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- **No financial disclosure relevant to this discussion**
 - **Product development for Biostable (HAART aortic annuloplasty ring)**

Surgical Placement of the Impella 5.5



Objectives

- **Define indications and selection criteria for device choice**
- **Review the steps of insertion of the Impella 5.5**

Background

- **Hospital systems are stretched thin**
- **Care has become even more complicated in rural areas**
- **The outlying community programs increasingly salvage patients in cardiogenic shock**
- **Downstream support is needed to “complete the rescue”**

**Survival without
adequate MCS**



*Window of
opportunity*

Time

Is the patient well supported?
Might they be hemolyzing?

- Intra Aortic Balloon Pump
 - Impella 2.5
 - Impella CP (3.4)
 - Impella 5.5
-
- Ecmo or addition of right sided support



Impella CP[®] / SmartAssist[®]

Percutaneous insertion, increased flow and repositioning
without imaging



Impella 5.5[®] with SmartAssist[®]

Delivers full forward flow from the left ventricle

Markers of concern

- Lactate, SVO₂, ABG, AST/ALT, urine output, creatinine, troponin, neuro status
- Inotrope and vasopressor requirement
- **Urine color**, urine output Haptoglobin, Plasma free hgb, LDH

Step one; Access

- **Right / Left Axillary (7-8mm)**
 - Infraclavicular incision medial to deltapectoral groove
- **Innominate or Aorta or both!**
 - Mini-sternotomy, sternotomy or thoracotomy
- Subclavian

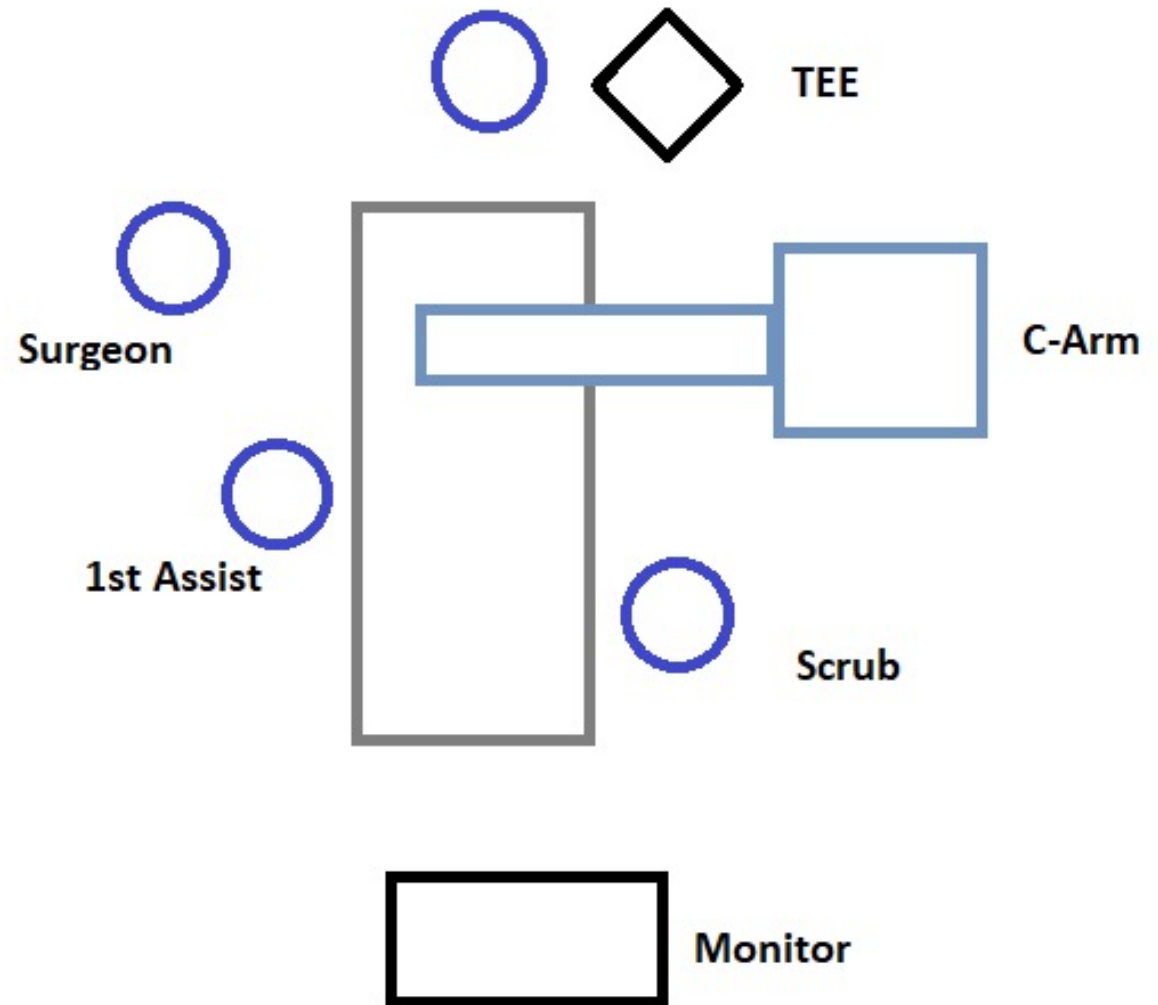




Access graft

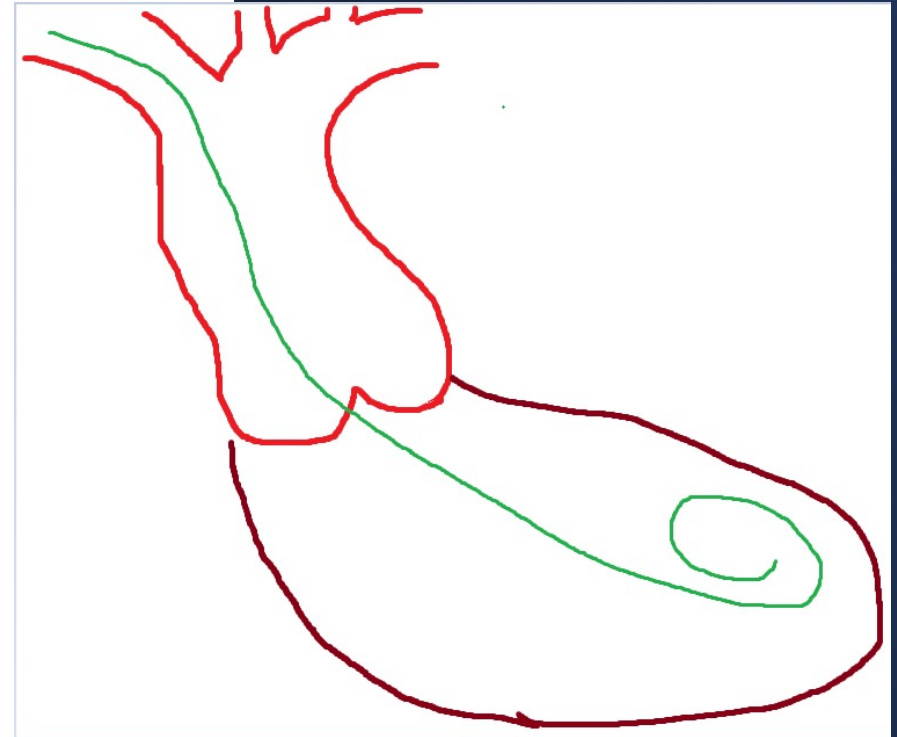
- **8 or 10 mm dacron graft beveled especially important for 8 mm graft usage**
- **Continuous running 5-0 or 6-0 prolene**
- **Place 23 fr peel away sheath and secure clip or clips**

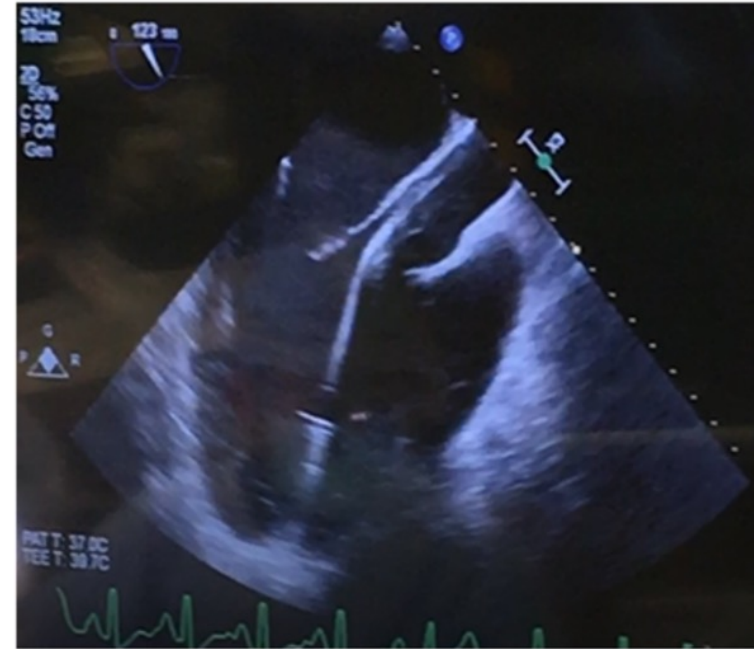
OR Layout in non hybrid room



Left ventricle access

- Preform 0.18 placement wire with double curve
- JR 4 access into the root with magic torque 0.35
- 5 French Pigtail to the apex
- Switch out to the 0.18 placement wire
- Better imaging makes this easier

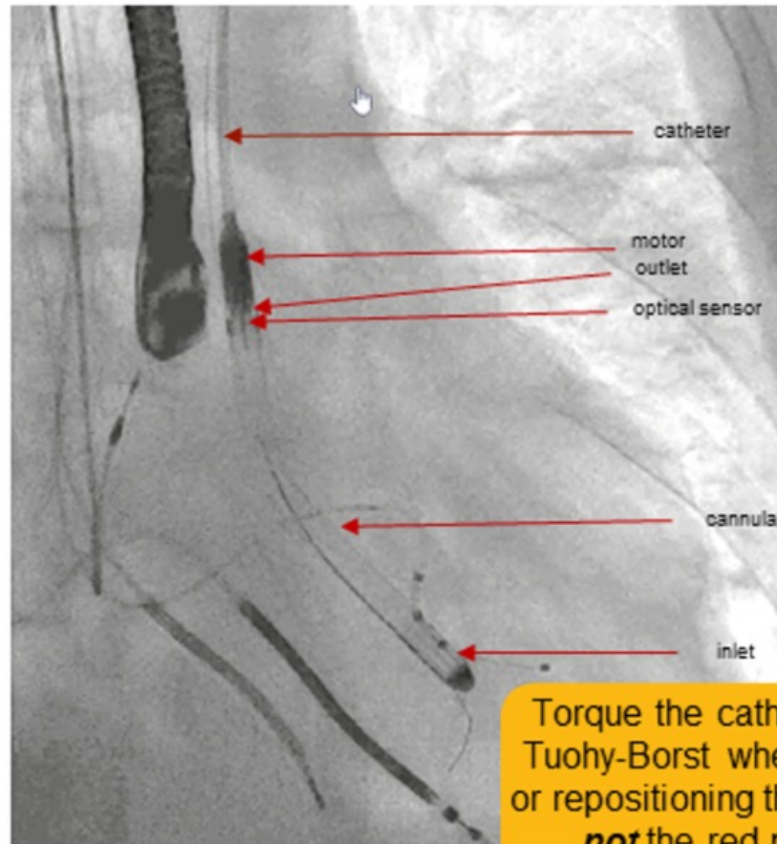




- **Clamp graft or quickly place completely into the sheath**
- **Place device angled towards apex or torque catheter after crossing valve**

Device placement

CONFIRMING PLACEMENT AND STARTING SUPPORT



Torque the catheter near the Tuohy-Borst when positioning or repositioning the Impella 5.5, **not** the red pump plug



Position the inlet area 5cm below the aortic valve annulus* and in the middle of the ventricular chamber, free from the mitral valve chordae.

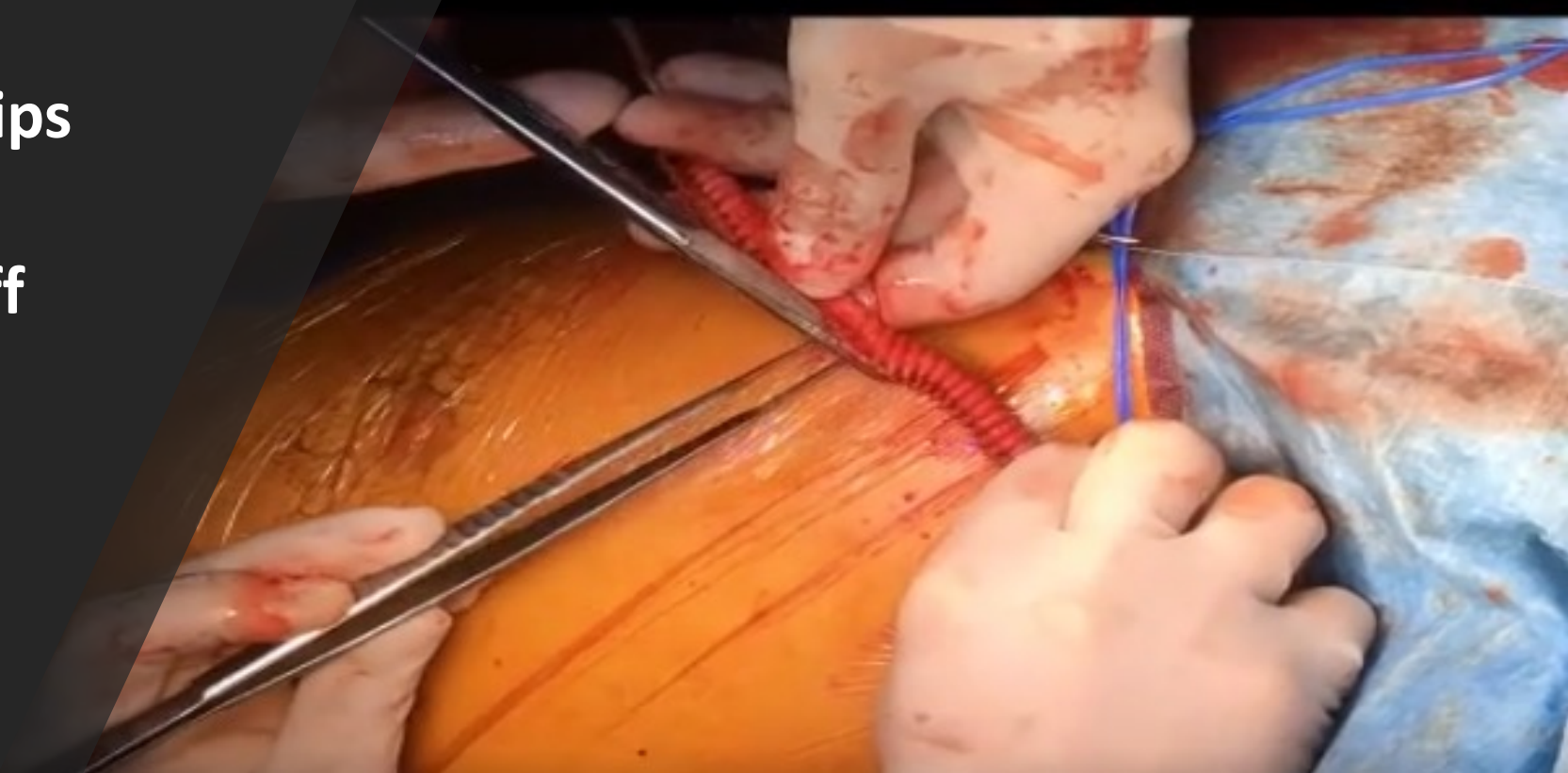
Recommended view:
TEE – Mid Esophageal Long Axis
TTE – Parasternal Long Axis

Proper placement

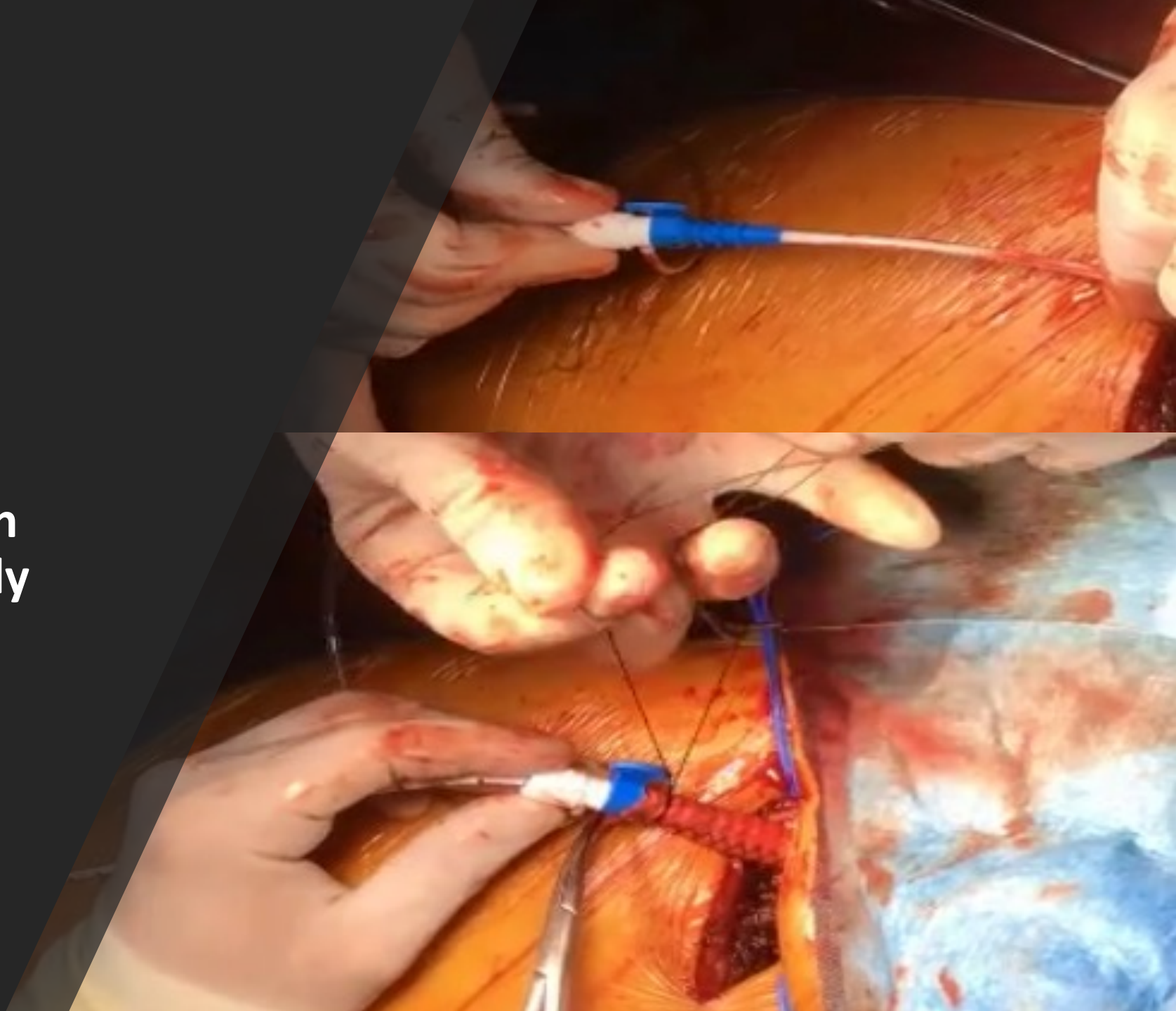
- Position the bend or elbow of the cannula at the aortic valve (Inflow is positioned 5cm below AV)*
- Free of the mitral valve and subannular structures

* Inlet position on the 5.5 is different than the 3.5cm recommended for the other left-sided Impella heart pumps

- **Clamp graft with soft insert clamp (sometimes 2)**
- **Remove the clip or clips**
- **Take the peel away sheath out and cut off excess graft**



- Place repositioning sheath and secure to graft (0-ethibond)
- Close the wound with the entire graft ideally covered by the skin



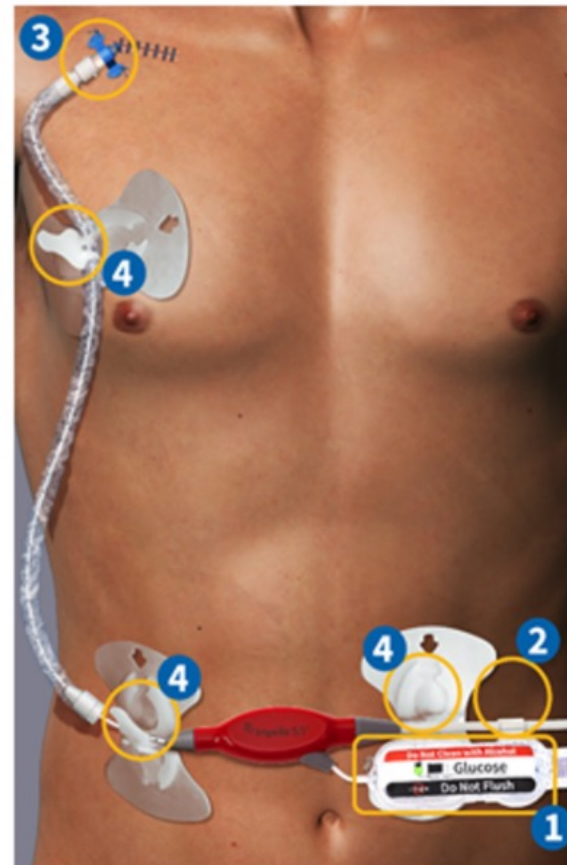
Central placement externalization

- **Access graft sewn to the innominate/aorta**
- **Counter incision right supraclavicular with tunnel between heads of the SCM**
- **Allows sternal closure, avoids intercostal bleeding, makes removal straight forward**
- **Warning: there is often varying amounts of clot in the graft during removal.**

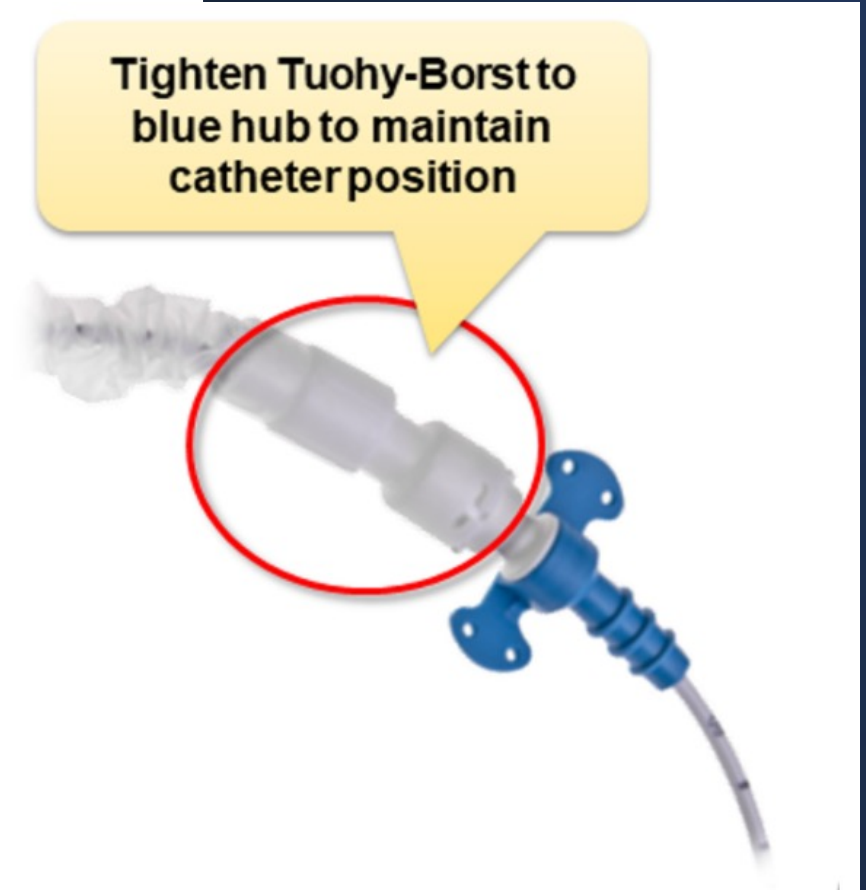
Securing the device

4 Key Points

1. Attach Sidearm Retainer
2. Clip Purge Sidearm
3. Tighten Tuohy-Borst
4. Three-Point Fixations



It is easy to forget this last important step



Surgical Placement of the Impella 5.5

My role as
the surgeon



The real work

ICU Nursing

Critical care NP/PAs

Cardiac Critical Care Physicians

Heart Failure Cardiology

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• **THANK YOU!!**