BEYOND THE SLIDES 2015

1st UDINE ECMO WORKSHOP

Vessels Cannulation: technical pittfals

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ECMO VA: choice of cannulation

- Peripheral femoro-femoral

  Cardiogenic shock
  Unoperated patient
  Fulminant myocarditis/AMI
  Decompensation of chronic HF

- Peripheral femoro-axillary

  Cardiogenic shock
  Unoperated patient
  Unusable femoral arteries

- Central thorugh sternotomy

  Postcardiotomy shock
  Unusable peripheral vessels (small size)

ECMO VA: choice of cannulation

Peripheral

PROS

- Easy and quick
- bedside, no OR required
- even percutaneous

CONS

- unfeasible in very small/diseased vessels
- no LV venting
- no patient mobilization (femoral)

Complications

- Bleeding, vacular injuries, leg ischemia/ venous stasis, infection

Central

PROS

- no cannulas size restrictions
- possible LV venting

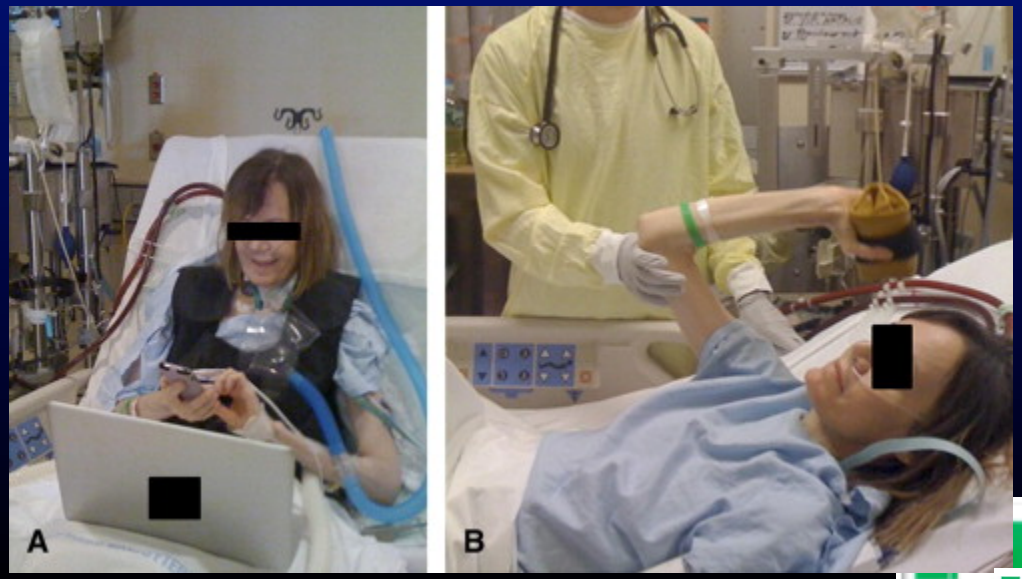
CONS

- OR/sternotomy required
- Invasivness
- no patient mobilization

Complications

- bleeding, cardiac injuries, infections

Peripheral ECMO VA cannulations



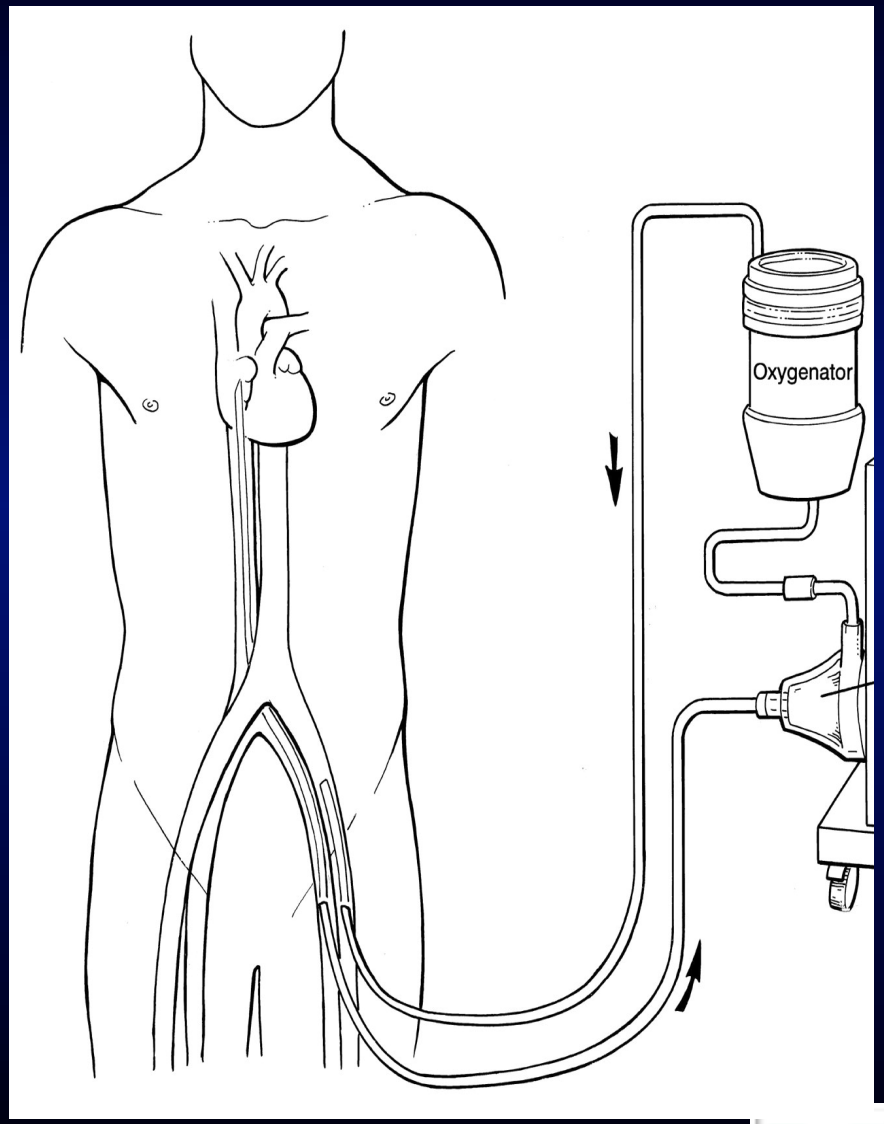
Peripheral VACannulation

General principles

- arteria/venous omolateral cannulation
  - (contralateral IABP)
- Inflow in common femoral artery
  - profunda femoris collaterals
- graft interposition
- Semi-open Seldinger technique with distal perfusion
- vessel purse string
- tourniquets loked cannulas
- skin tied-up cannulas
- Silastic vascular loop in situ

Peripheral ECMO VA cannulations

- femoral vessels
- axillary artery
- neck vessels
- percutaneos/surgical
- Venous cannula: 24 Fr
- Arterial cannula: 17-20 Fr



Peripheral VA cannulation

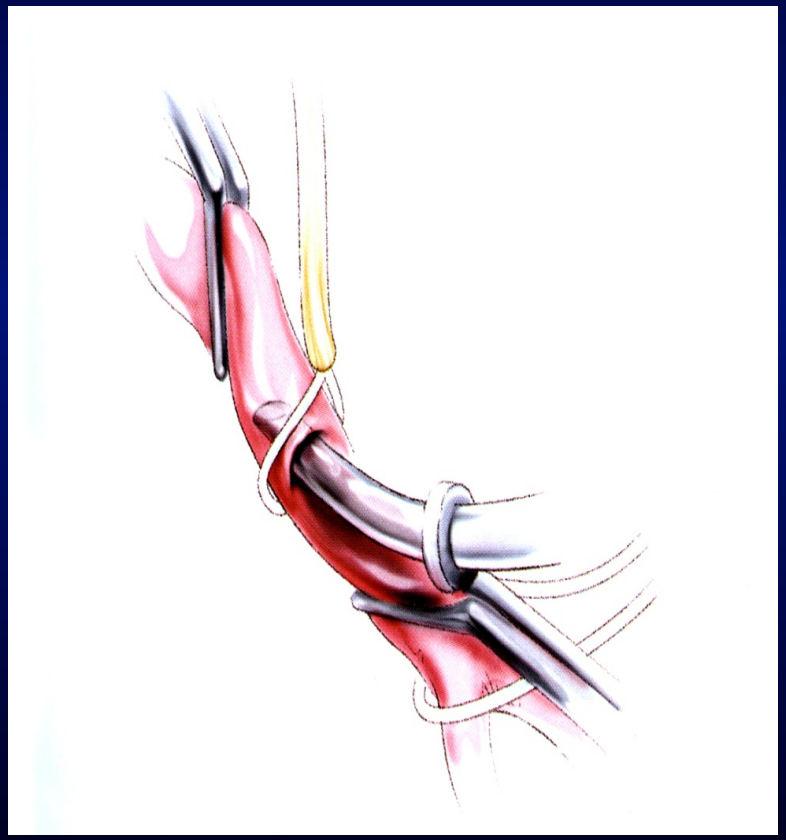
Open technique

PROS

- surgical view
- low arterial injuries risk

CONS

- Invasive
- vascular Xclamp
- arterial wall reconstruction
- infection



Peripheral VA Cannulation

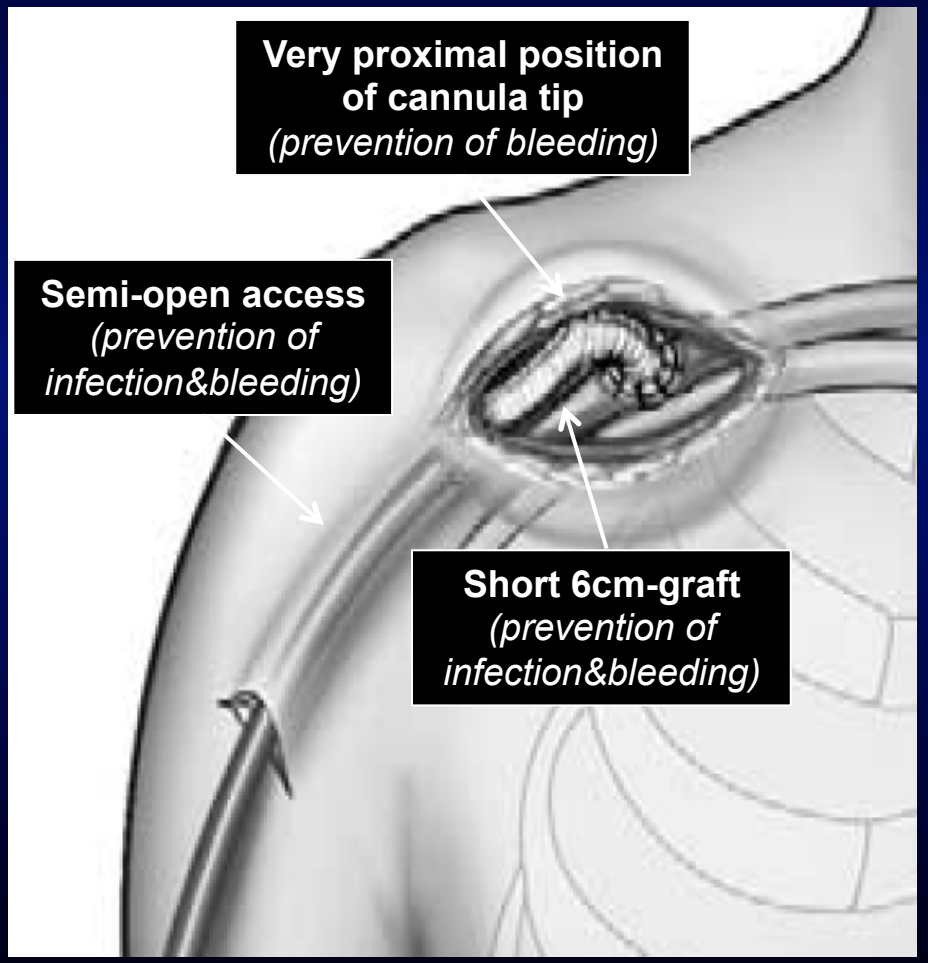
Surgical open technique – graft interposition

PRO

- no direct cannulation
- forward/backward flow
    - no distal ischemia

CONS

- arterial Xclamp
- graf anstomosis
- transient arm oedema
- graft oozing
- graft/wound infection



Peripheral VA cannulation

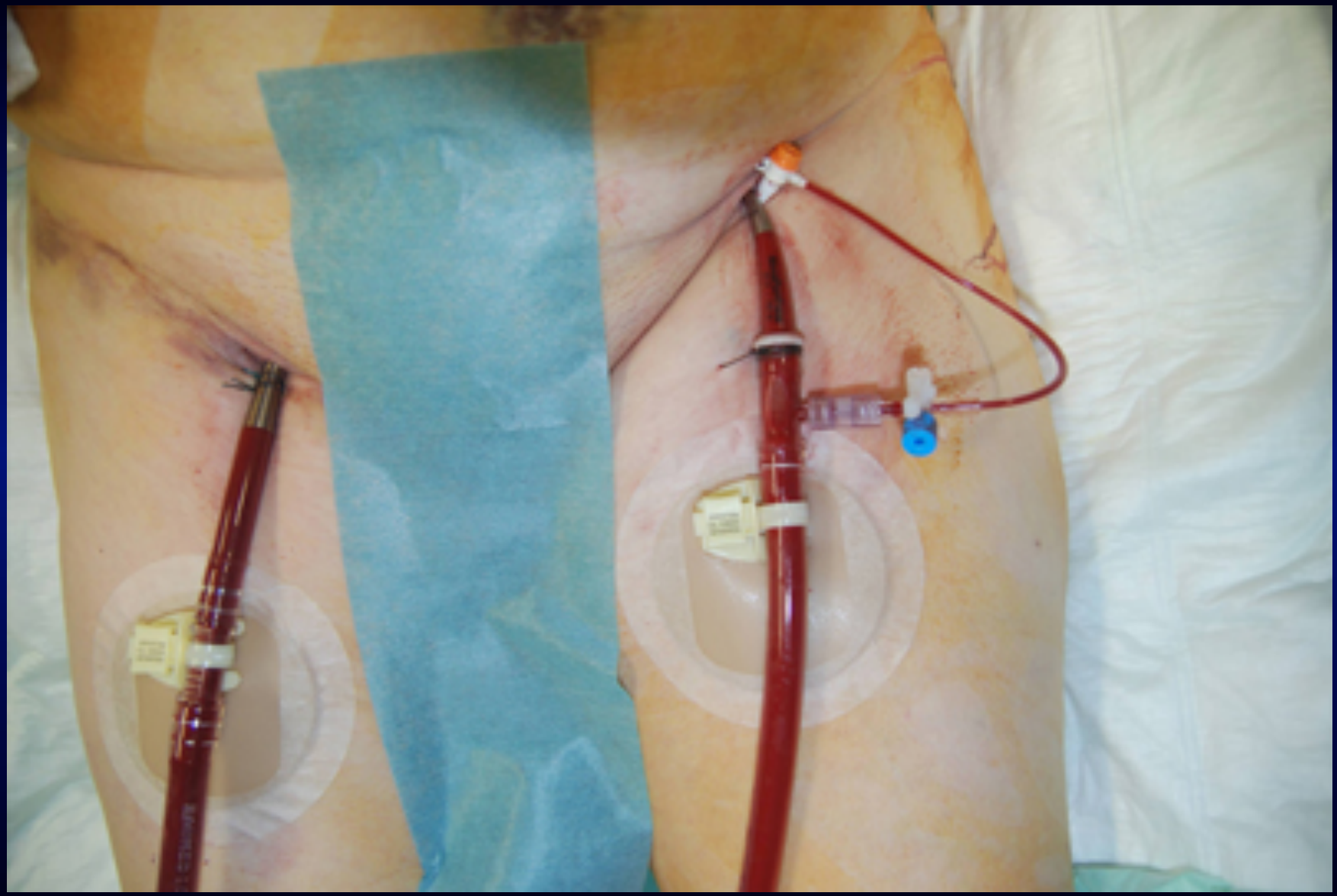
Seldinger technique

PROS

- Percutaneous
- no incision
- no arterial Xclamp

CONS

- no vascular exposure
- risk of arterial dissection
- risk of retroperitoneal hematoma
- unlocked cannula
- *blind* cannula removal



Peripheral VACannulation

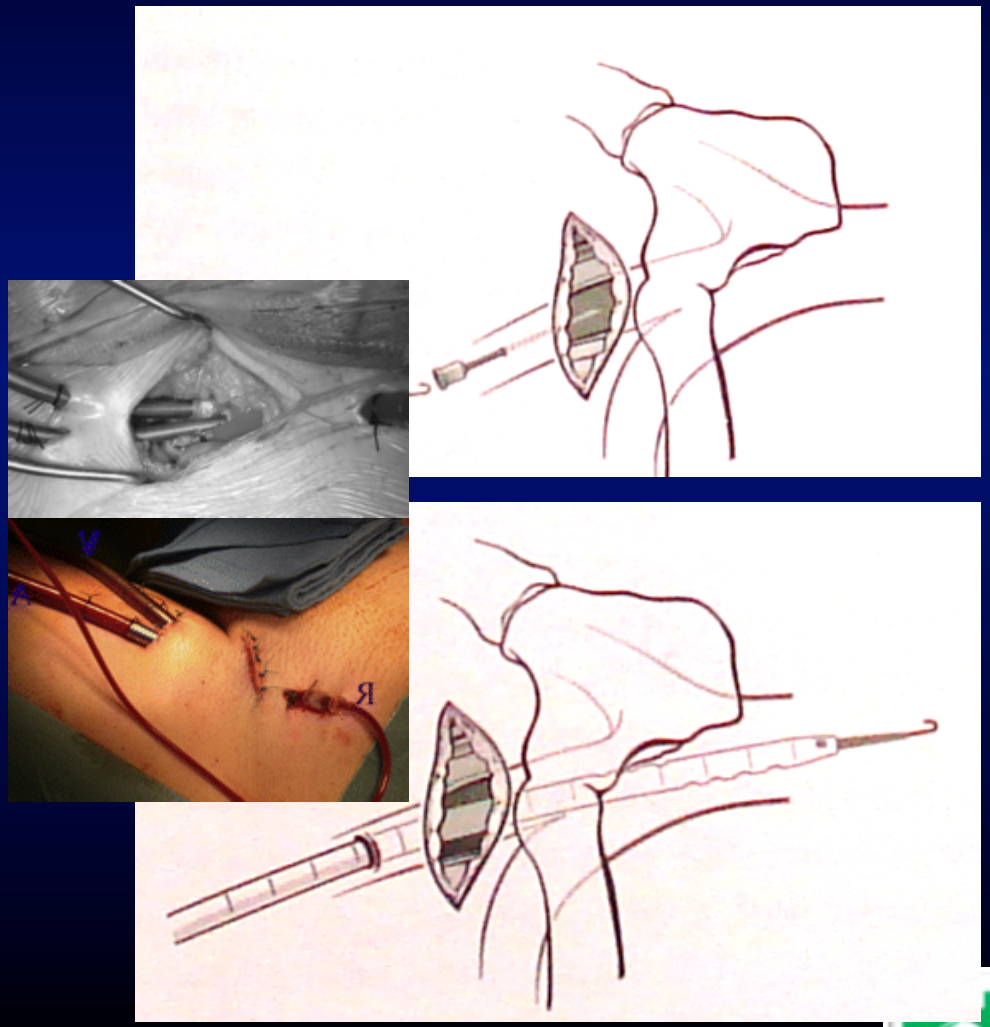
Semi-open Seldinger technique

PROS

- direct vessel vision
- no arterial Xclamp
- percutaneous cannulas

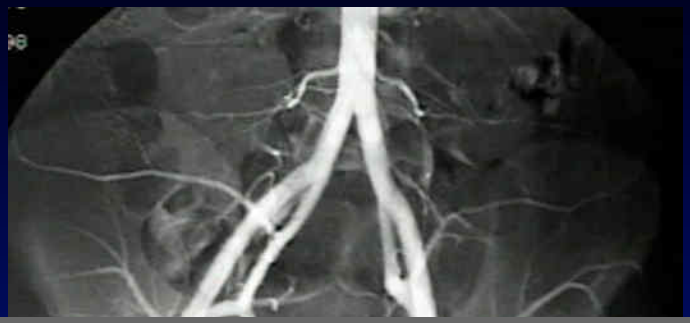
CONS

- wound infection risk



Femoral vessel status

- Vessel diameter (20 Fr cannulas!)
- Tortuosity



Definite risk of inadvertent vascular injury during peripheral cannulation

pre-ECMO assessment of femoral vessel status is very often unfeasible

VA-ECMO: distal pefusion setting

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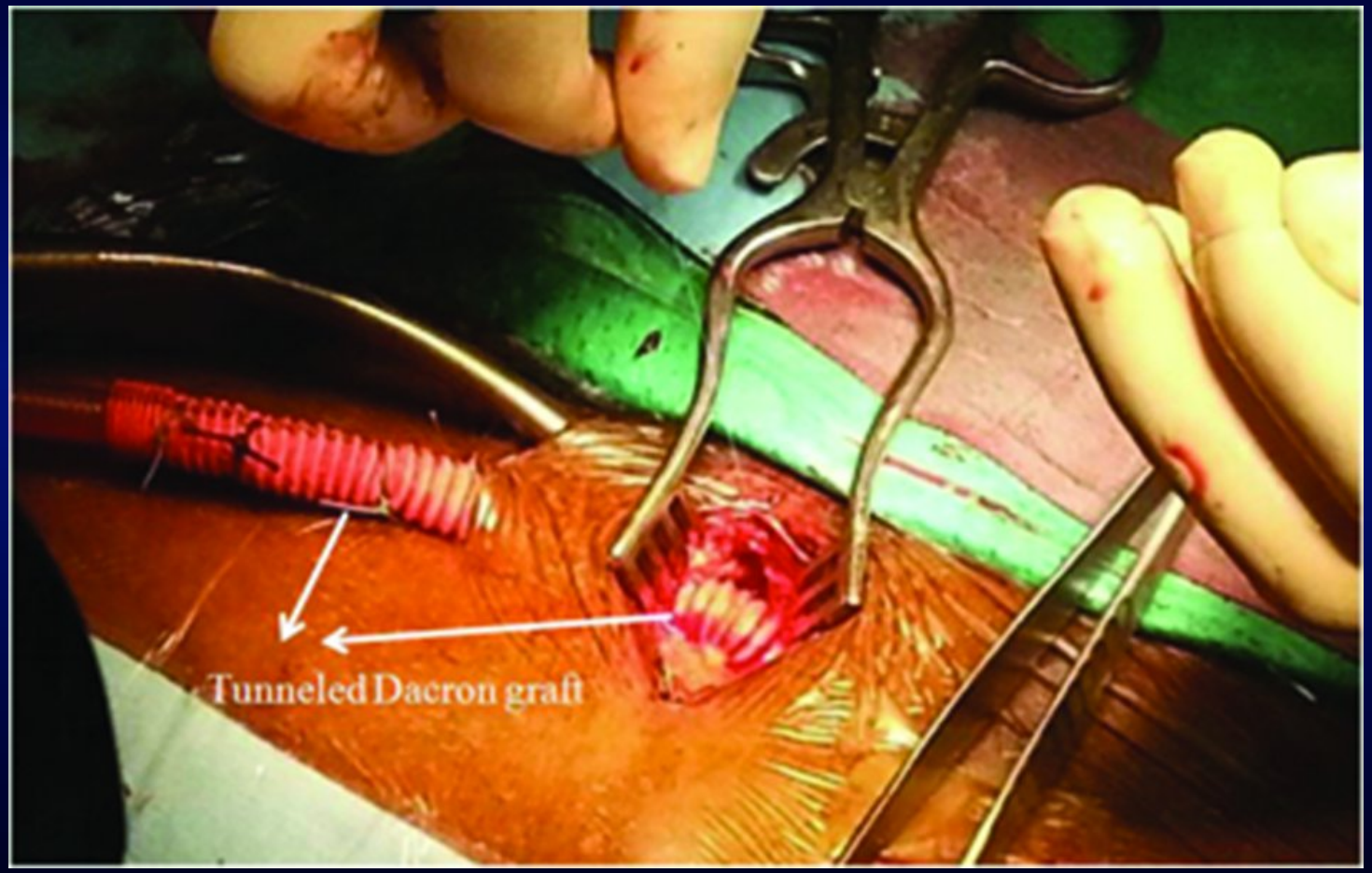
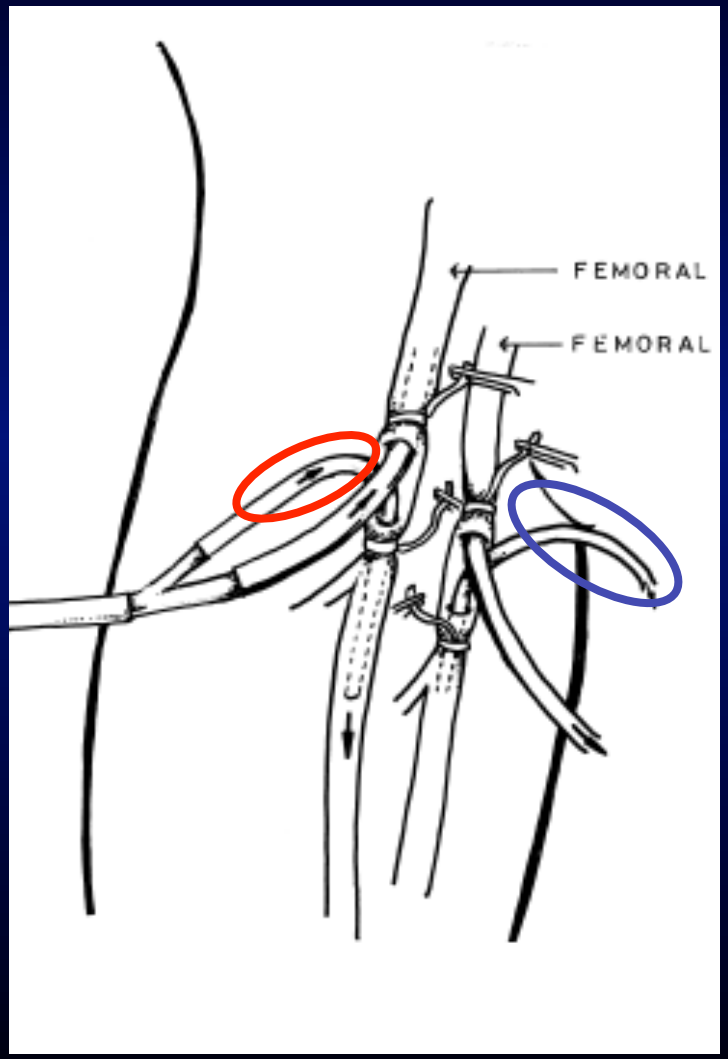
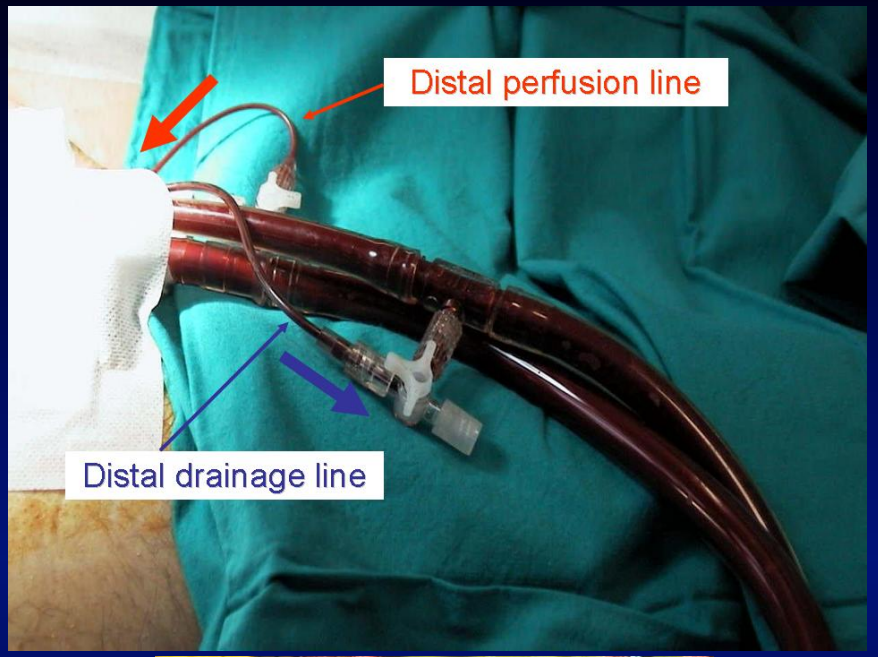
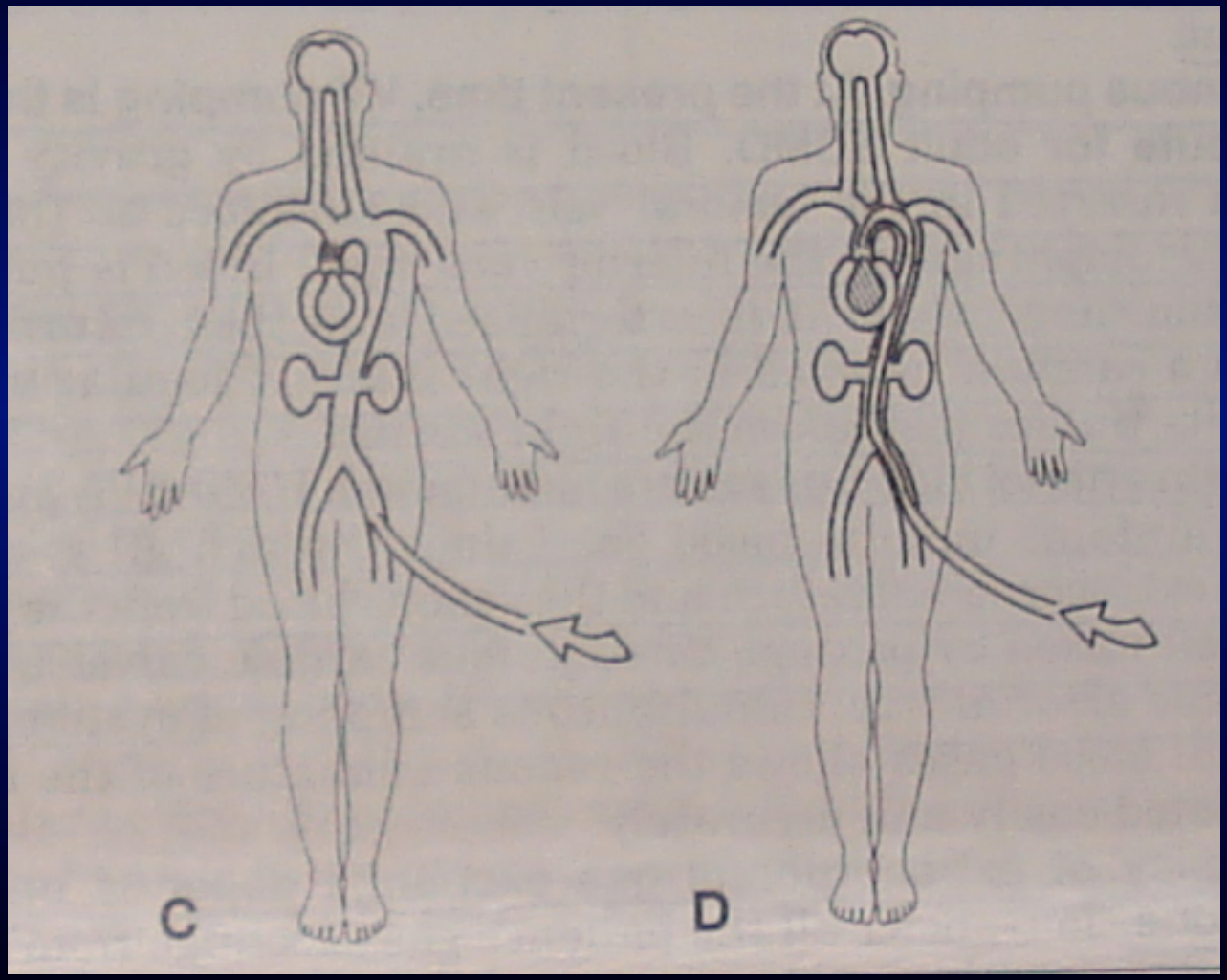


VA-ECMO: distal pefusion setting

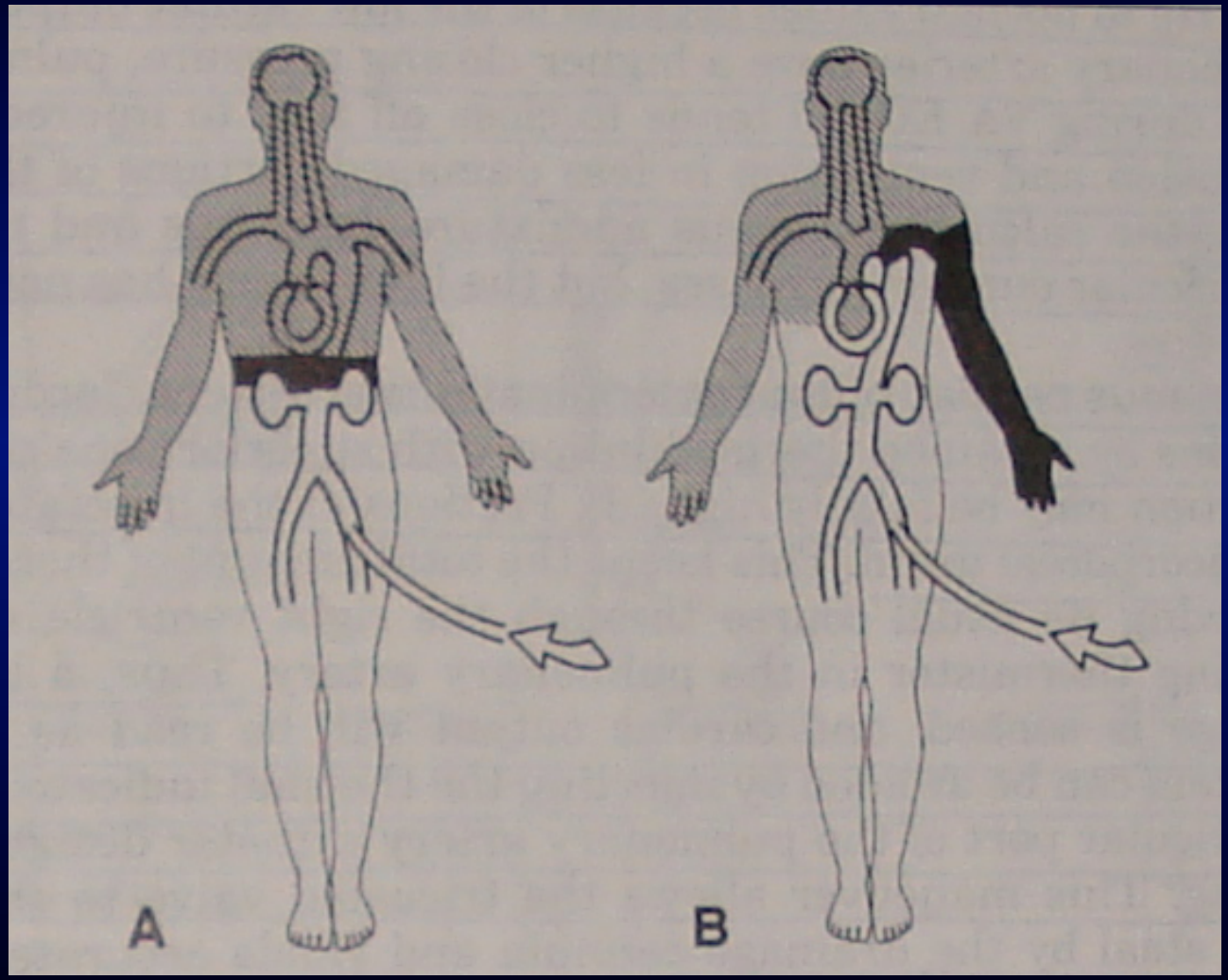




Pulmonary shunt: the Harlequin syndrome



Pulmonary shunt: the Harlequin syndrome



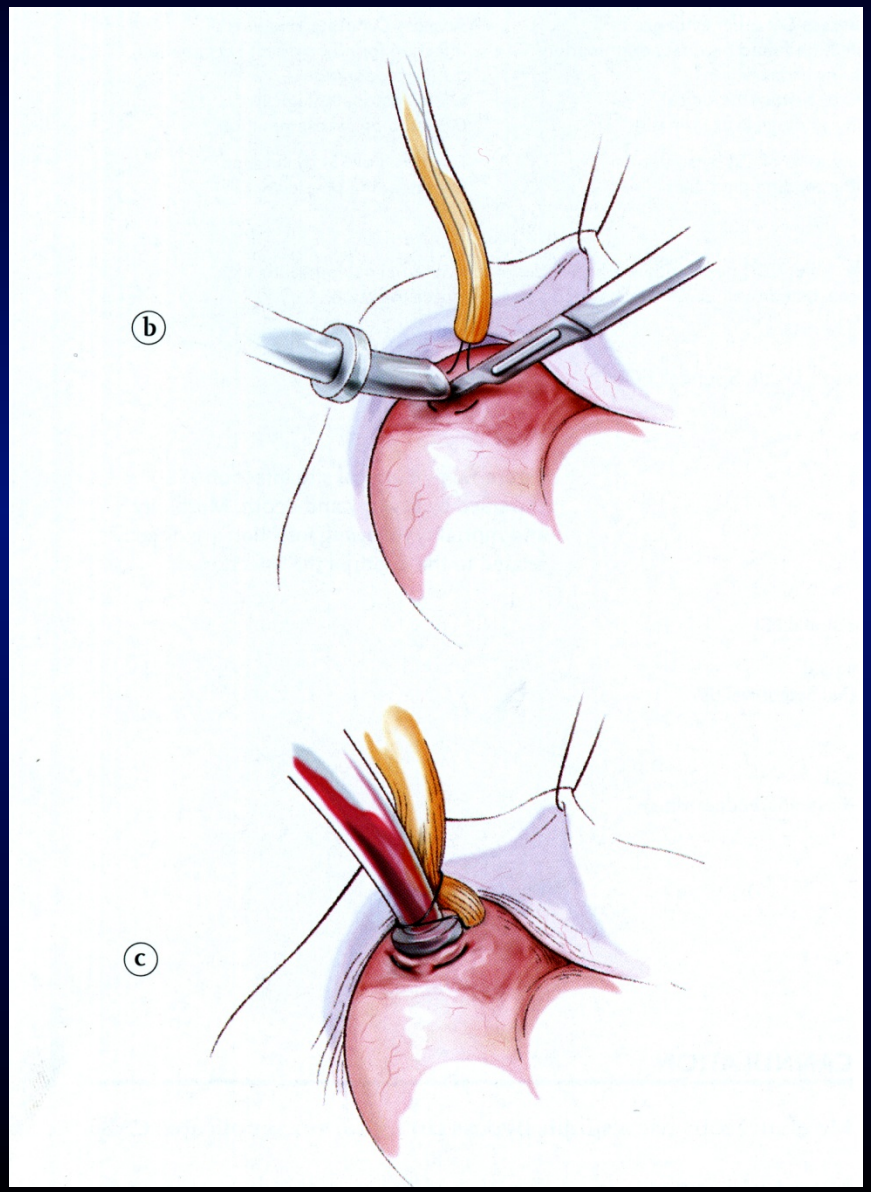
VA-ECMO Central access (sternotomy)

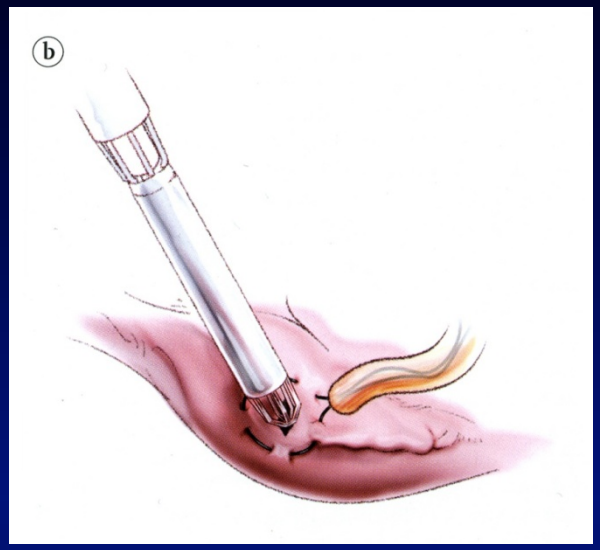
- postacardiotomy suppport
- very small/diseased femoral vessels

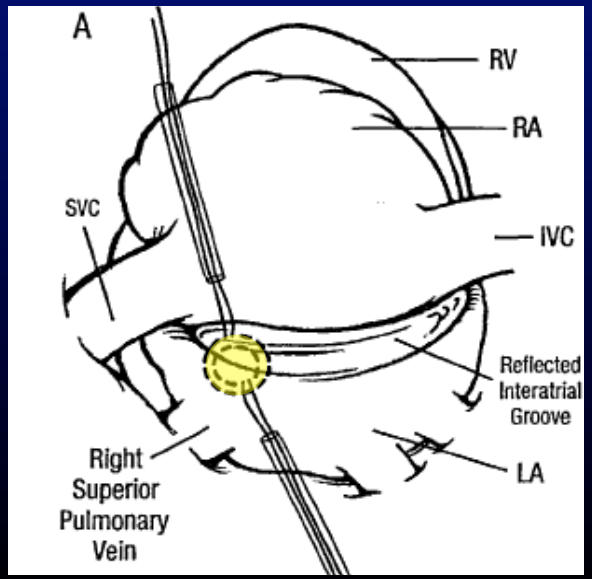
Alternative central cannulations:

- upper ministernotomy
- II ic space right minithoracotomy (arterial)
- V ic space left minithoracomy (LV apex)

Centrale VA Cannulazione



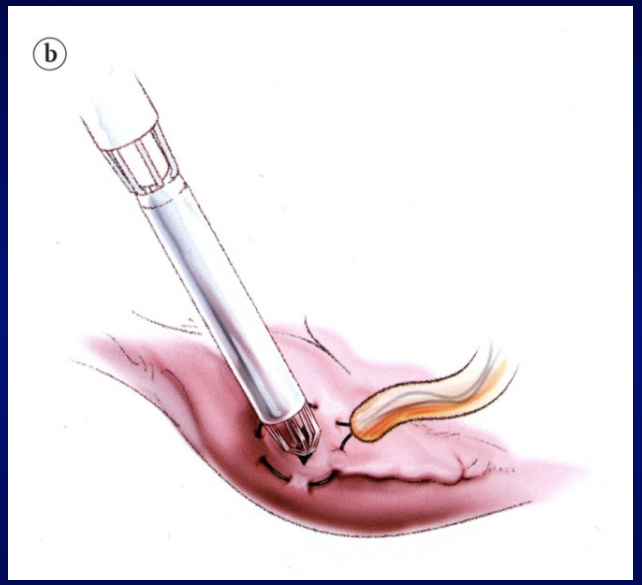




Central VA Cannulation

General Principles

- double pledget purse string
- tourniquet locked cannulas
- selective transcutaneous path
- skin tied-up cannulas
- meticolous surgical hemostasis
- chest waal reconstrunction (syntetic patch)



LV Venting

General Principles

- not always necessary
- right superior pulmonary vein

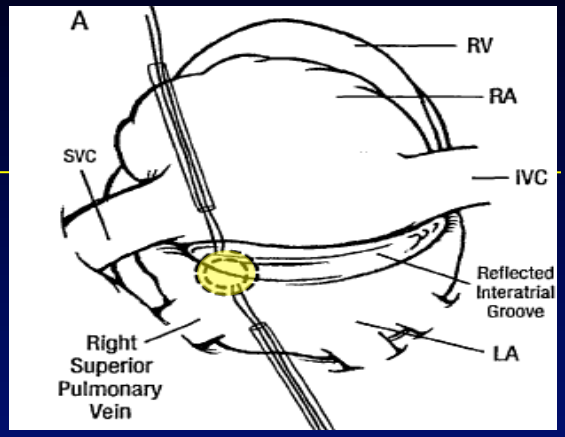
Alternative sites in peripheral VA ECMO

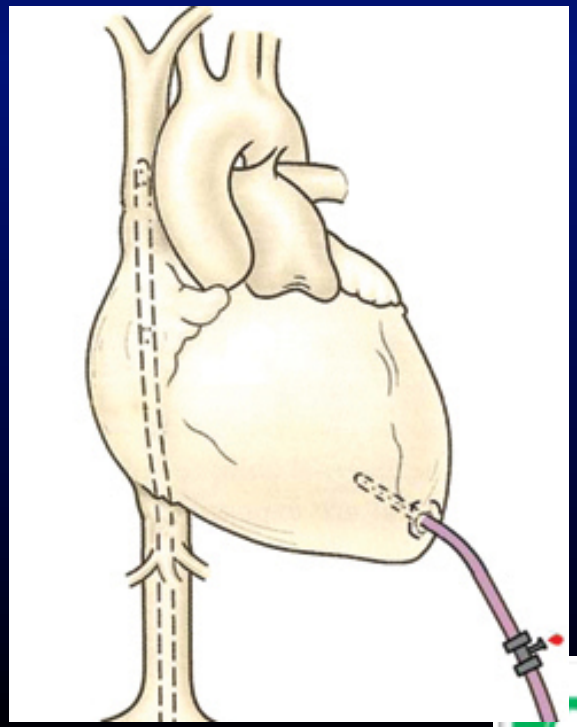
- LV apex

  5th intercostal left minitoracotomy

- right superior pulmonary vein

  4th intercostal right minitoracotomy





Groin cannulation: bleeding complications

- **Usually after 7-10 days on ECMO**
- Concomitant DIC
- Awake extubated patients (limb movements)

- **No a procedure for residents!**
- Operating room
- Light-source
- Two surgeons
- **Prompt availability of blood products**
- **Causes:** torn vessels (femoral vessels and their branches)
  cannula insertion site
  impending decannulation
- In severe cases, intraop blood loss ≈ 1-2 L → *hemodynamic instability*

Groin cannulation: bleeding complications