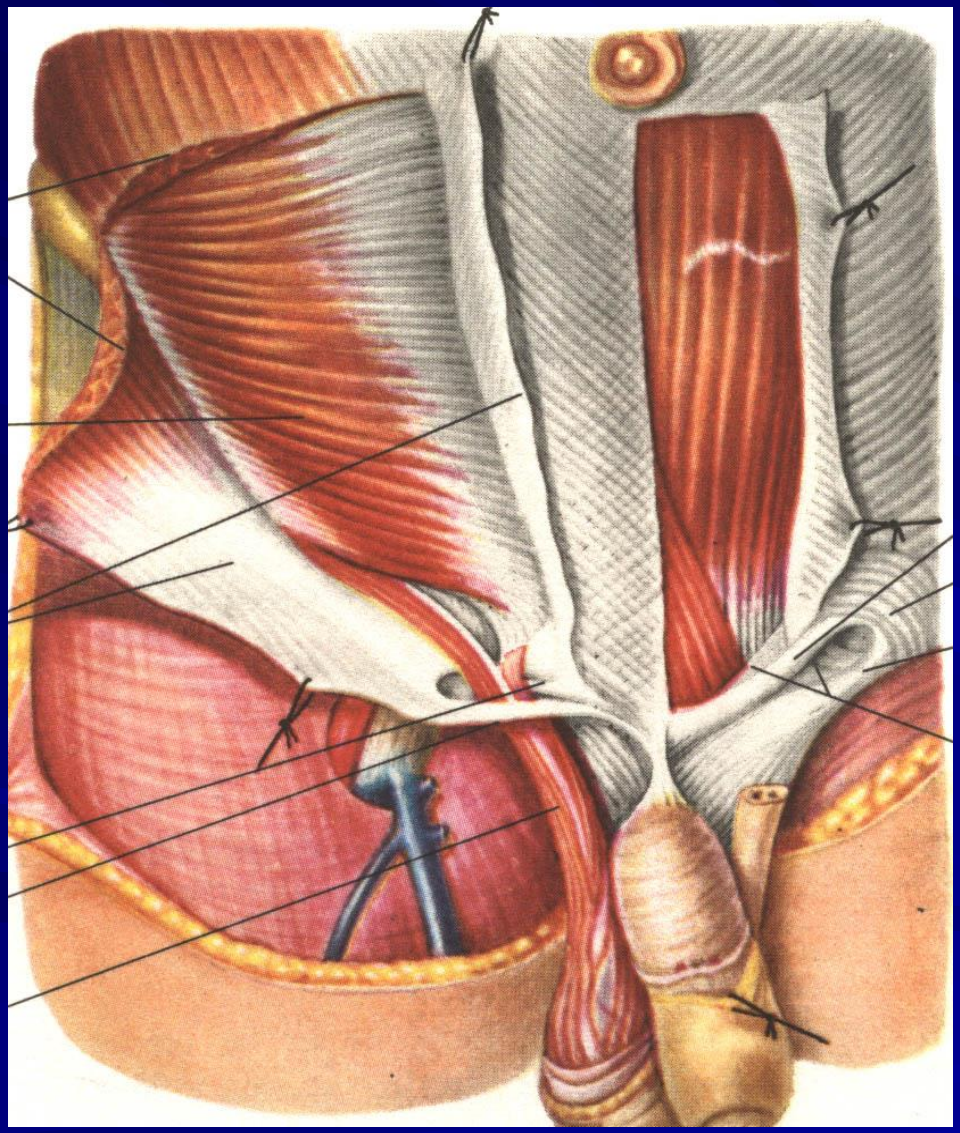
Mesogastrium

3 – regio umbilicalis;
4, 8 – regio laterales abdominis

Hypogastrium

6 - regio pubica;
5, 7 – regio inguinales

Layers

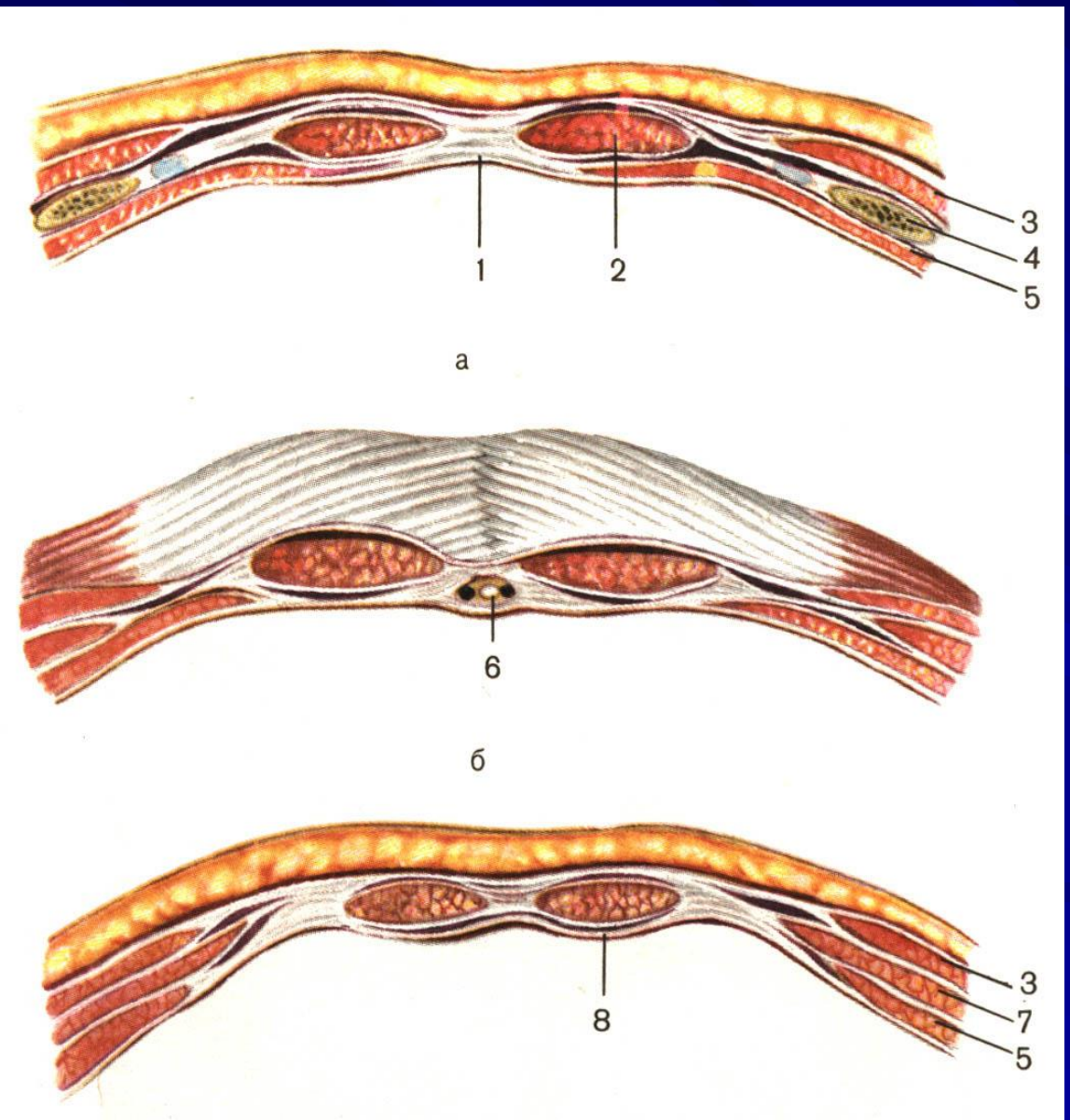


A. Superficial:
   - skin;
   - subcutaneous tissue;
   - superficial fascia.

B. The middle layer is represented by:
   - m. rectus abdominis;
   - m. obliqus externus;
   - m. obliqus internus;
   - m. transversus abdominis.

C. The deep layer consists of:
   - transverse fascia;
   - preperitoneal fat;
   - the parietal peritoneum.

Vagina of m.recti abdominis



Above the umbilicus

aponeurosis of internal and external oblique muscles form the anterior wall of m. recti abdominis vagina,

aponeurosis of internal oblique and transverse muscles form the posterior wall of it.

Under the umbilicus (near 5sm)

the back wall of the vagina is formed by transversal fascia, tendons of all wide muscles form the anterior vaginal wall rectus muscle.

Arteries of the abdominal wall

- Superficial arteries are placed in the subcutaneous adipose tissure:

  - *a.epigastrica superficialis*
  - *a.circumflexa ilium superficialis* (from femoral artery)
  - 5-6 *aa.intercostales*
  - *a.pudenda externa* (from femoral artery)

- Deep arteries are situated in the preperitoneal adipose tissure:

  - *a.epigastrica superior* is the branch of internal pectoral artery
  - *a.epigastrica inferior* is the branch of external iliac artery
  - *a.circumflexa ilii profunda* is the branch of external iliac artery
  - *lumbar arteries* - pass in between an internal oblique and transversal muscles of abdomen.

Veins of the abdominal wall

Veins of anterior-lateral wall of abdomen are also divided into superficial and deep.

- Superficial veins of the anterior-lateral wall of the abdomen are portocaval anastomosis. When violations of the portal vein (liver cirrhosis, diseases of the esophagus and stomach) subcutaneous veins are visible like "Gorgona's head" surraundly of the umbilicus.
- The deep veins of anterior-lateral wall of abdomen (*vv. epigastricae superiores et inferiores, vv. intercostales and vv. lumbales*) accompany (sometimes on two) of the same names arteries. Lumbar veins are the sources of odd and semiazygos veins.

Nerves of anterior-lateral wall of abdomen

- In innervation of anterior-lateral wall of abdomen 7-8 lower intercostals nerves and two nerves of lumbar plexus (n.iliohypogastricus and n.ilio-inguinalis) take part.
- The basic trunks of these nerves are disposed between an internal oblique and transversal muscles of abdomen. Direction of basic nervous trunks is oblique parallel to ribs.
- After the cut 3 and more branches of intercostals nerves the changes in muscles can occur.

Weak places of the abdominal wall

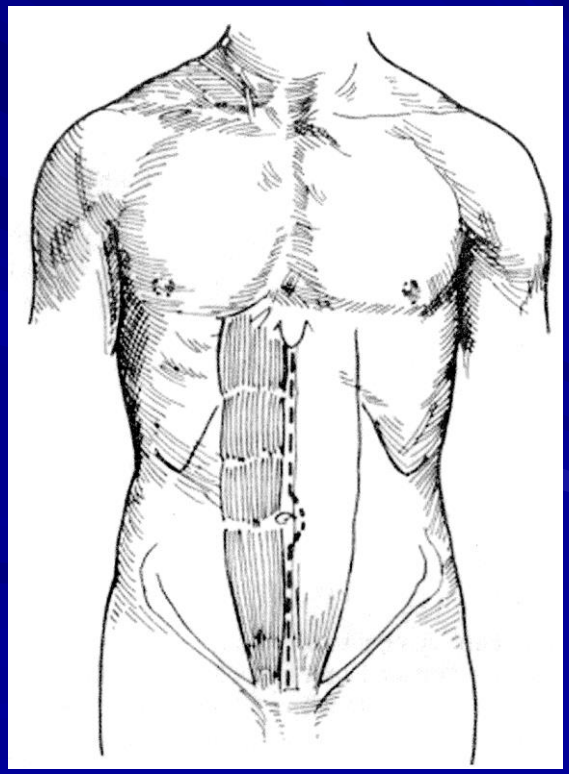
- Inguinal region
- Inguinal interval
- White line of abdomen
- Umbilical ring

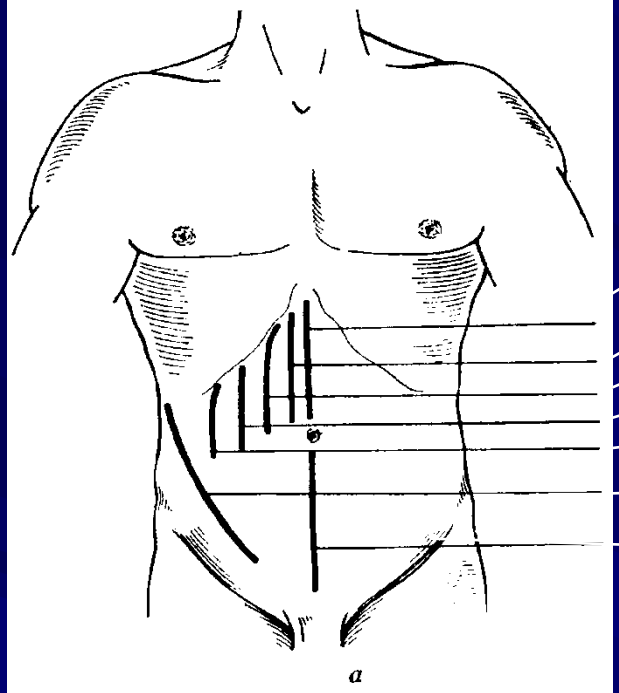
Laparotomy

Laparotomy (*lapar* - abdomen, *tomia* - dissection) is a surgical approach to organs of the abdominal cavity performed by incision of the abdominal wall.

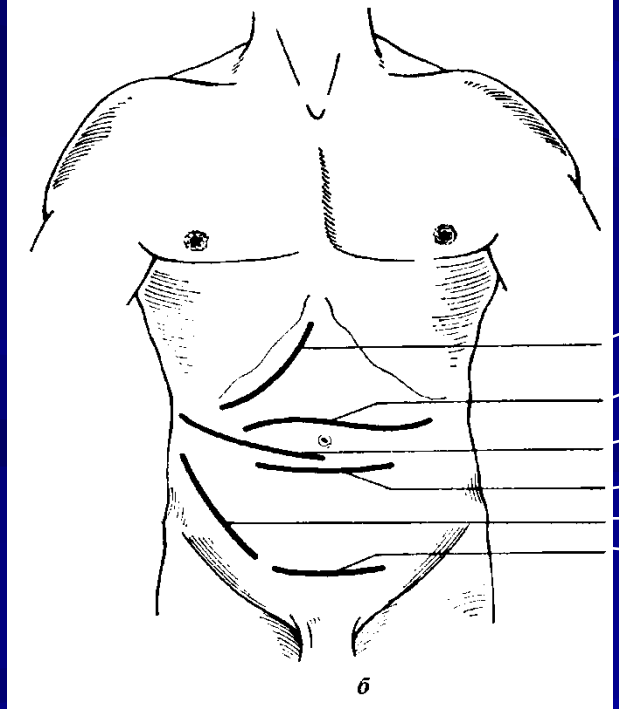
Types:

- longitudinal;
- oblique;
- transverse;
- combined.





Median
Paramedial
Transrectal
Pararectal
Through the semilunar line
Lateral transmucal
Lower medial

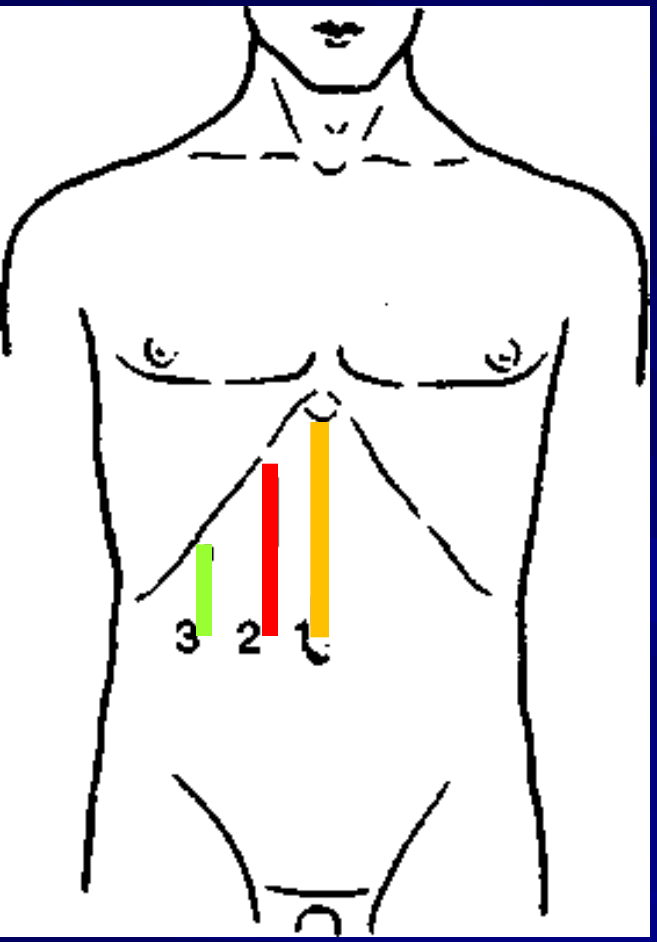


Subcostal
Upper transversal
Upper lateral
Lower transversal
Volkovych-Diakonov
Pfannenstiel Incision

Longitudinal laparotomy

- The widely used **longitudinal** cuts can be in surgical practice: median, paramedial, transrectal and pararectal.
- *median* - is conducted between a xiphoid process and pubic symphysis. It can be an upper, middle and lower.
- *paramedial* is conducted on the medial edge of rectus muscle of abdomen.
- *transrectal* - is separation of the rectus muscle fibers with cutting of rectus sheath.
- *pararectal* – is incision along the lateral margin of the rectus muscle of abdomen.

Longitudinal laparotomy



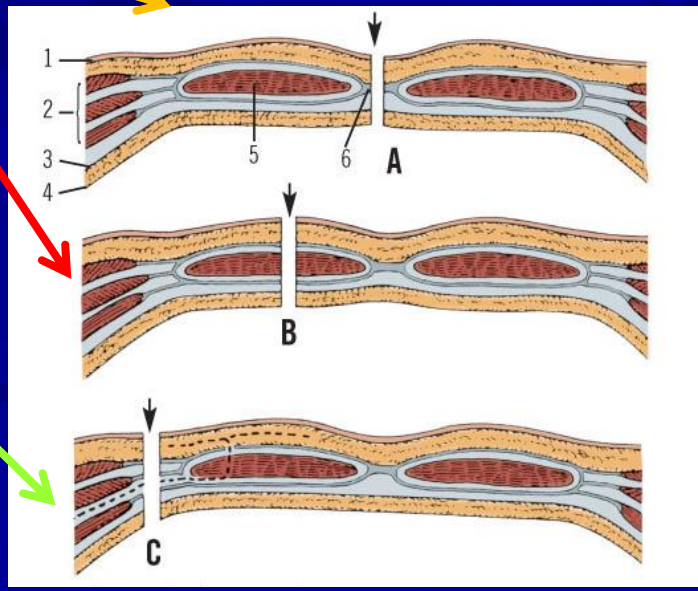
Types:

Median

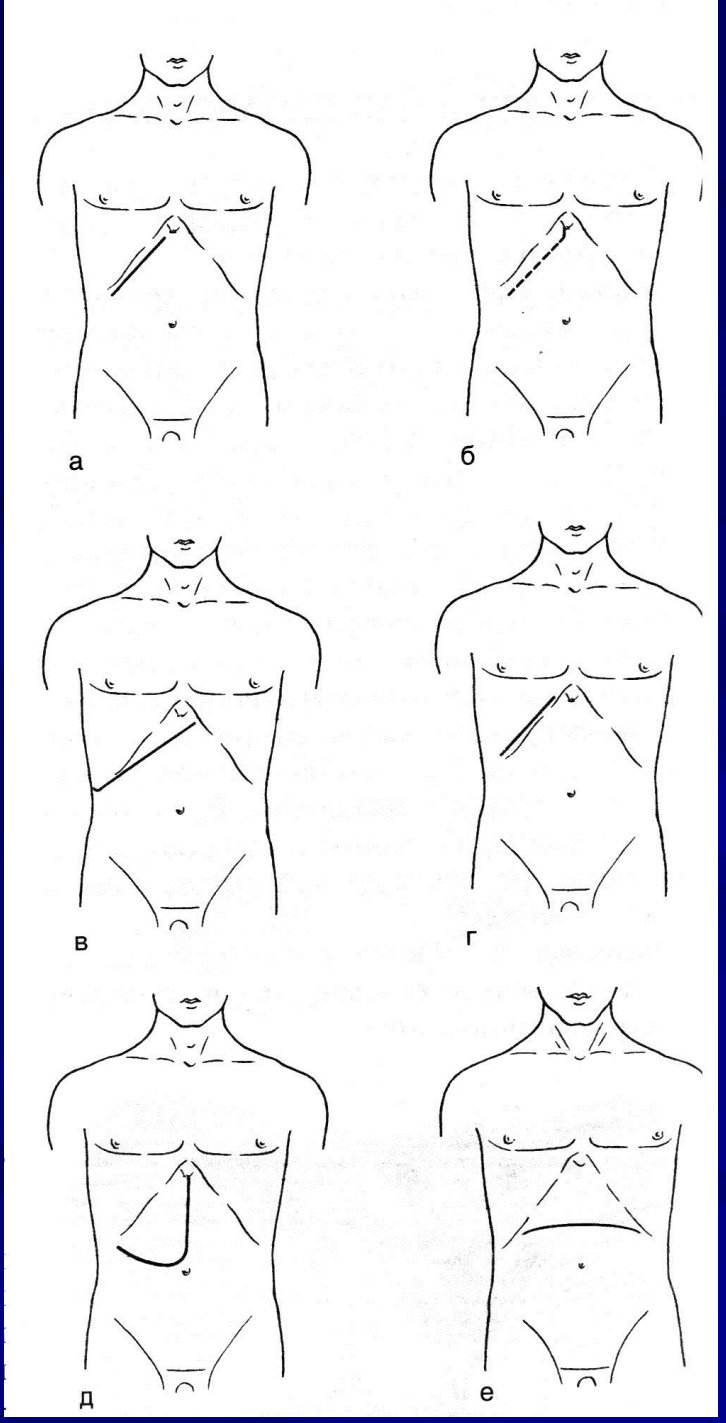
Transrectal

Pararectal

upper, middle, lower and total



- **Oblique** cuts of the antero-lateral wall of abdomen are executed with the purpose of accesses to organs, projected in subcostal and inguinal regions. These incisions in subcostal region damage nerves less, than similar interferences in inguinal regions.
- **Transverse** sections are performed mainly in the hypogastrium, often to access the pelvic organs



Oblique and transversal incisions

а – by Courvuasie-Kocher

б – by Fedorov

в – by Shpriengel

г – by Pribram

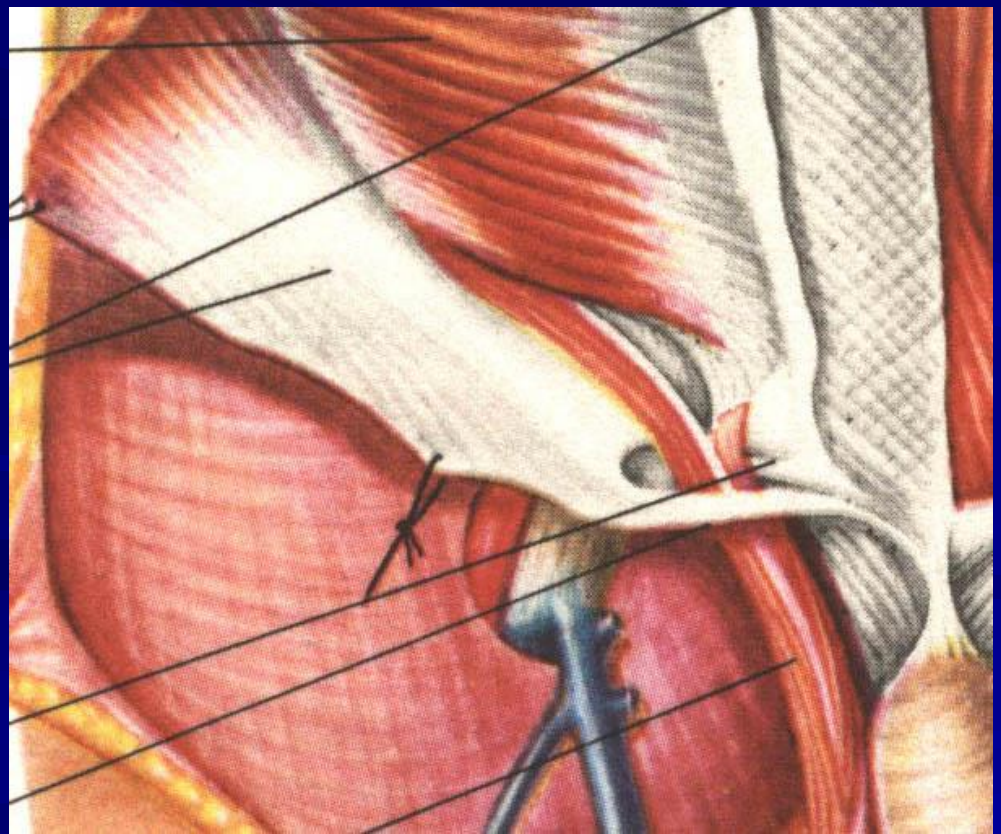
д – by Rio-Branko

е – upper transversal by Shpriengel

Inguinal canal

Borders (walls):

- anterior - aponeurosis of external oblique muscle;
- *posterior* – transversal fascia;
- *superior* – lower margins of internal oblique and transverse muscles;
- *inferior* – inguinal ligament.



Inguinal rings:

External - is between the lateral and medial cruses of external oblique muscle aponeurosis;

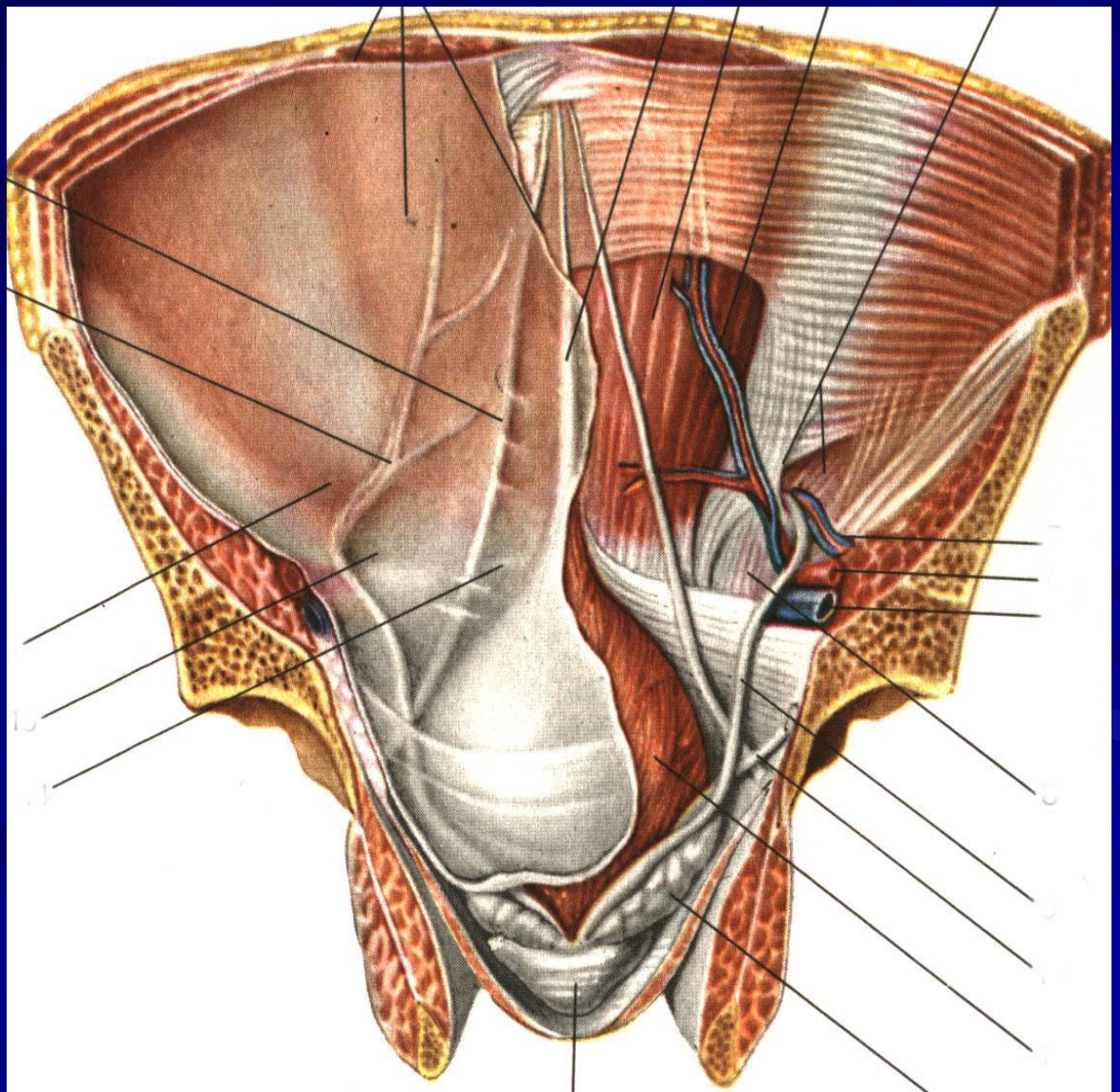
Internal - is in the lateral inguinal fossa

Content:

mail - the spermatic cord,

femail - round ligament of the uterus.

Visceral surface of abdominal wall

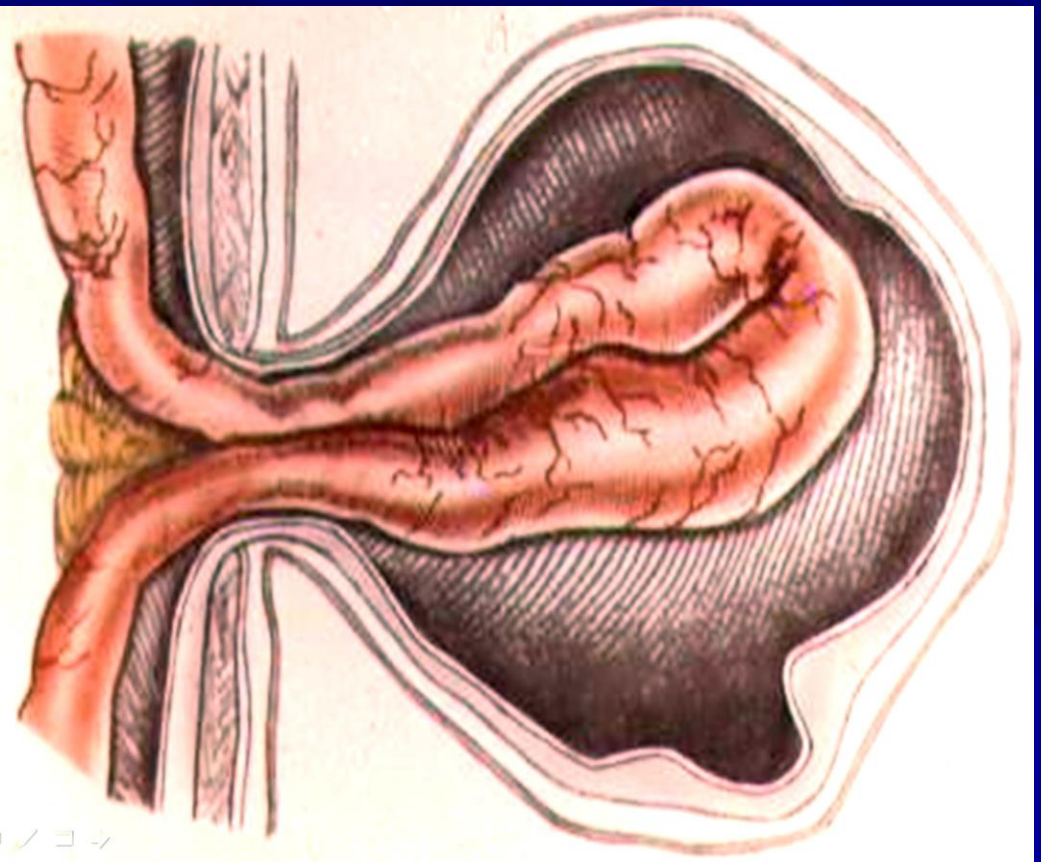


Hernia

Hernia is a congenital or acquired defect of muscular or aponeurotical layer of the abdomen, which causes protrusion of internal organs through undamaged skin.

Parts of hernia:

1) hilus;
2) sac;
3) contents of sac;
4) coverings of sac.



Sac is a diverticulum of parietal peritoneum. It consists of mouth, neck, body, fundus.

Hilus is situated in weak place.

The most common **contents** of hernial sacis one or more of following:

- omentum,
- small intestine,
- appendix vermiformis.

Coverings are derived from layers of abdominal wall through which sac passes.

Classification of hernia

1. According to hernial mouth:

- *Inguinal (*direct and oblique).
- *Umbilical*.
- *Femoral*.
- *Linea alba*

2. According to etiology:

- *Congenital*
- *Acquired*

3. Clinically:

- *Reducible;*
- *Irreducible;*
- *Strangulated*: elastic, retrograde, parietal

Inguinal hernia

- **Direct**

mouth – medial inguinal fossa;

coverings of sac – transversal fascia;

wall of the inguinal canal needs to strengthen – back;

etiology – acquired only.

- **Indirect (oblique)**

mouth – lateral inguinal fossa;

coverings of sac – shells of spermatic cord;

wall of the inguinal canal needs to strengthen – anterior;

etiology – acquired and inborn.

Indirect (oblique) inguinal hernia

- Incomplete is limited to the inguinal canal, the processus vaginalis having been odliterated at the superficial inguinal ring.
- Complete: the processus vaginalis is closed at its lower end only, just above the epididymis.
- Scrotal: there is a persistence of the prenatal condition before the processus vaginalis becomes obliterated. The testis appears to lie within the lower part of hernia

Femoral hernia

- Femoral canal is abnormal structure. It forms during femoral hernia.

- Deep ring of the femoral canal is situated in vascular lacuna most often. Borders of deep ring:
  - anterior – inguinal ligament;
  - posterior – lig. pectineum;
  - medial – lig. lacunarum;
  - lateral – femoral vein.

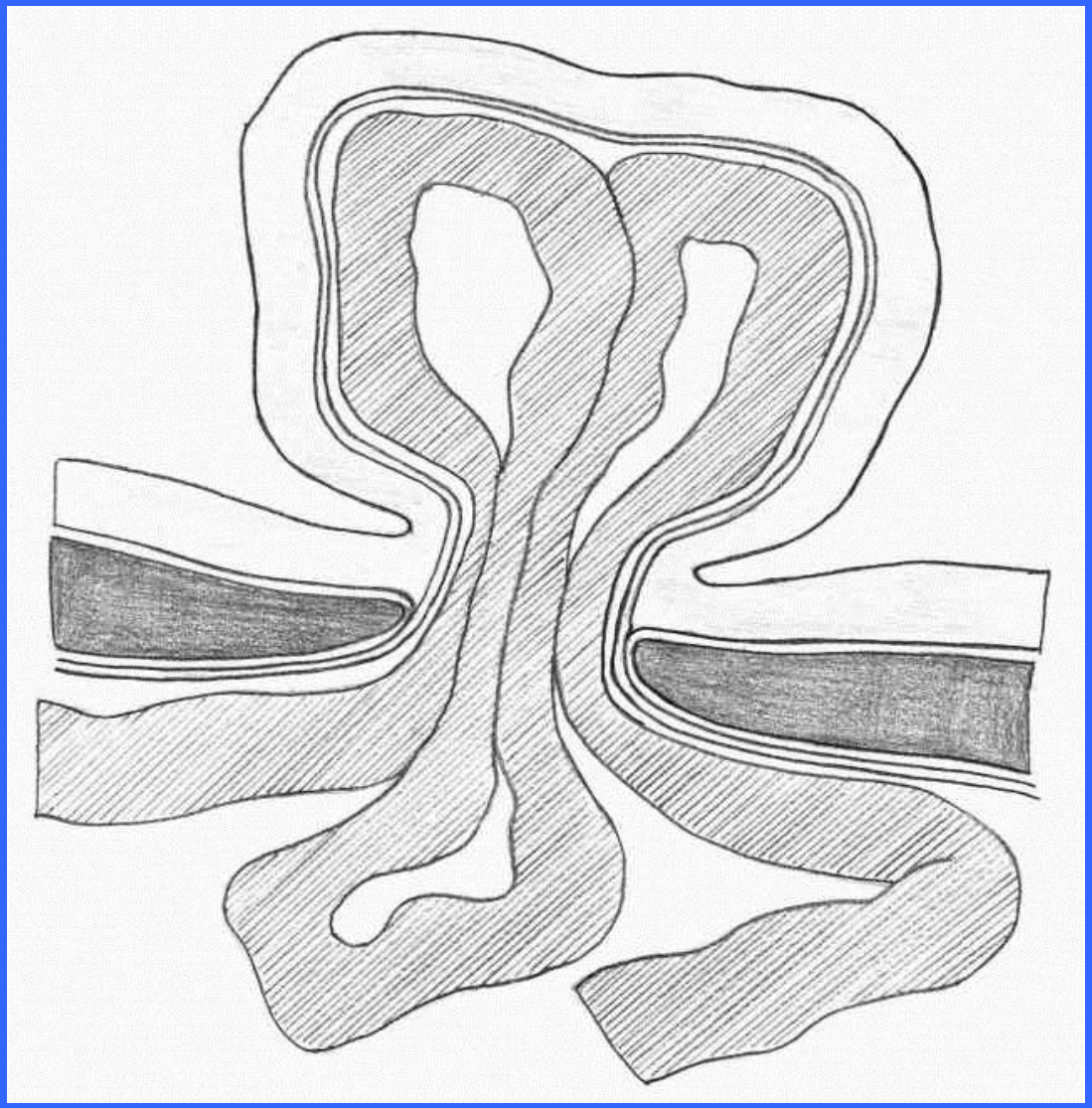
- Superficial ring of the femoral canal is placed in foramen ovale of wide femoral fascia.

Clinical classification of hernia

- ***Reducible*** hernia can be reduced by the patient or by the surgeon, when the patient lies down.
- ***Irreducible hernia*****:** contents can't be returned to the abdominal cavity.
- A hernia becomes ***strangulated*** when the contents of the sac is pressed in hilus**.**

Parietal strangulation (Richter's hernia)

Retrograde strangulation (Maydle's hernia)



Thank you for attention!