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Chest Tube Insertion

SICU & TICU

January 2013

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GOALS:

- Describe indications and contraindications for chest tube placement in SICU & TICU
- Describe equipment necessary for procedure.
- Describe pre-procedure steps.
- Describe steps of the procedure.
- Describe post-procedure steps.
- Describe possible complications of procedure.

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INDICATIONS

- Pneumothorax
- Hemothorax
- Pleural Effusions
- Empyema

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CONTRAINDICATIONS

- No absolute contraindications
- Coagulopathy (consider correcting if non-emergent)
- Prior chest surgery (consider adjusting site)
- Rib fractures
- Loculations

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NECESSARY EQUIPMENT:

- Chest Tube insertion tray plus ancillaries
  - or
- Chest Tube insertion kit (pre-packaged)

} See next slide

- Chest tube (36 French or larger)*
- PleuraVac
- Drapes & sterile PPE

* - Occasionally, smaller chest tubes may be used, but this is not typical.

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TOOLS

What you need for each setup

TRAY

Instrument tray

Local anesthetic

Scalpel

Syringe

Needles

Suture

Gauze

KIT

The Kit

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CT INSERTION TRAY

PRO

More instruments

Better instruments

Reusable

CON

No ancillary supplies

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CT INSERTION KIT

PRO

All supplies included

CON

Single use instruments

More expensive

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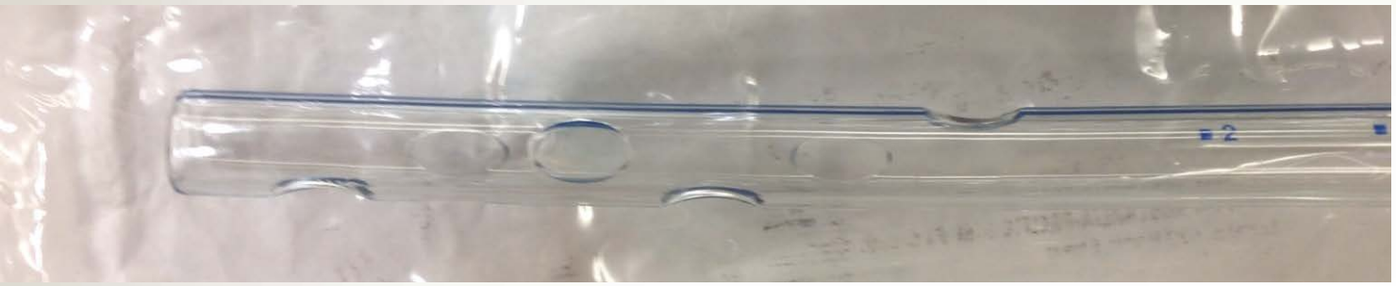
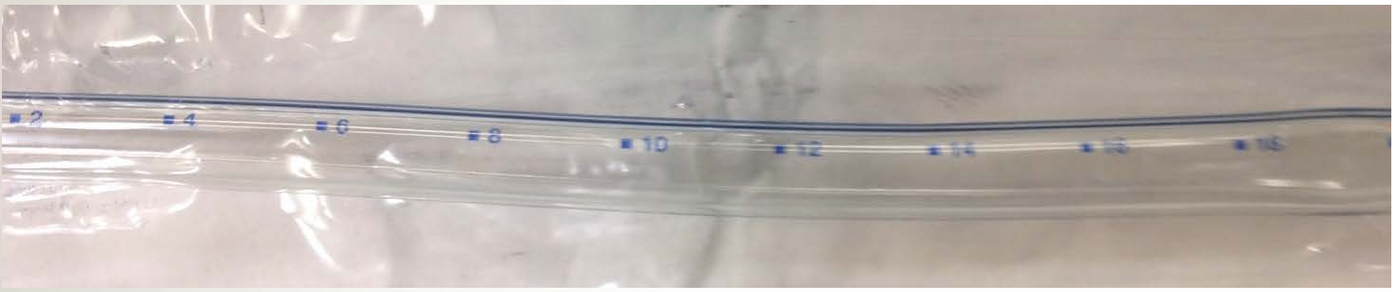
ANATOMY OF A CHEST TUBE



- Tip, with drainage holes and "sentinel eye".



- Body, with distance markings.

- Tail, with taper.

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PRE-PROCEDURE STEPS

- If possible, obtain Informed Consent (a conversation, not a signature)
- Administer antibiotics (1-2 gram Ancef, 30 minutes prior to incision)
- If patient is awake, discuss use of additional sedation with supervising physician
- Set up drainage system, verify functional suction
- Patient position and prep

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DRAINAGE SYSTEM

- VUH uses Atrium Oasis Dry Suction Chest Drain system
- Included ampule of water must be poured into system prior to use
- Pre set at -20 cmH2O suction (adjustable from -10 to -40)
- Suction indicator visually confirms suction is working

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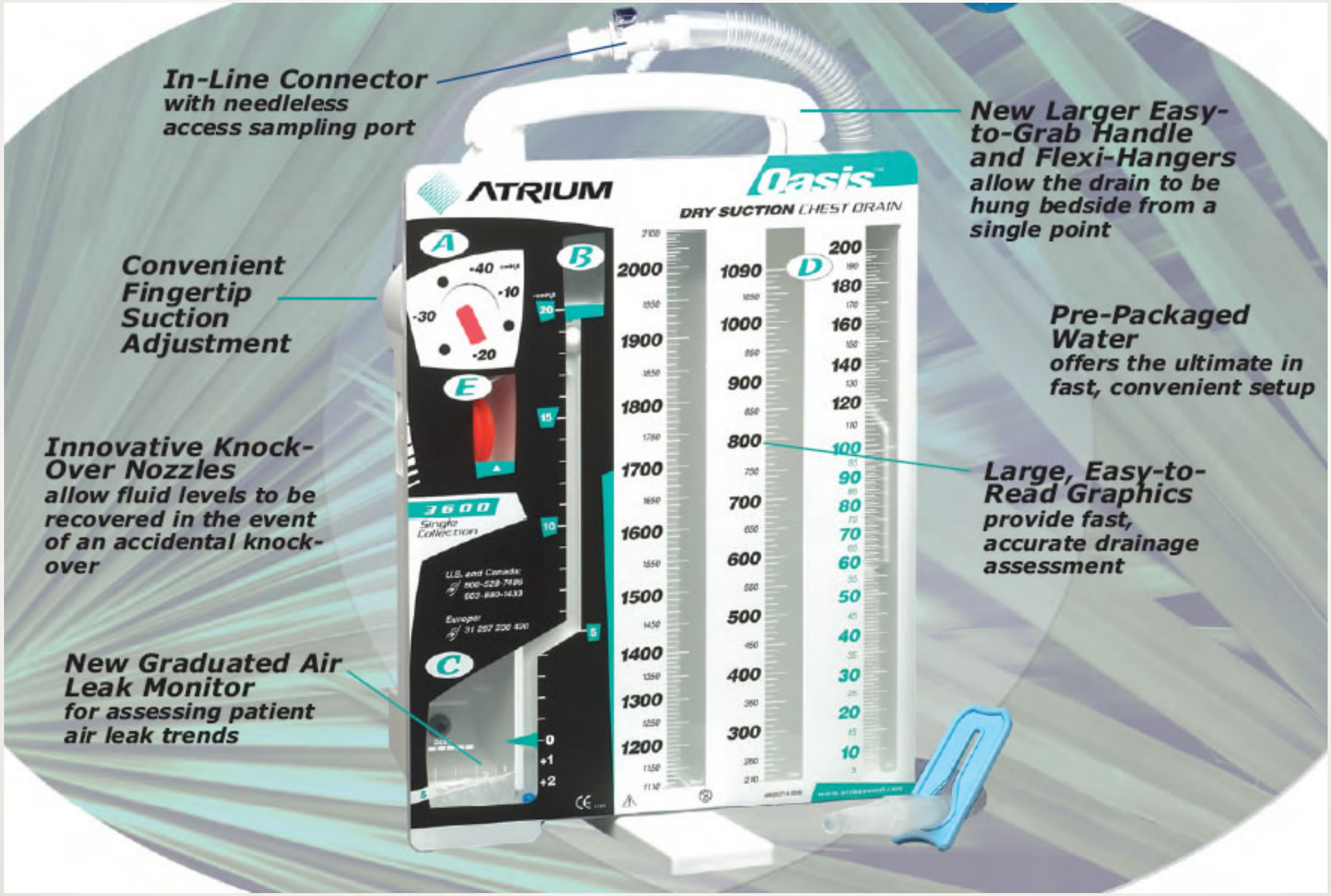
DRAINAGE SYSTEM



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PATIENT POSITIONING

- Place AND SECURE arm over head (patients seem to like "helping out" a lot during this procedure).

- Place chucks under patient at insertion site (the bedside nurse will love you).

- Raise bed to comfortable height.

- Consider supplemental Oxygen.

- Clear insertion site of EKG leads, dressings, etc.

- Consider marking insertion site (prior to prep/drape)

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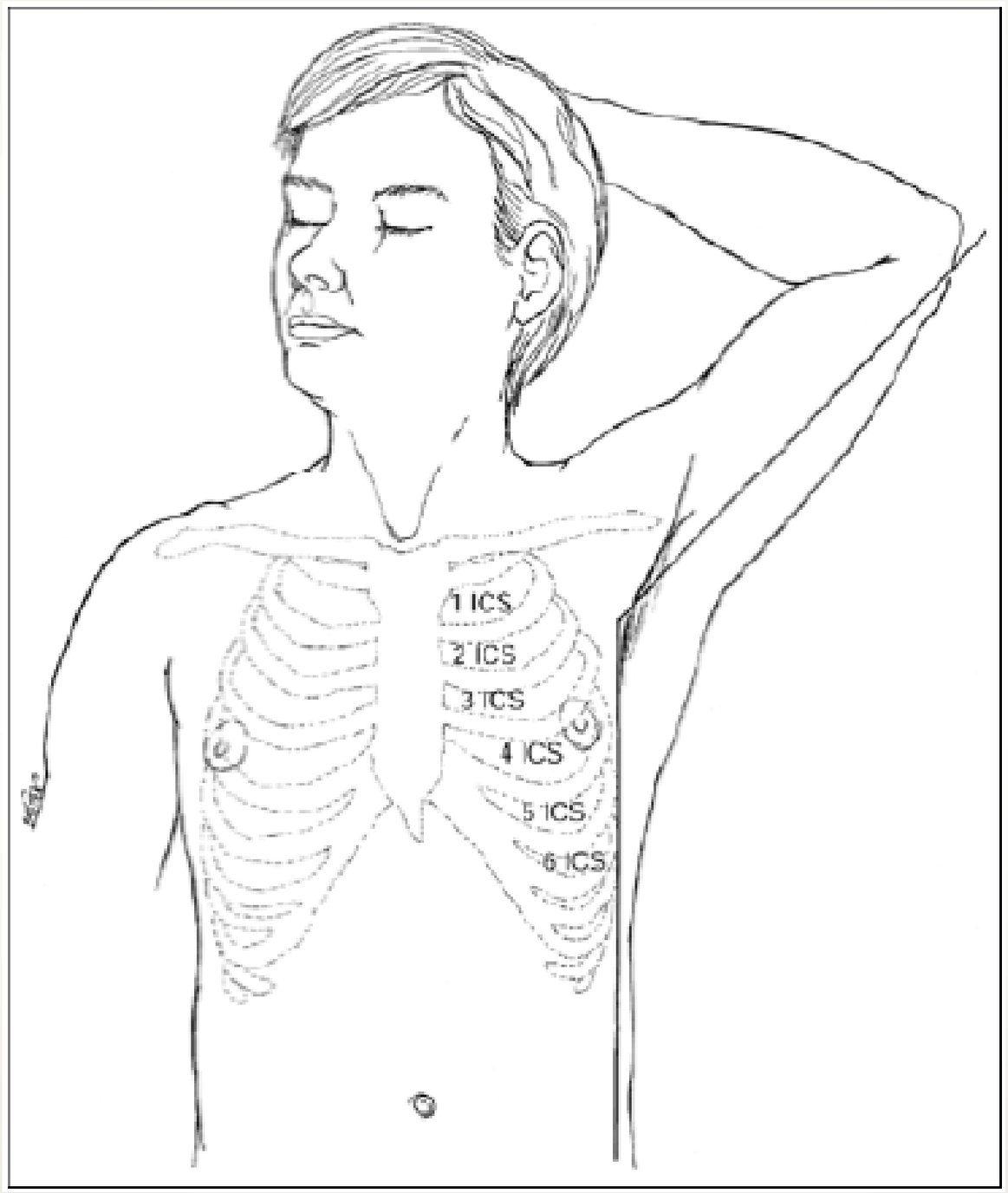
PATIENT POSITIONING



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LOCATION

- Insertion site should be no lower than 5th intercostal space. This avoids intra-abdominal placement
- Place between anterior and midaxillary lines
- Direct anteriorly or posteriorly for pneumothorax
- Direct posteriorly for effusions
- Avoid inserting into fissure by directing the tube

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STEPS OF THE PROCEDURE

- Sterile prep and drape
- Local anesthetic
- Prepare the tube
- Incision and dissection
- Insertion of tube
- Secure tube
- Connect to pleuravac
- Apply dressing

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STERILE PREP & DRAPE

- Full sterile technique
- Mask & cap for everyone in room
- Chlorhexidine skin prep
- Square off with towels
- Include nipple in field
- Full body drape

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STERILE PREP & DRAPE

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LOCAL ANESTHETIC

- Skin
- Subcutaneous tissue
- Periosteum
- Parietal pleura
- Insertion tract

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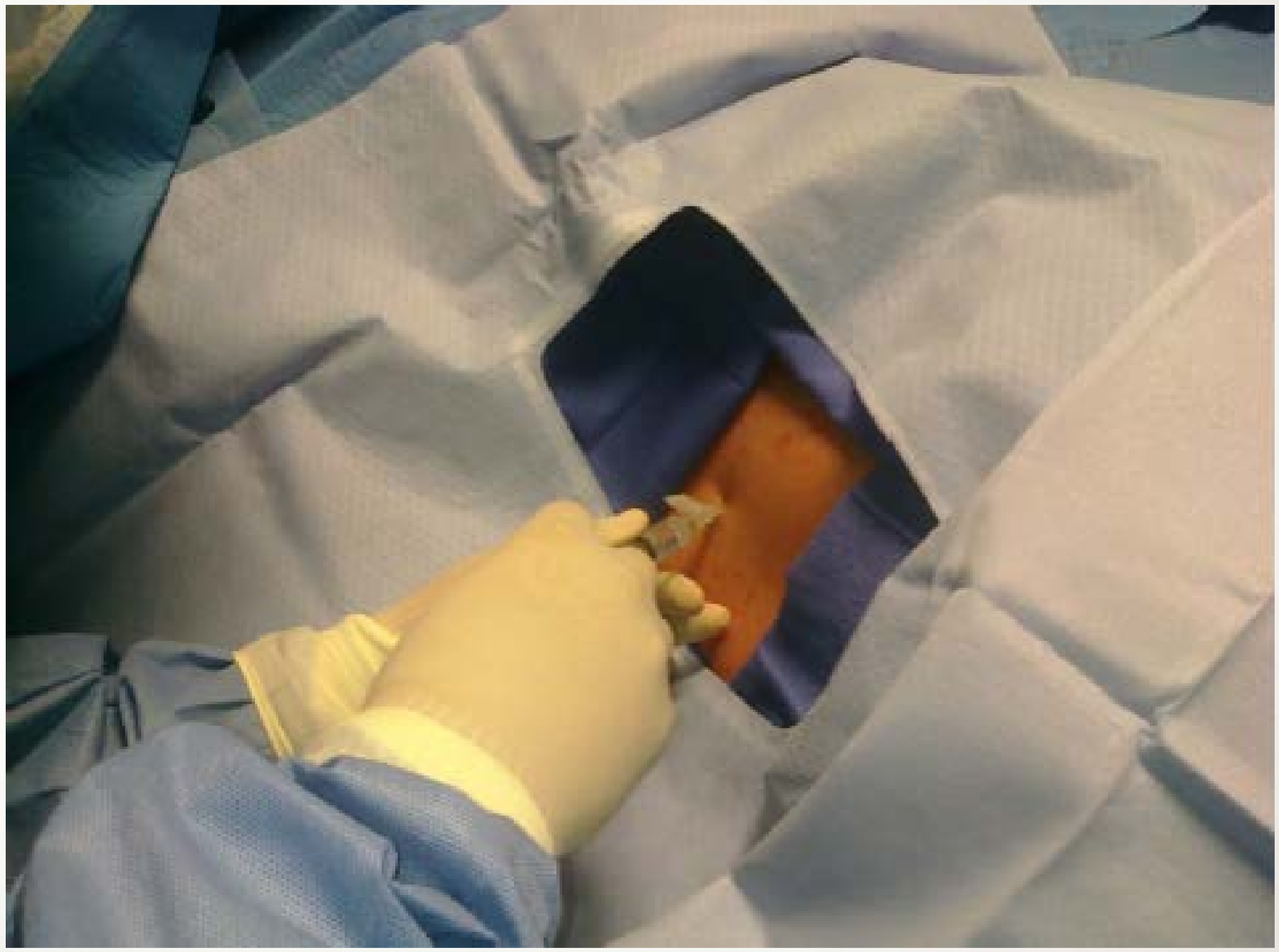

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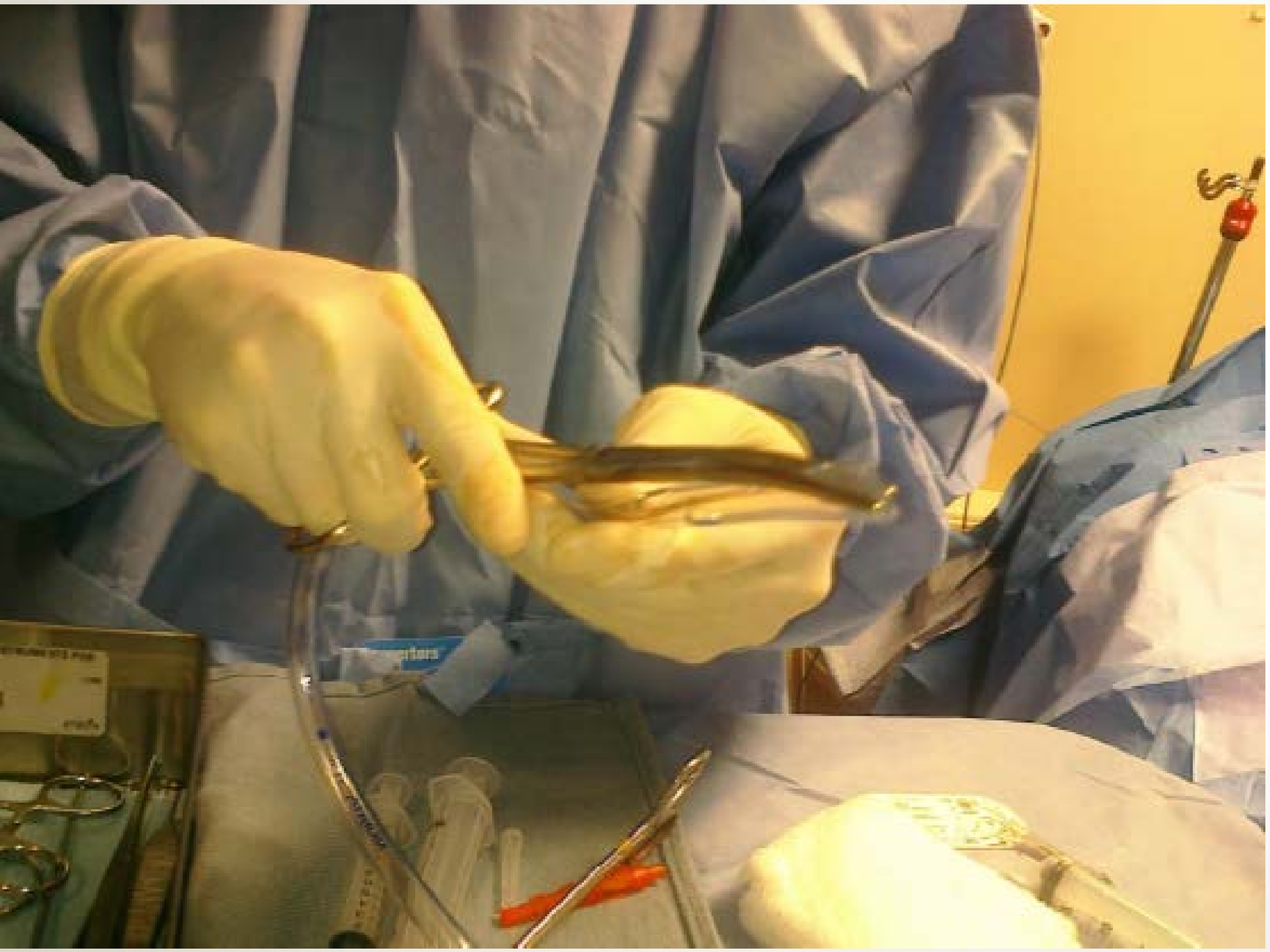
PREPARE THE TUBE



- Place clamp on tip for insertion.
- Do not let instrument tip pass the end of the tube.

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PREPARE THE TUBE

- Cut tube at widest portion of the tail
- Place a clamp 5 cm from end, to keep your shoes dry.

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INCISION AND DISSECTION

- Make incision big enough to accommodate index finger and chest tube, about 3 cm.

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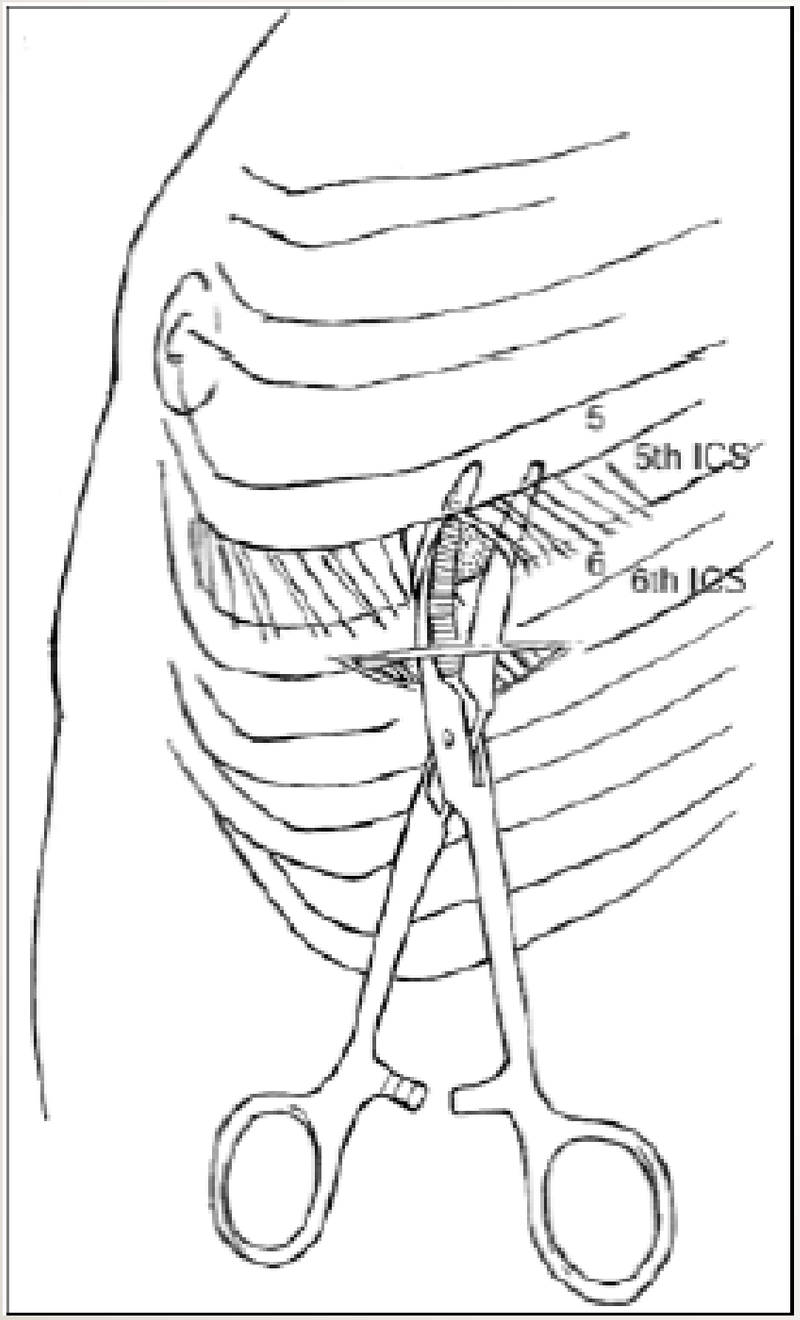
INCISION AND DISSECTION



- Use large clamp to dissect cephalad, tunneling up at least one rib space
- Once at the rib, place the tips of the clamp at the superior edge of the rib and apply firm pressure to pass through the parietal pleura.

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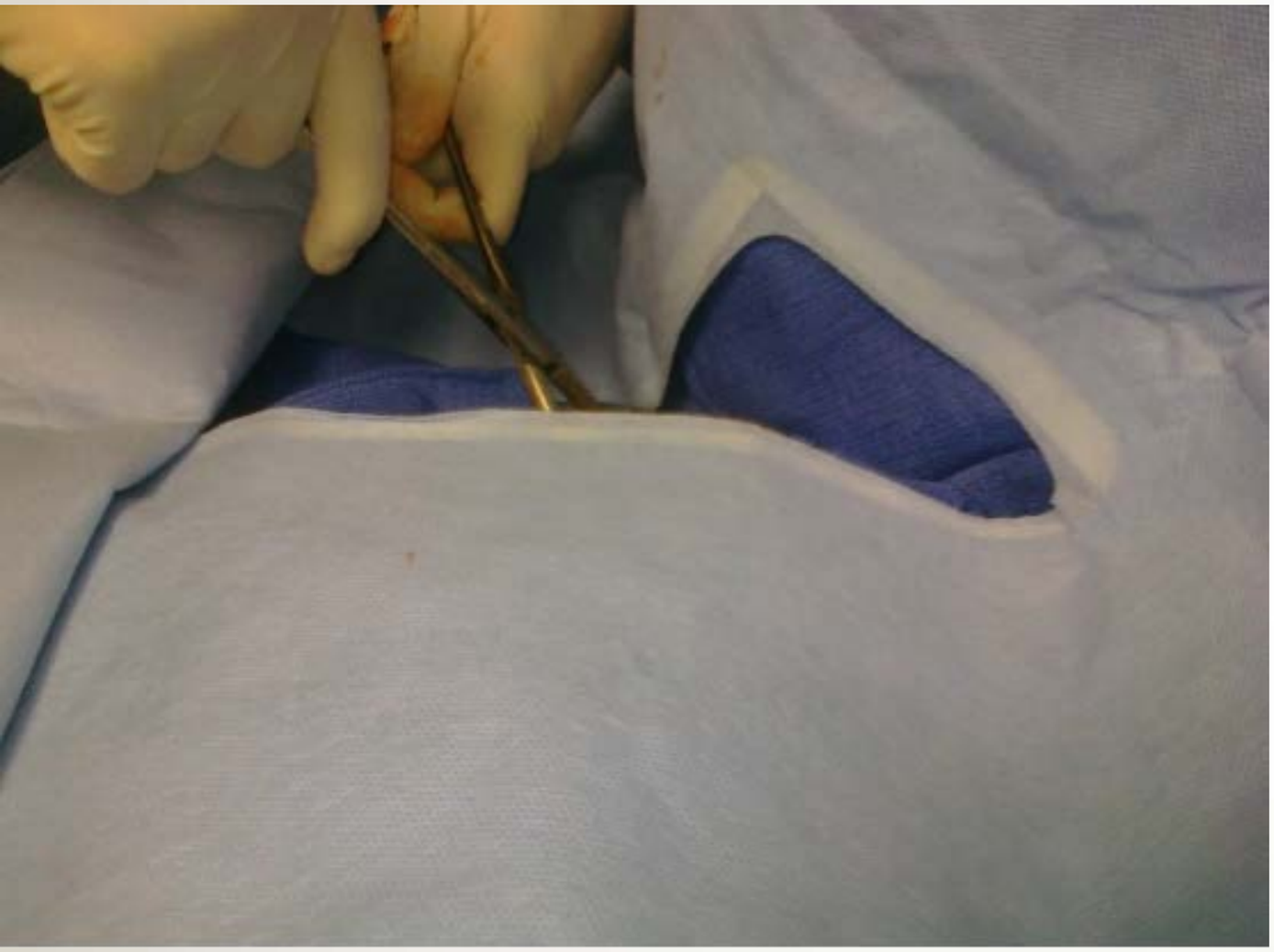
INCISION AND DISSECTION



- Spread instrument parallel to rib, wide and using two hands, to make adequate space.
- Insert finger into thoracic space to confirm thoracostomy, and free any local adhesions.

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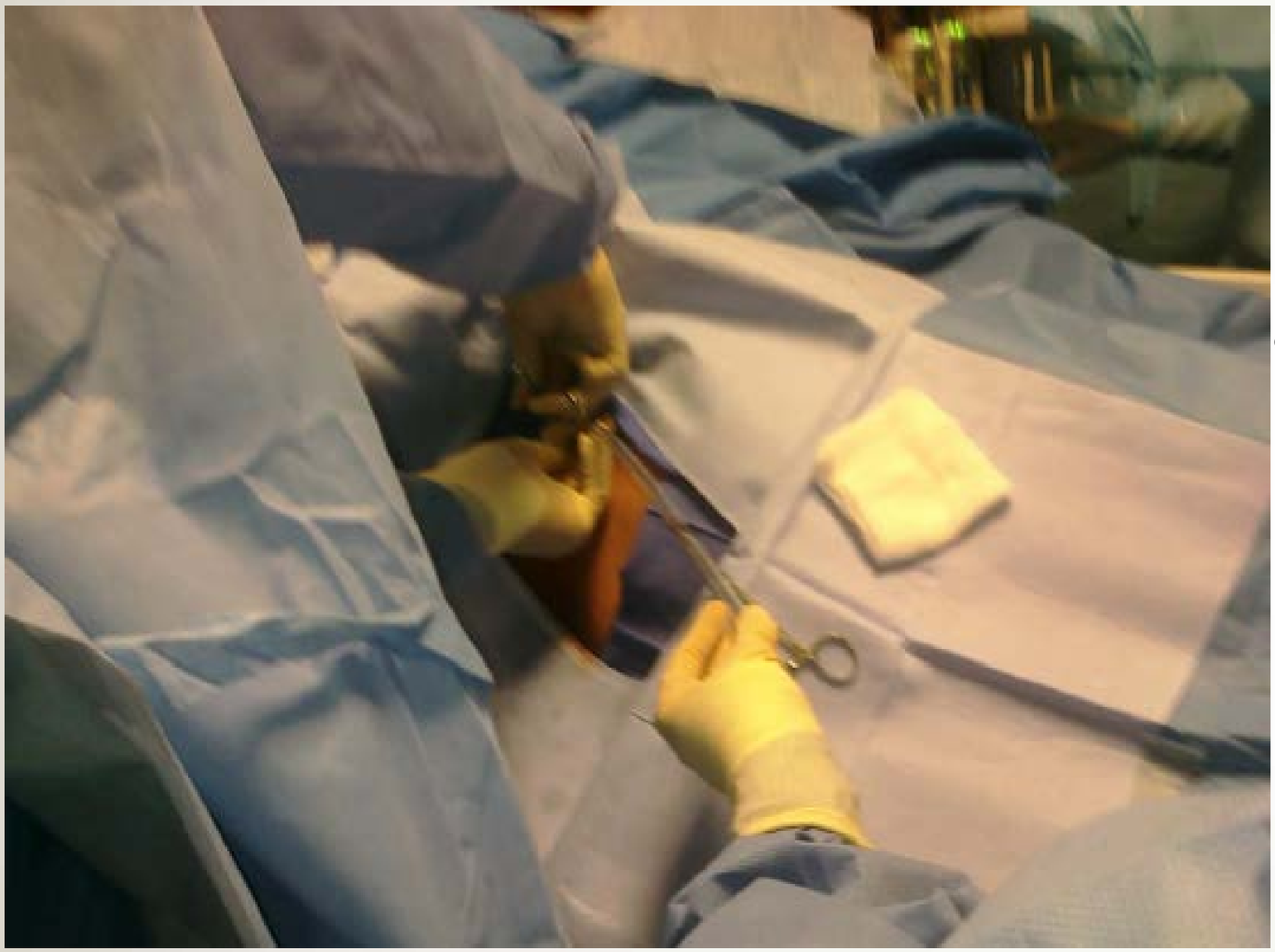
INSERTION OF TUBE



- Use clamp on tip to insert tube along tract, and into thoracic space

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ALTERNATE METHOD

- Use Insertion Guide in Kit instead of clamp at tip of tube.

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INSERTION OF TUBE

- Direct tube cephalad.
- Direct tube along chest wall to avoid placement in fissure.
- Rotate tube while inserting to assist with guiding.
- Insert until meeting resistance.
- Ensure last hole is within pleural space.
- Take note of distance marker at skin level. Should be 10-14 cm in normal person.

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TUBE INSERTED

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CONFIRMATION OF TUBE IN PLEURAL SPACE

- Palpation
- Return of blood or effusion
- Fogging of chest tube

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SECURING THE TUBE

- Secure before attaching to drainage system.
- Use heavy gauge permanent suture (#0 silk, #1 ethibond).
- Large cutting needle.
- Primary purpose of suture is to secure tube, not to close incision.

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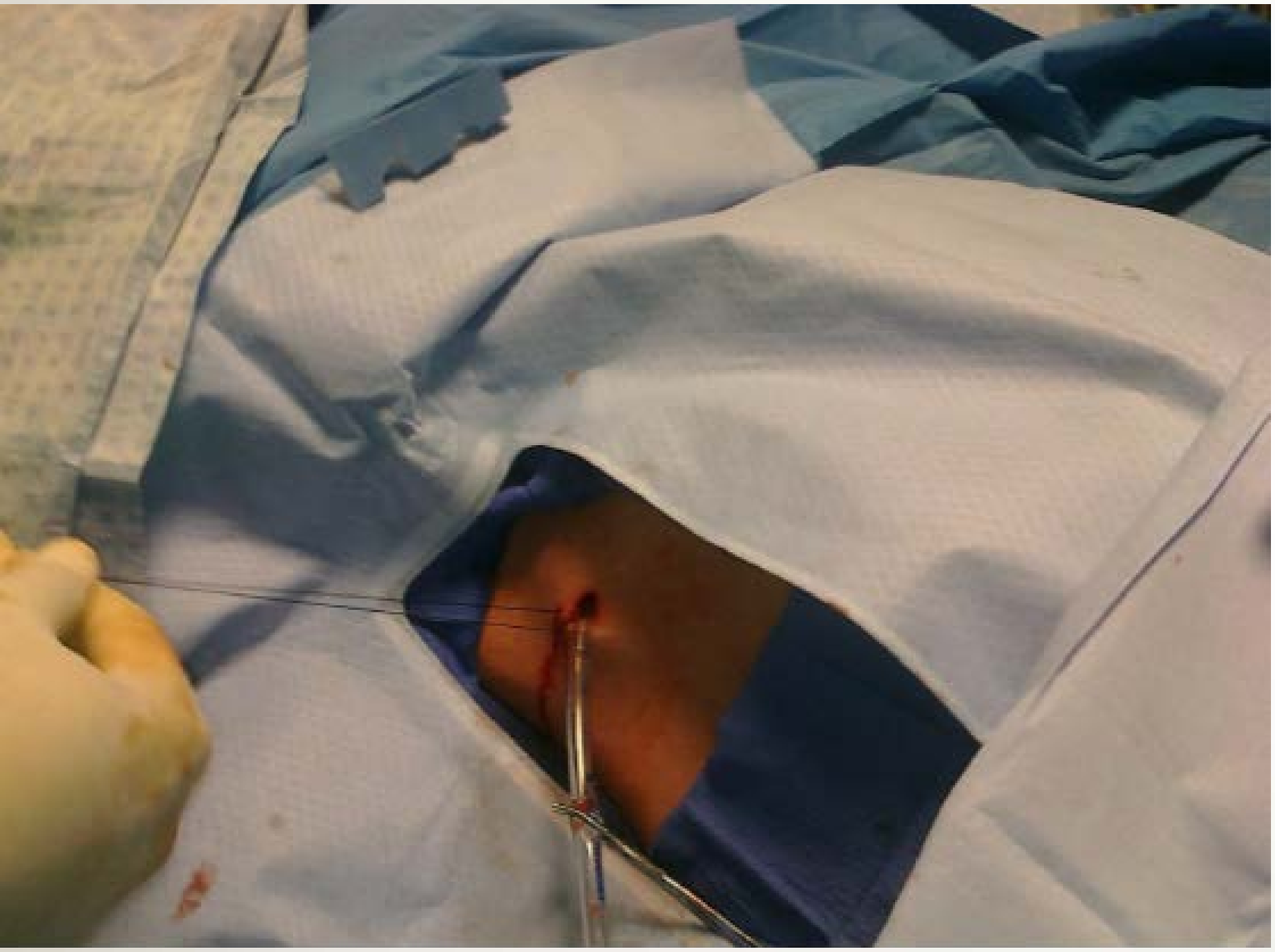
SECURING THE TUBE



- Place across incision so as to partially close the incision
- Verify unchanged position of distance marker
- Wrap suture around chest tube twice and tie knot. Repeat.

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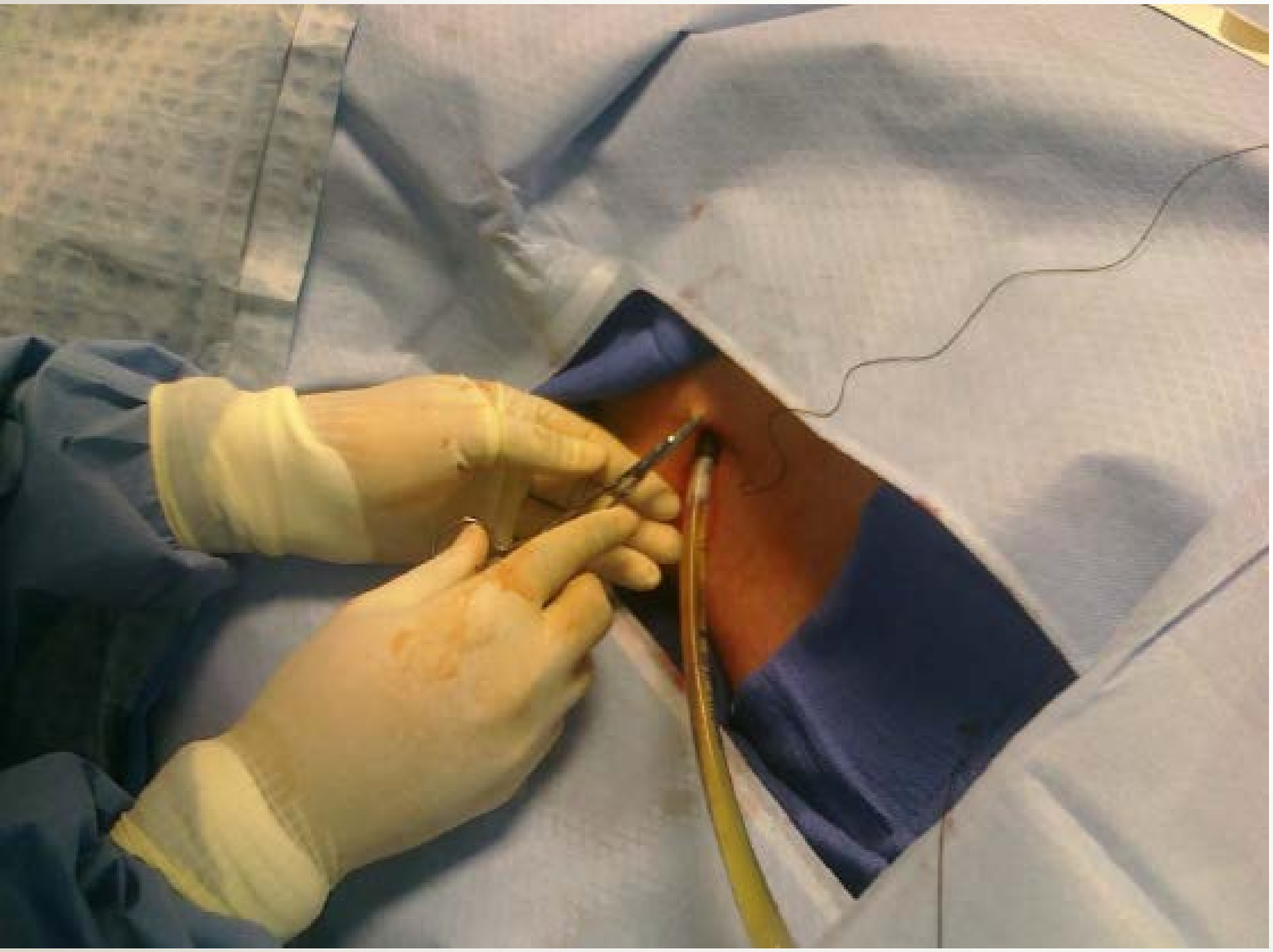
SECURING THE TUBE



- Consider placing a second stitch to close the incision and prevent further drainage around the tube

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CONNECT TO PLEURAVAC

- The tip of the pleuravac tubing is covered and sterile.

- Have assistant remove the cover and connect the tubing to the chest tube.

- Remove Kelley clamp.

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CONNECT TO PLEURAVAC

- Assess volume output from thorax

- If >1500 ml, then consider taking off suction to prevent flash pulmonary edema

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APPLY DRESSING

- Vaseline gauze or Xeroform are not typically used.
- Apply 4x4's to insertion site, and secure with tape.
- Apply tape to junction of chest tube and drainage system tubing

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APPLY DRESSING

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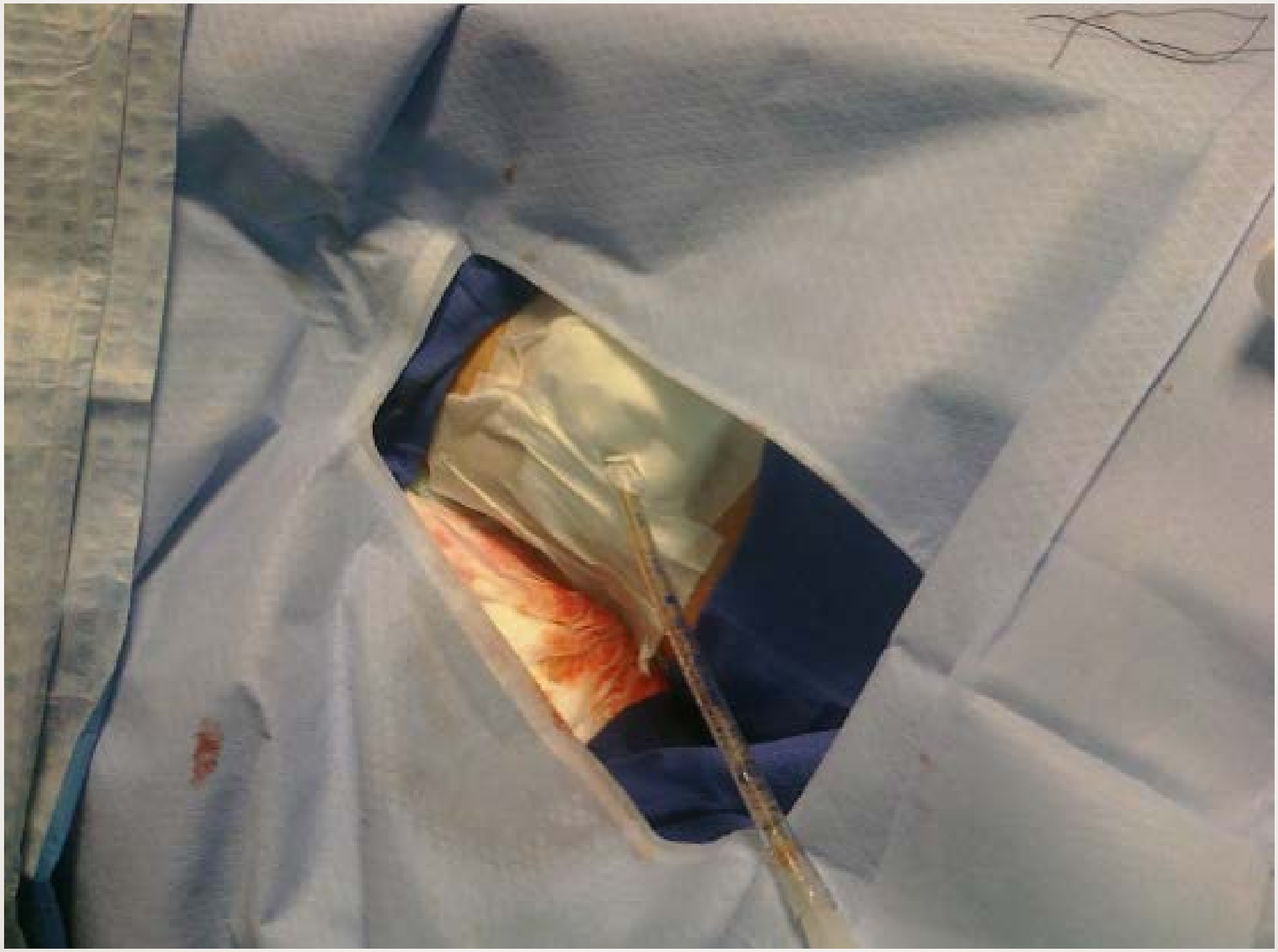

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APPLY DRESSING

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POST-PROCEDURE

- Verify functional pleuravac.
- Quantify initial output and size of air-leak.
- Order chest x-ray.
- Complete procedure note.
- Log procedure in log book
- Follow chest tube management guidelines found at www.traumaburn.com

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COMPLICATIONS

- Malpositioned Tube
- Persistent pneumothorax or Hemothorax
- Hemorrhage
- Parenchymal Lung injury
- Empyema

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CREDITS

- Revised January 2013

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- Created July 2010

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