Institute of Surgical Research

„C" Module – Advanced Medical Skills

C1-2 MODULE – Minor Surgical Skills. Advanced suturing

C3-4 MODULE – Operations in practice

Abdominal drainage: diagnostic and therapeutic peritoneal lavage

Laparotomy

Tracheostomy

Thoracic drainage: insertion of chest tube

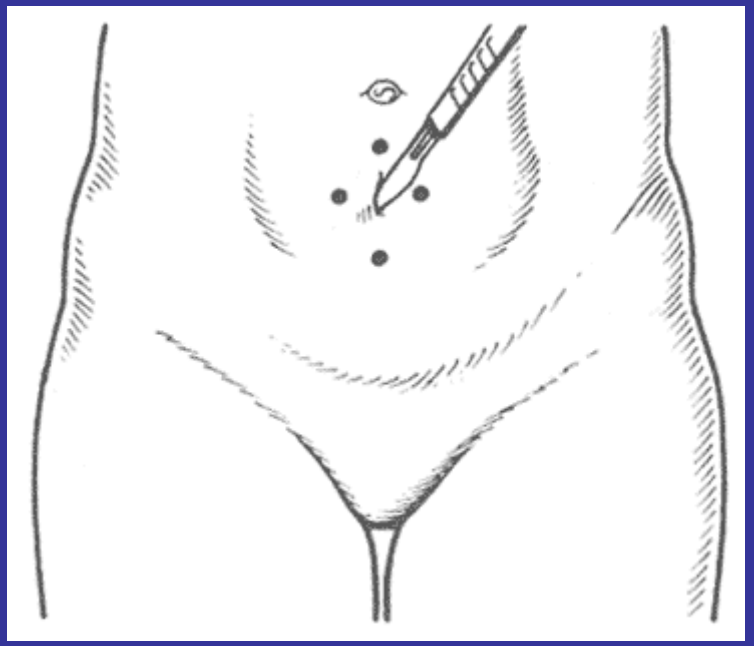
C5-6 MODULE – Minimally invasive surgery

I. Abdominal drainage: diagnostic and therapeutic peritoneal lavage

Diagnostic (acute) peritoneal lavage 1.

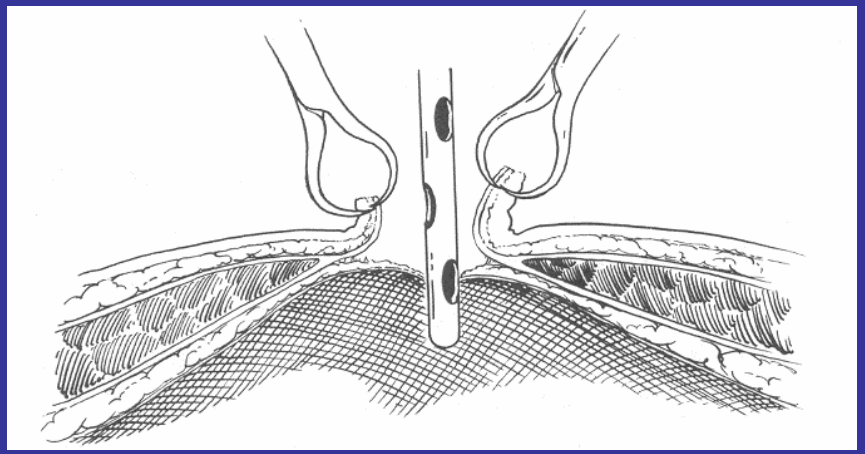
Steps:

1. **Skin incision:** 1-2 cm long median incision below the umbilicus
1. **Blunt dissection of subcutaneous tissues**, exposure of linea alba
2. **Handling bleeding**



Diagnostic peritoneal lavage 2.

4. **Introducing the catheter into the peritoneal cavity:**
   - Grasping and lifting the linea alba with tissue forceps (Kocher hemostatic forceps)
   - Incision of the linea alba and peritoneum (3-4 mm) or pushing the catheter into the abdominal cavity



   - Removing the trocar and introducing the catheter into the pelvis

Diagnostic peritoneal lavage 3.

5. **Sucking with syringe.** If negative: lavage
6. **Lavage:**
   - 250 ml 37°C Ringer-lactate infusion into the abdominal cavity
   - 3 min equilibration
   - Placing the bottle on the floor, collecting the washing fluid

4. **Laboratory examination:**
   If positive (RBC: $>10^5$/ml, WBC: >500/ml, feces, bile, amylase or bacteria) → **laparotomy**

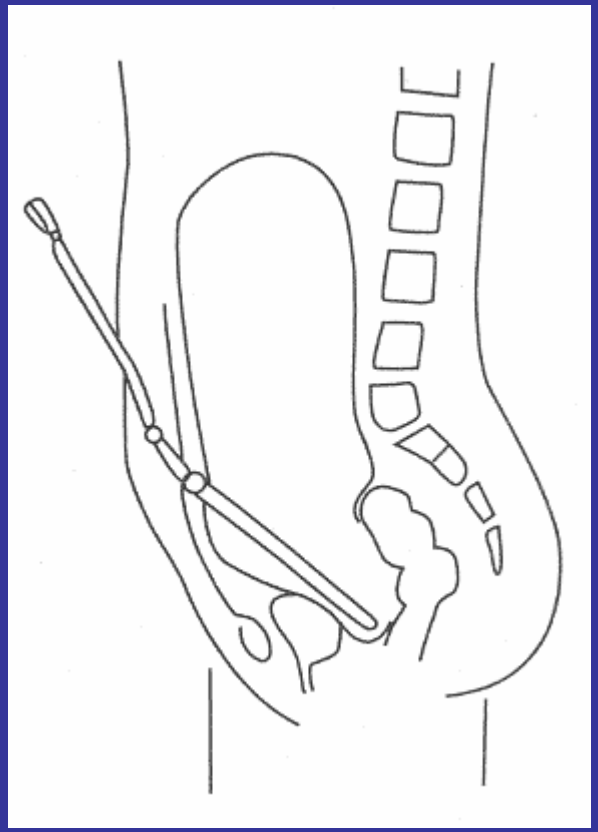
6. **Removal of the catheter**

7. **Skin suture** (Donati suture)

Chronic peritoneal lavage (dialysis)

The end of the implanted catheter is in the Douglas space of the pelvis.

The catheter exits the abdominal wall lateral to the midline at one third of the distance between the umbilicus and the symphysis.



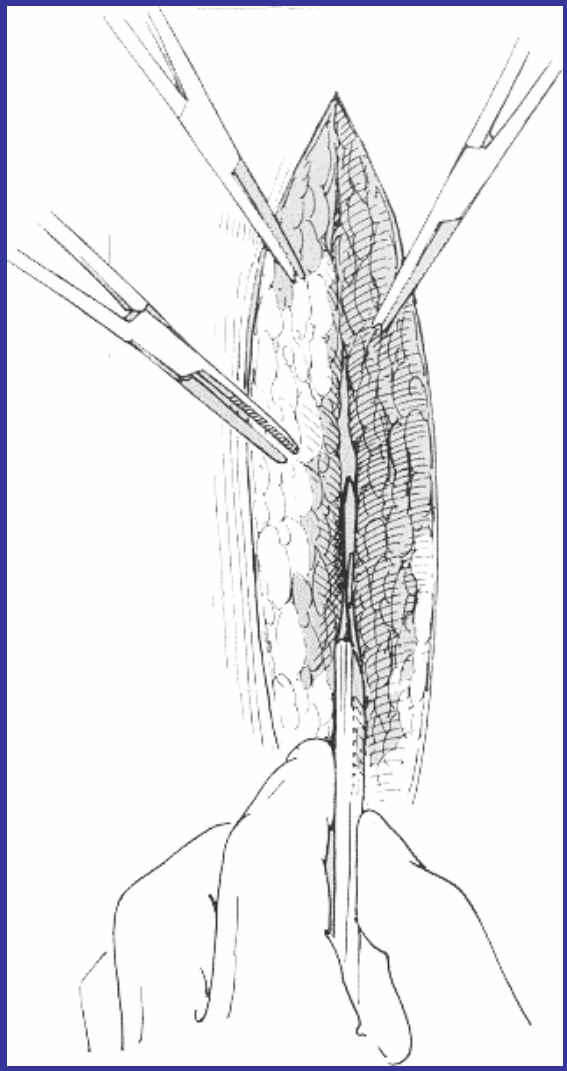
Practising of peritoneal dialysis on phantom:

1. Putting on **sterile gloves**
2. Unscrewing the **sterile cap** of the dialysis catheter
3. Screwing a **3-way stopcock** on the catheter
4. Attaching the tubing of the sack with **37°C dialysing solution** to one of the connectors of the stopcock (and an **empty infusion set** to the other).
5. **Filling the abdomen with the fluid** by opening the stopcock and the roller wheel.
6. **After equilibration,** the **fluid is drained** by gravity.
7. **The catheter is closed** with the sterile cap.

Middle median laparotomy. Inspection of abdominal organs

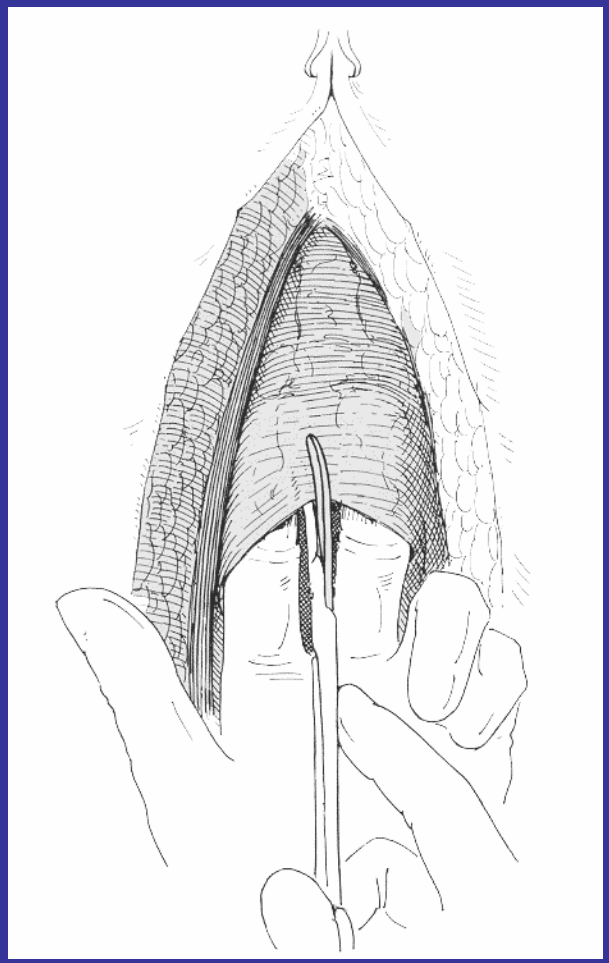
The technique of laparotomy 1.

1. **Operating team:** surgeon, first and second assistant, scrub nurse
2. **Placing two sterile wound towels** on the operative field
3. **Stretching the skin on both sides of the planned incision** by the surgeon and the assistant.
4. **Skin incision:** 15-20 cm long incision with scalpel. Handling bleeding



The technique of laparotomy 2.

5. **Stitching the wound towels to the wound edges** (simple interrupted sutures)
6. **Incision of the subcutaneous tissues** with diathermy to the linea alba. Handling bleeding
7. **Lifting up the linea alba** with two tissue forceps above the umbilicus
8. **Incision of the linea alba and peritoneum** (~1 cm)
9. **Lengthening the incision** with Mayo scissors to the wound corners

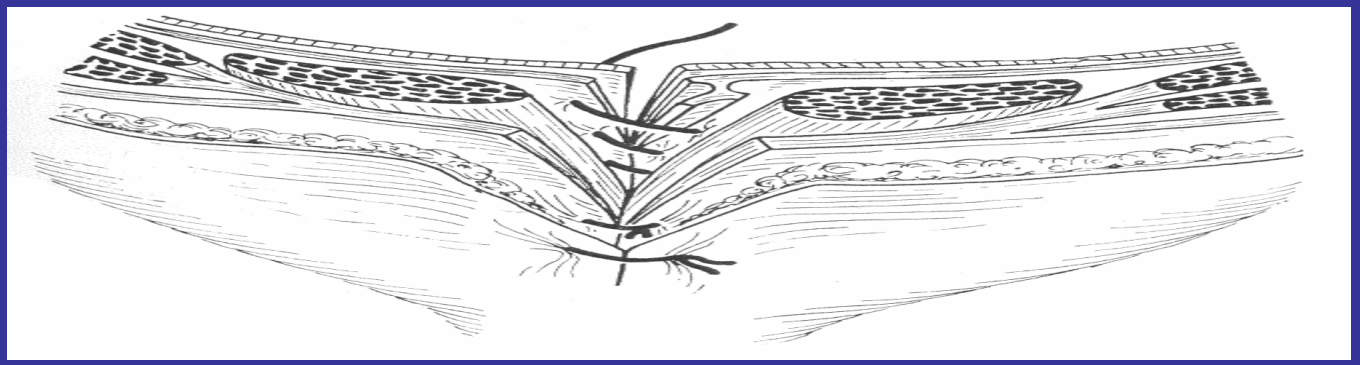


The technique of laparotomy 3.

10. **Grasping the peritoneal edges with Mikulicz clamps.** Preperitoneal fat is cut, if necessary.
11. **Placing the Gosset's self retaining retractor** (pressing organs to the abdominal wall should be avoided).
12. **Inspection of the abdominal and pelvic organs** (greater omentum, stomach, spleen, small and large intestines, kidneys, urinary bladder, genital organs). **Organs should be protected from drying out with wound towels soaked in physiological saline.**

Closure of the abdomen

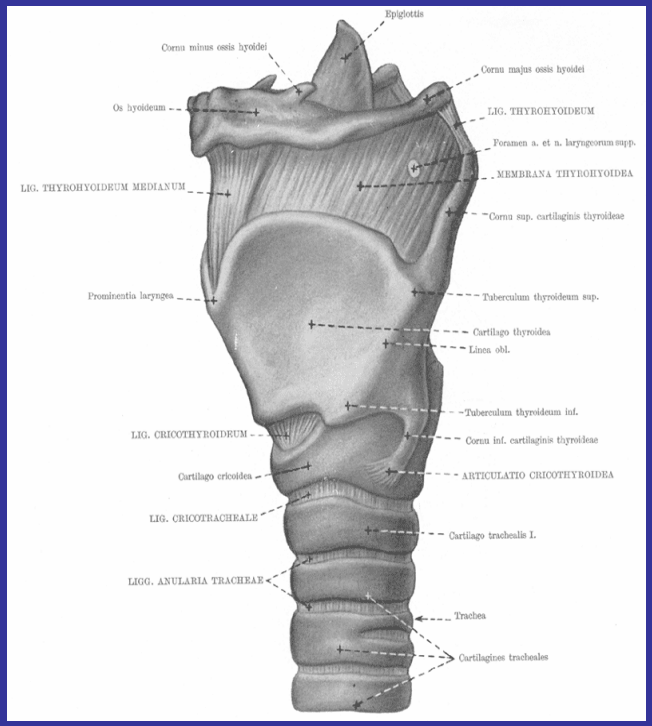
1. **Placing the organs back to the abdomen,** covering them with the greater omentum
2. **Removing the Gosset's self retraining**
3. **Closing the peritoneum and linea alba** with continuous suture
4. **Subcutaneous suture** (simple interrupted suture)
5. **Skin closure** (Donati suture)



Tracheostomy

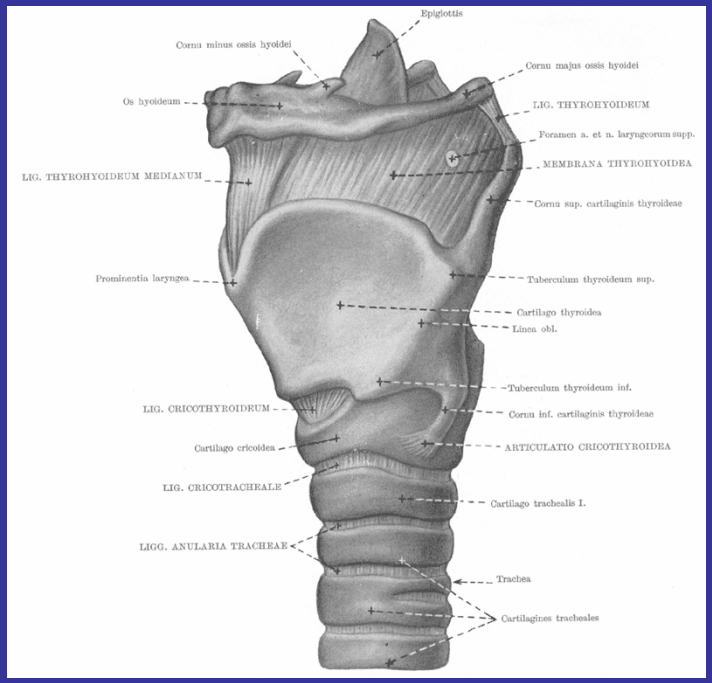
The technique of tracheostomy 1.

1. **Palpating the thyroid and crycoid cartilages** and localization of the 1st and 2nd tracheal cartilages
2. **Transverse skin incision** between the 1st and 2nd cartilages, handling bleeding
3. **Dissection of the subcutaneous tissues** with Mayo scissors
4. **Cutting the linea mediana alba colli** longitudinally with scissors



The technique of tracheostomy 2.

5. **Blunt separation of the muscles** in the midline with scissors
6. **Retracting the wound edges** with muscle retractors
7. **Dividing the fascia** covering the trachea longitudinally with scissors
8. **Incision of the membrane between the 1st and 2nd cartilages** transversally with knife



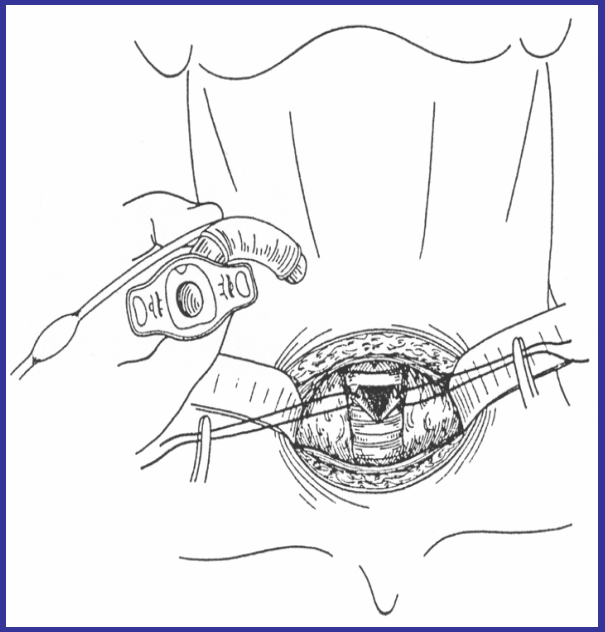
The technique of tracheostomy 3.

9. **Elevation of the 2nd and 3rd tracheal cartilages** with a mosquito hemostat and **cutting** them with scissors in the midline

10. **Placing atraumatic stitches** into both cut edges of the 2nd cartilage

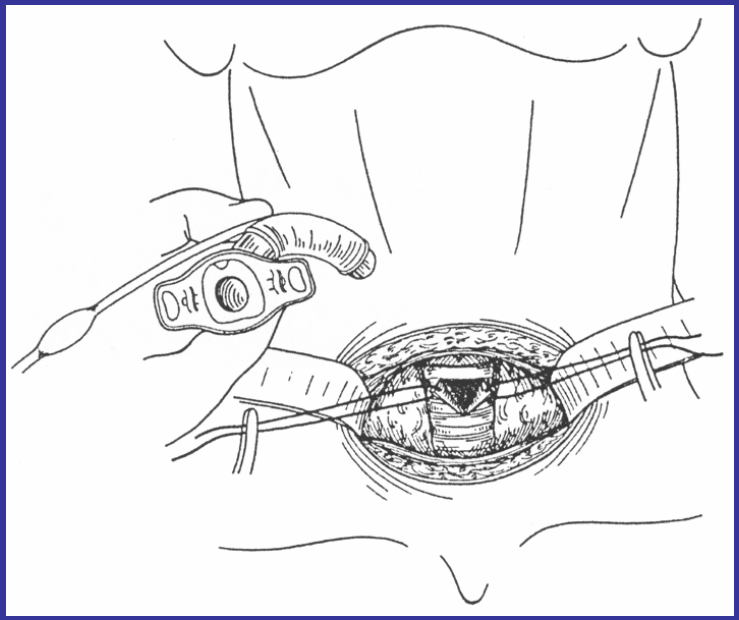
11. **Selection of a tracheostomy tube** of appropriate size, and **testing the cuff**

12. **Stretching the edges** and introducing the tracheostomy tube



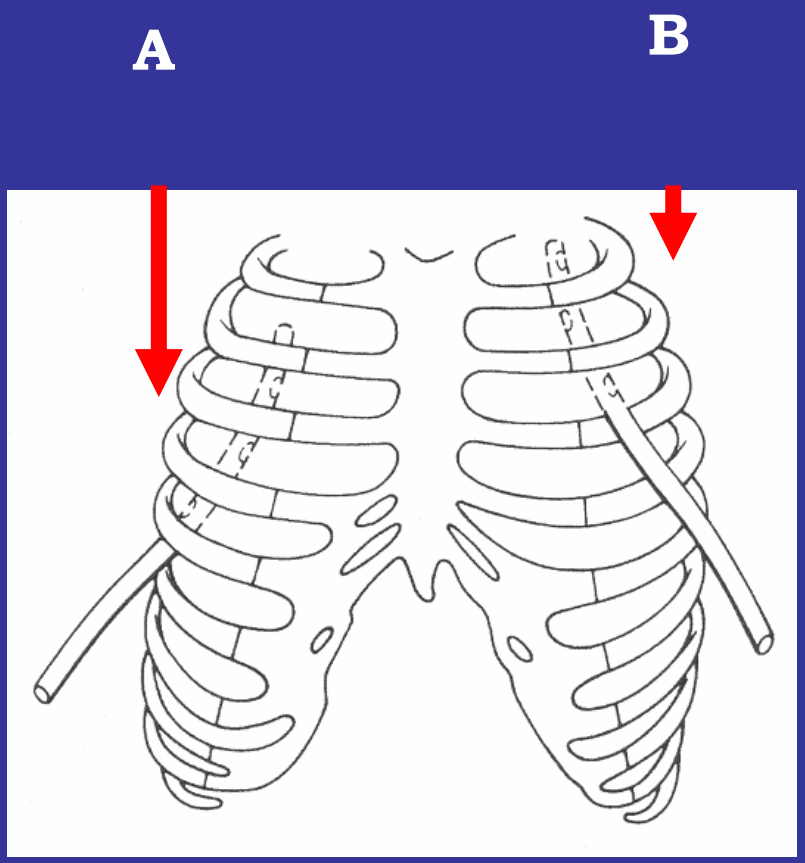
The technique of tracheostomy 4.

13. **Removal of the obturator and inflation of the cuff**
14. **Removal of the holding stitches or tying knots on them**
15. **Skin closure with Donati sutures on both sides of the tube**



Thoracic drainage: chest tubing

1. **Standard places: A: in the midaxillary line** between the 5th-7th ribs or **B: in the mediocclavicular line** between the 2nd-3rd ribs
2. **Penetration: over the upper margin of the rib** (at the lower margin nerves and vessels can be damaged)

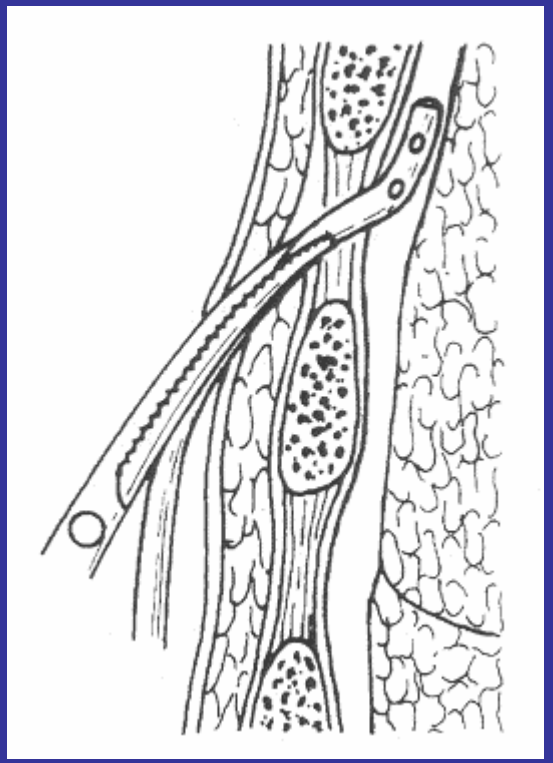


The technique of chest tubing 1.

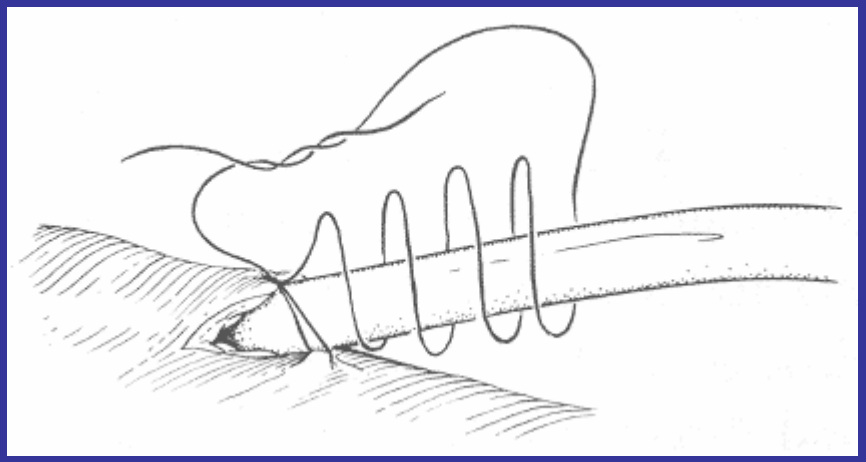
3. 2-3 cm long transverse **skin incision exactly over the upper margin of the rib.** Blunt dissection

4. **Stabbing the parietal pleura with a curved Péan (or trocar)** (then introducing an index finger to explore the pleural cavity and free adhesions)

5. **Introducing a closed drain tube with Péan (or through the trocar)** (in case of pneumothorax, into the apex of the chest)



The technique of chest tubing 2.



6. **Single skin suture to fix the drain,** knotting, wrapping the thread around the tube, tying knot
7. **U-form skin stitch** around the entry of the drain. Winding up the thread on a sponge

The technique of chest tubing 3.

8. **Attaching the tube to a suction system** (wet, dry, Bülau drainage, central suction system, etc.)

Removal of the drain

- **cutting the thread** that fixes the tube
- removal
- the skin wound is closed by **knotting** the „U” stitch.

Execution of the practical:

1. Teacher's presentation (computer room, ~20 min)
2. Scrubbing, gowning, gloving: 5 students/group (2-3 x 10 min = 30 min)
3. Students waiting for scrubbing: peritoneal dialysis in the computer room (1-2 x 4-5 students)
4. 4-6 students/operating table with a teacher
5. Diagnostic peritoneal lavage (20 min)
6. Laparotomy, inspection of abdominal organs, closing the abdomen (60 min)
7. Tracheostomy (30 perc)
8. Chest tubing (20 min)
9. The first group returns to the teaching room to practise peritoneal dialysis.