2009 LV Support for High Risk PCI

- Clinical Use: Case Examples
- IABP
- Impella Lp2.5

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Clinical Use of LV Support Devices

Emergency use:

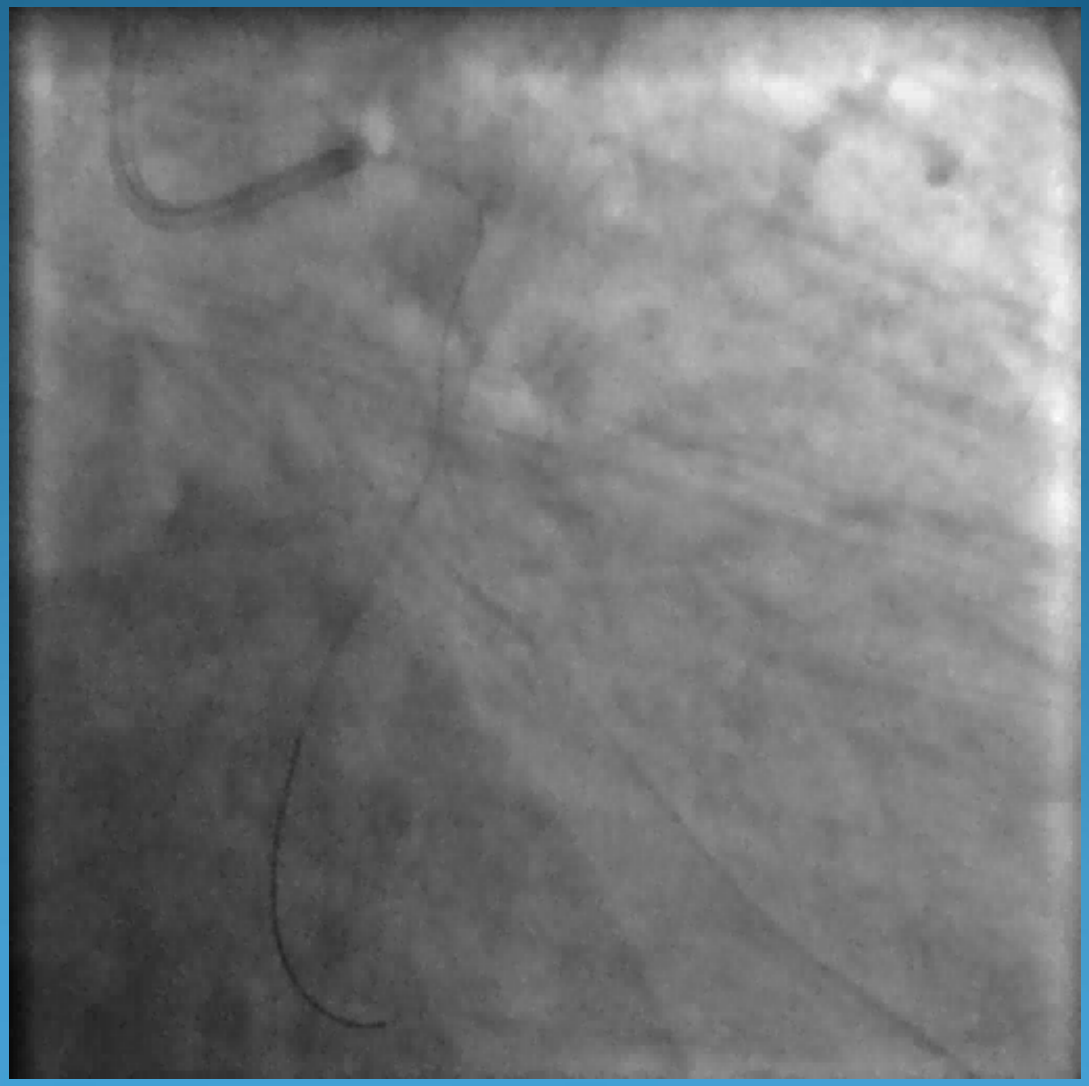
- Peri-procedural complications: dissections, no reflow phenomenon.
- Patients presenting with acute MI and hemodynamic instability / shock.

Electively for high risk intervention:

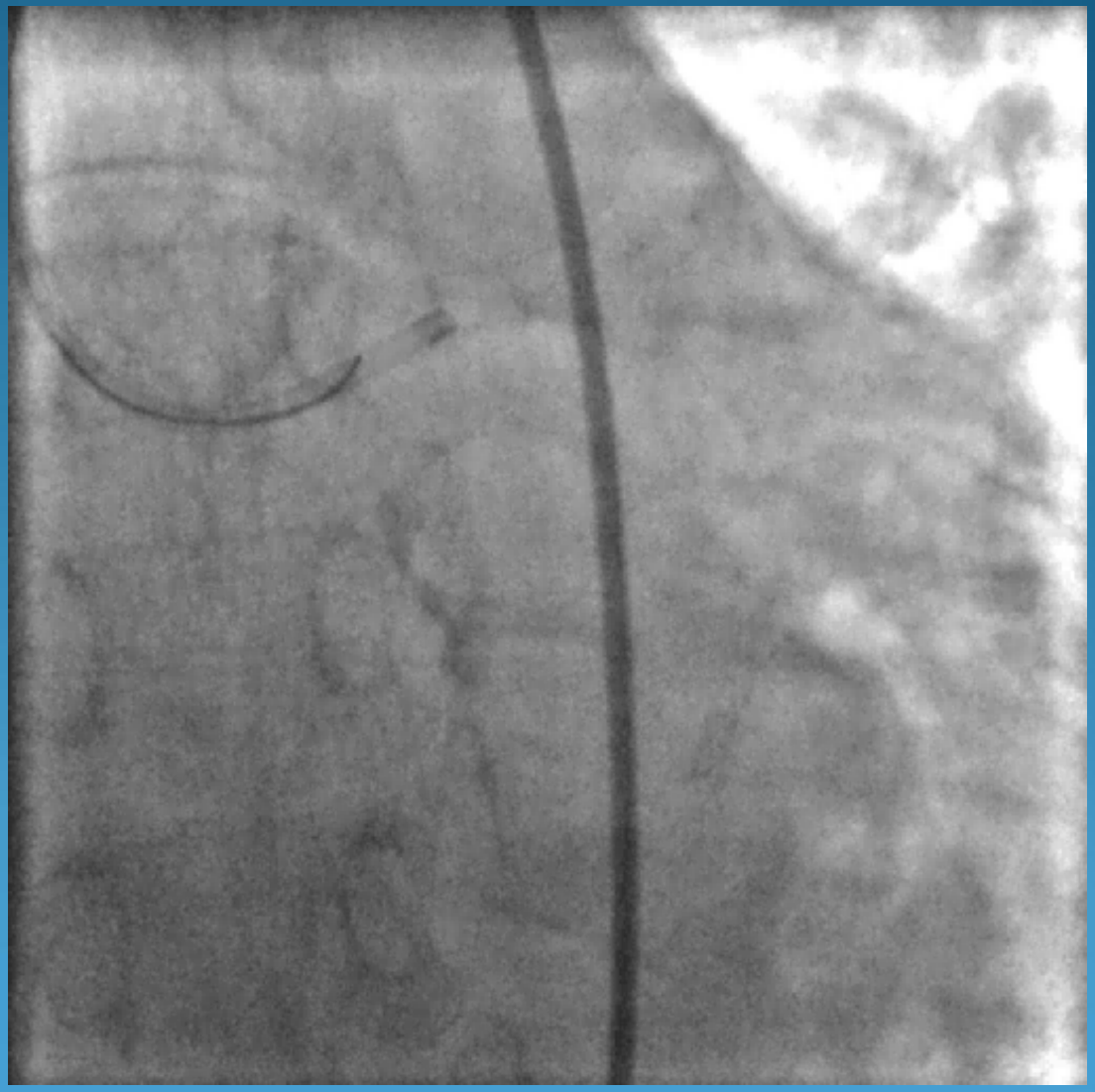
- Planned or Prophylactic use
- “Standby” use

Elective LCx stenting

56 yr old with angina and a positive stress test.
Cypher 2.5x13

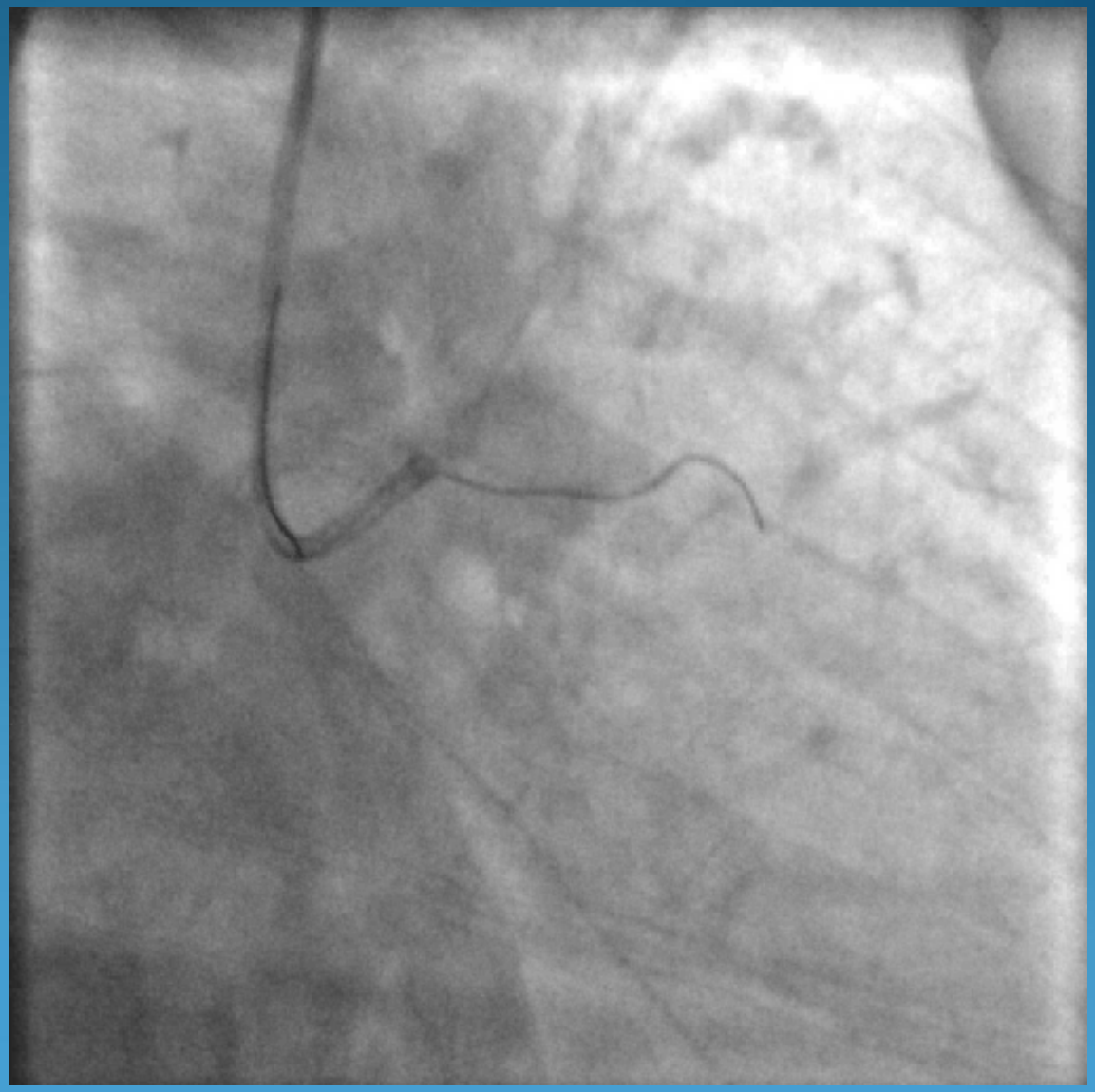


Final picture without guide wire…..



Next picture…

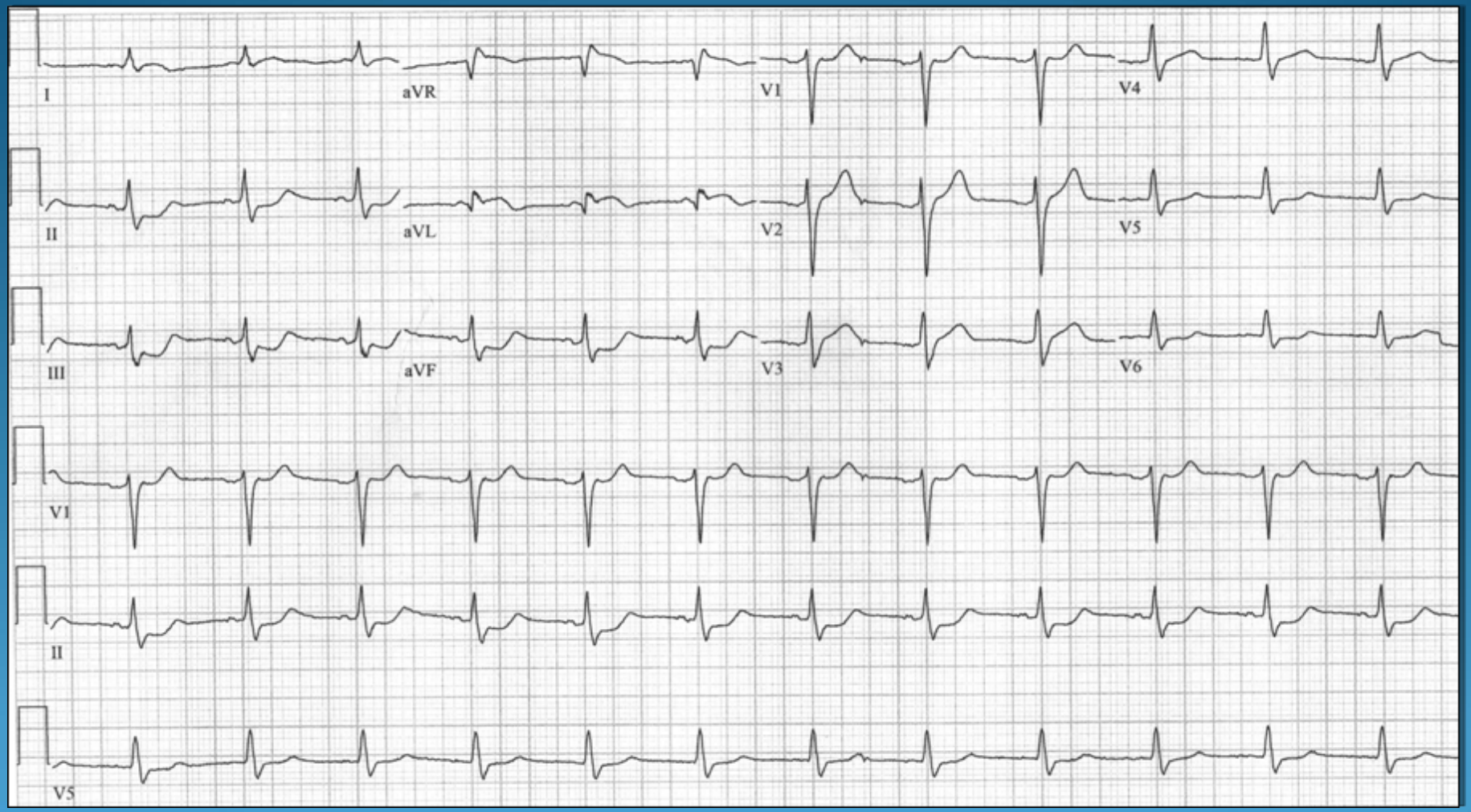
Called CTS:
“Both surgeons in the middle of an operation”…



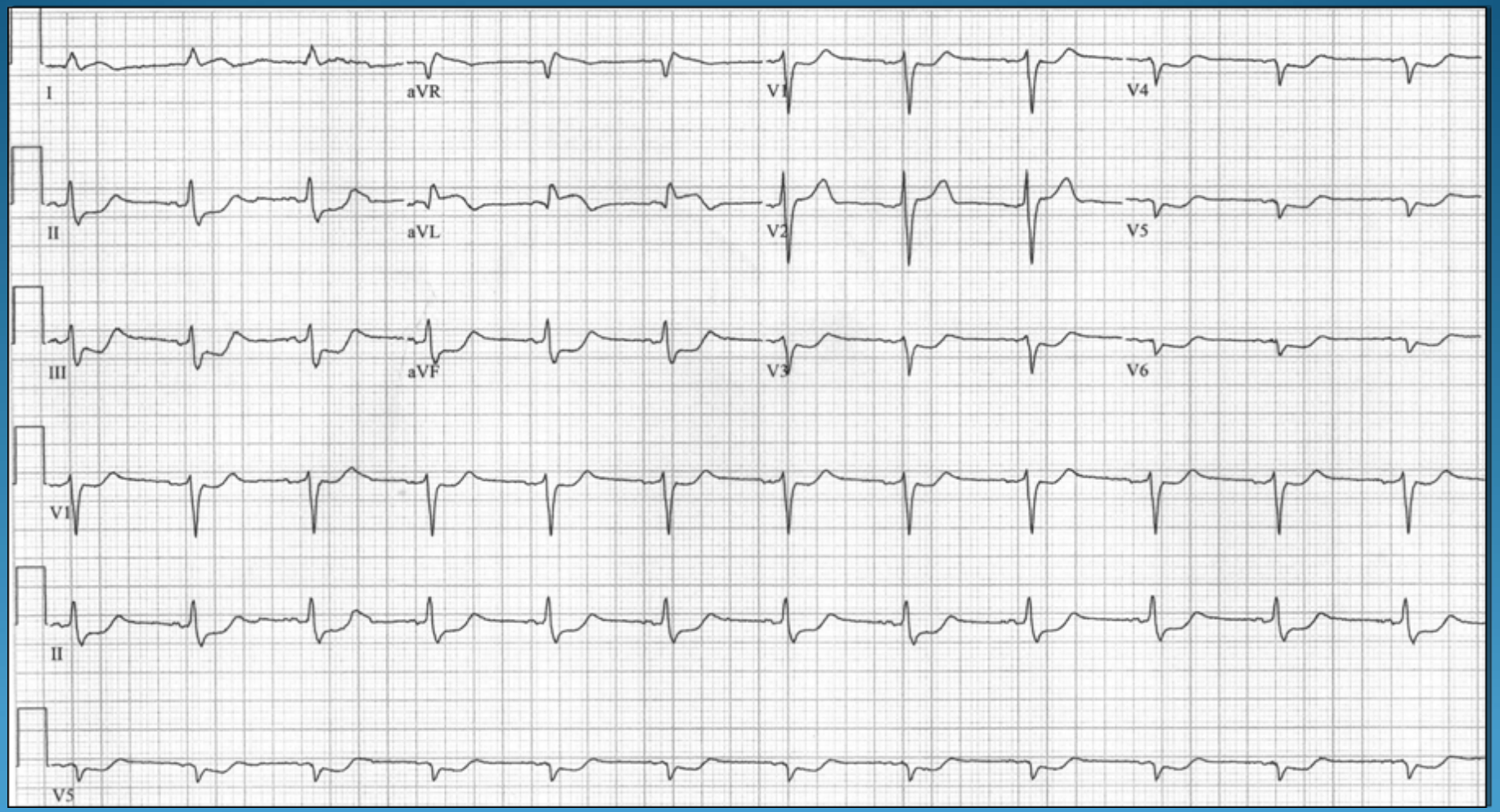
Acute MI and shock

- 66 yrs old on vacation from Canada and without previous heart disease comes in to the ER with epigastric discomfort.
- BP 60-80 mmHg, EKG abnormal.
- CT scan chest and abdomen was negative for dissection.
- Interventional Cardiology consult called with 2nd EKG NSTEMI.

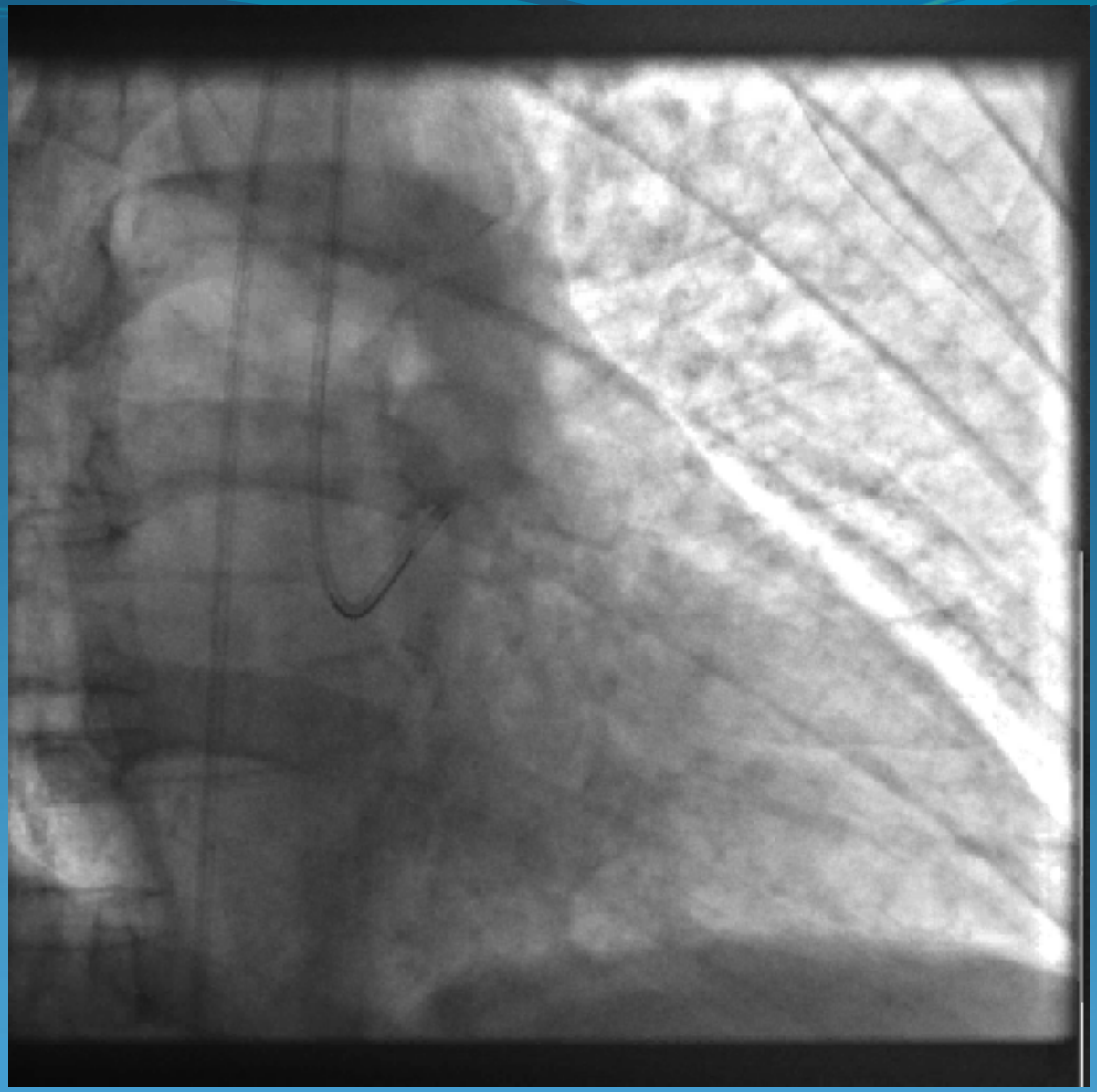
EKG # 1 at 08:54 AM



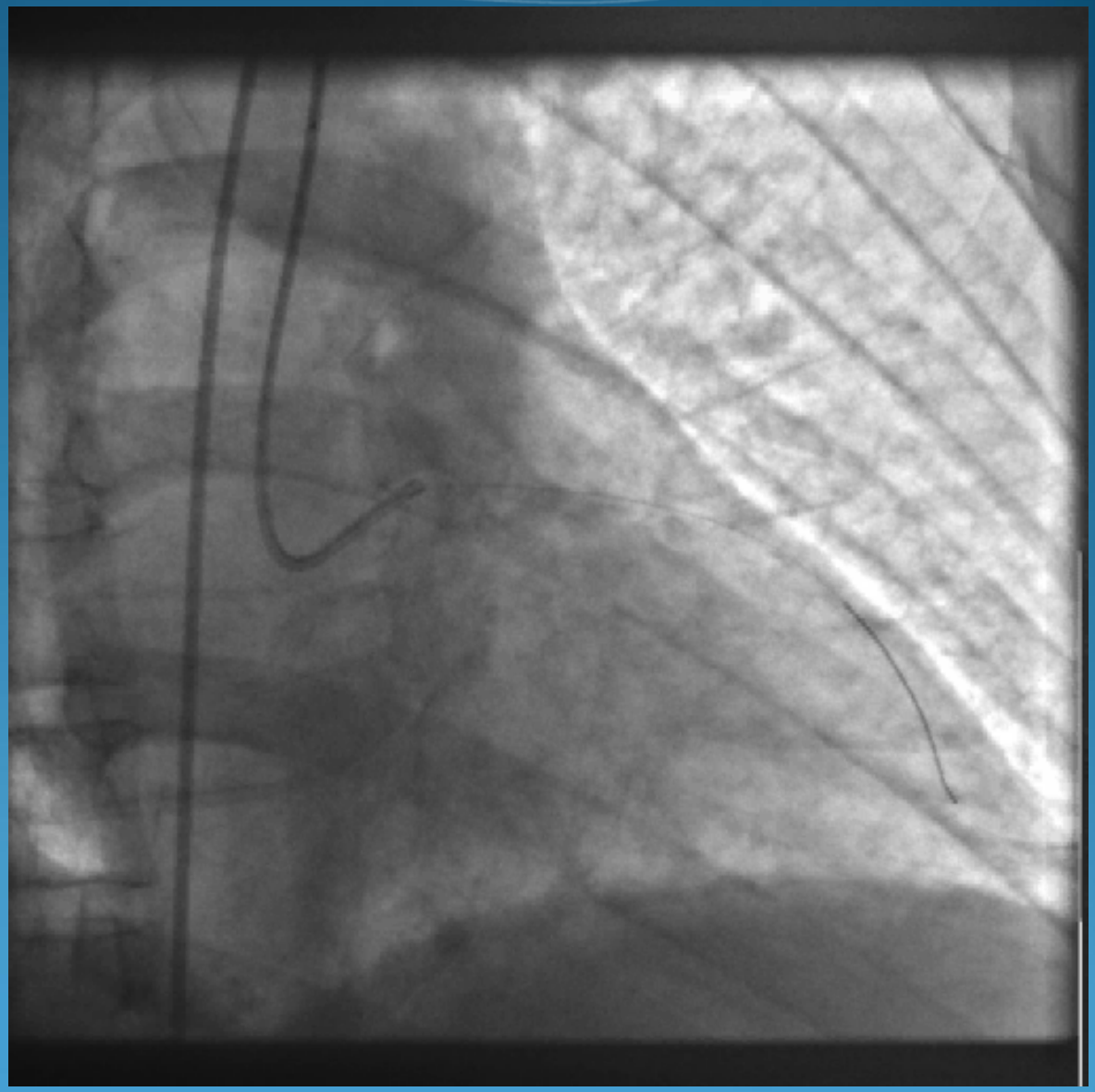
EKG # 2 at 9:32 AM



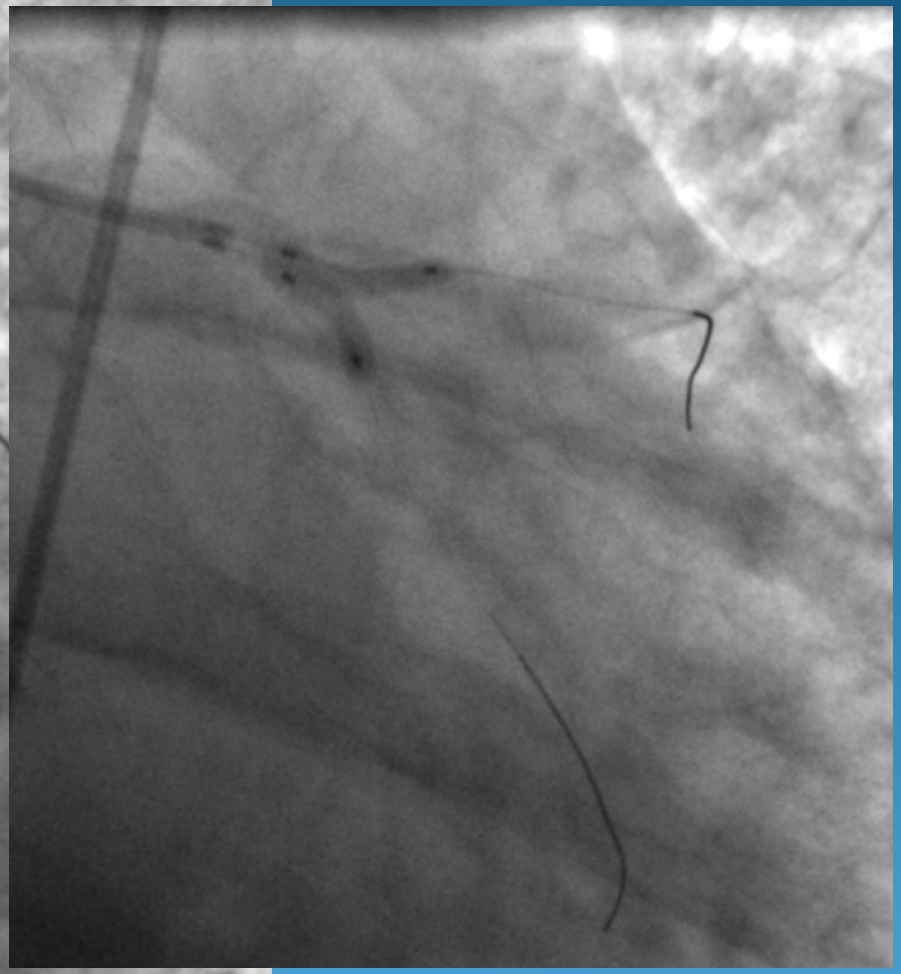
Angio

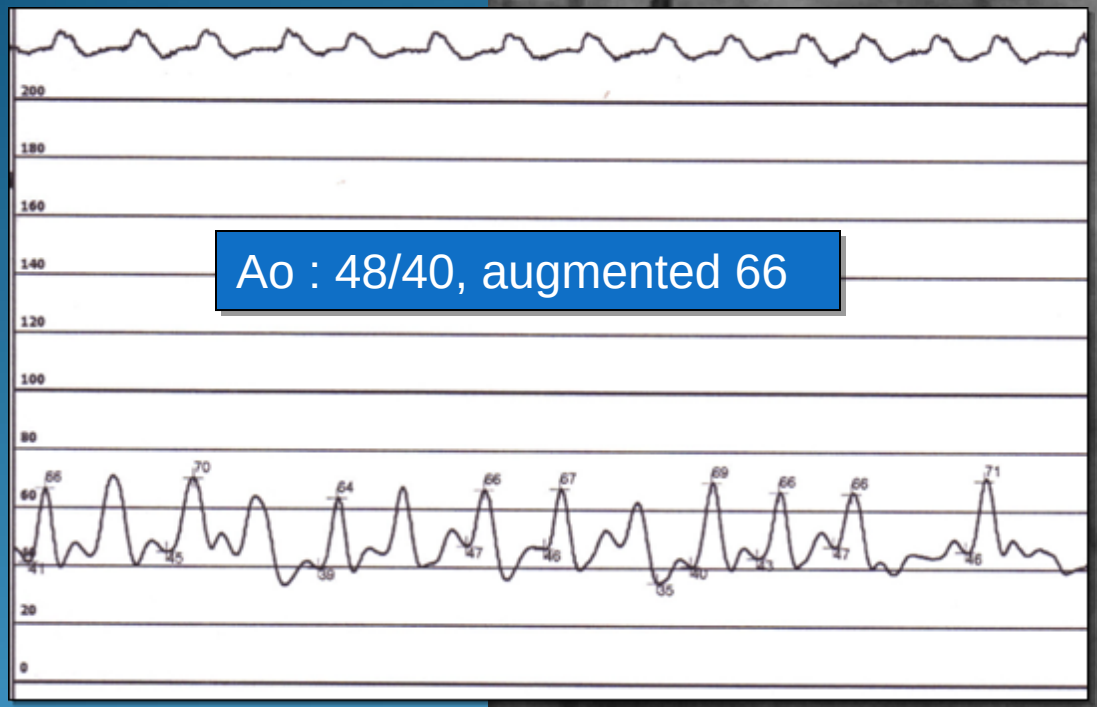


After initial ballooning



More Ballooning/stenting





LV

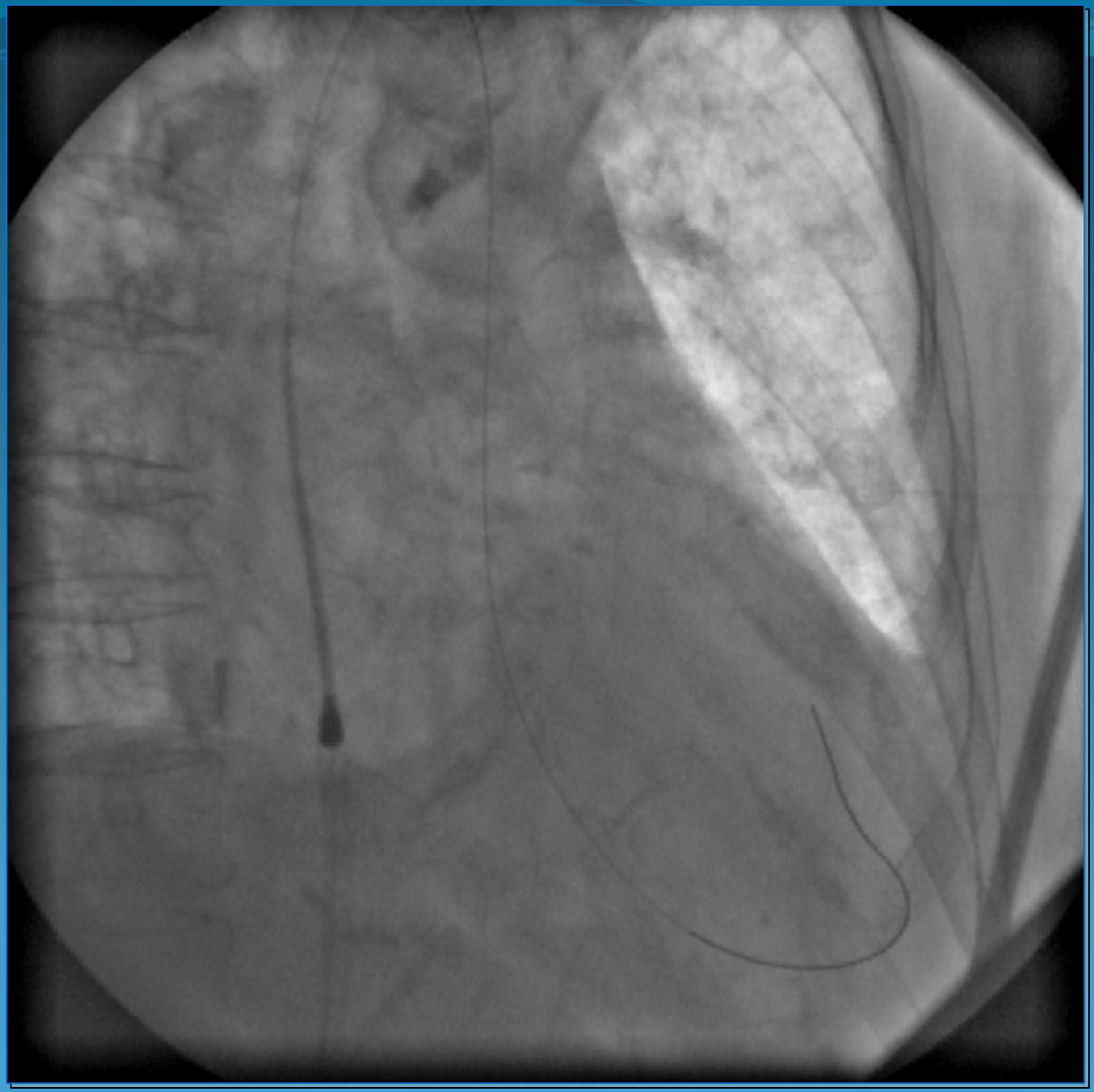
Follow up

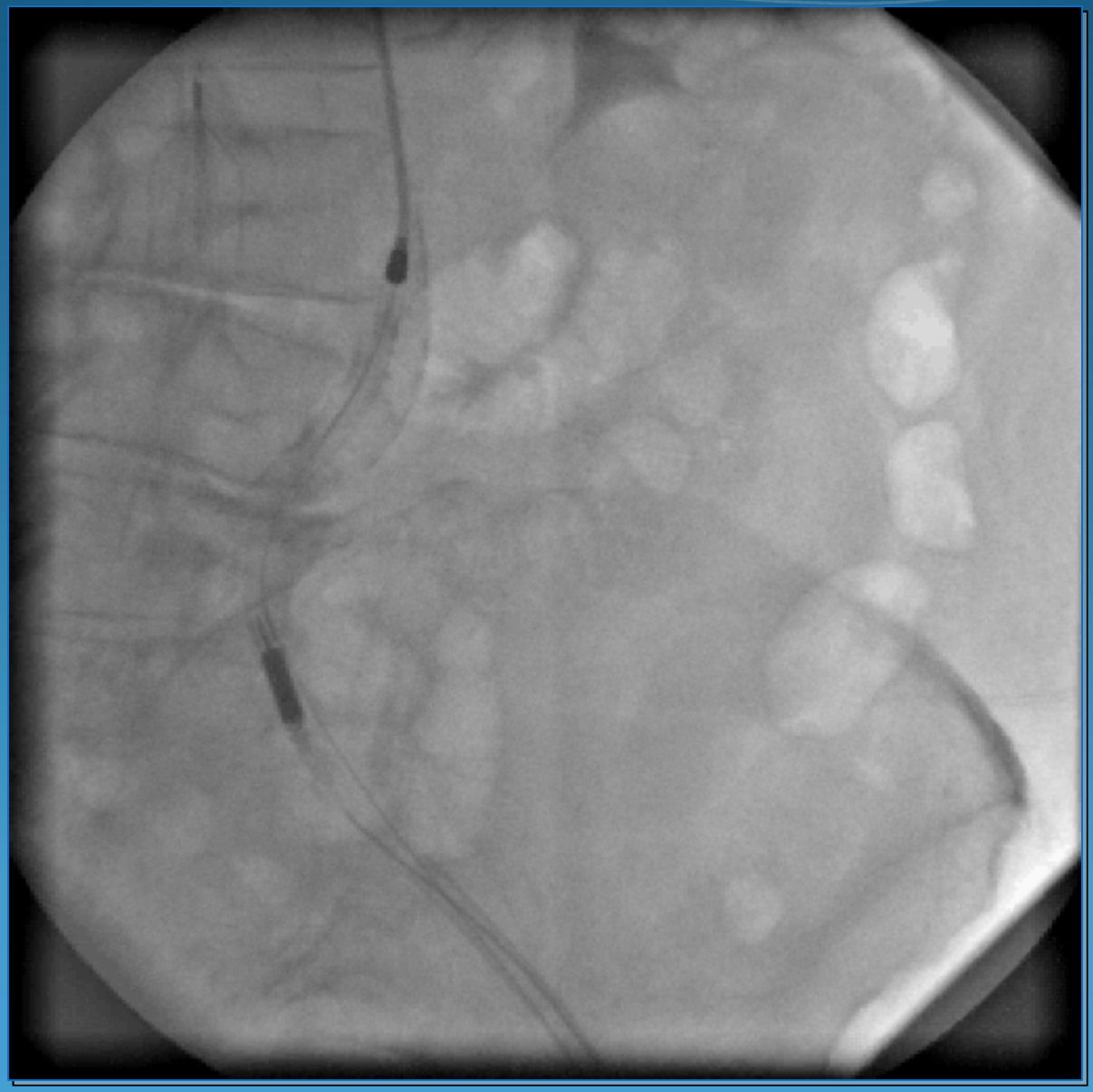
- Severely hypotensive despite vasopressors
- Patient wide awake but subsequent days developed ATN, liver shock and ARDS
- EF recovered to 35%
- DNR at the request of family and expired 6 days after presentation

Planned Use: High Risk PCI

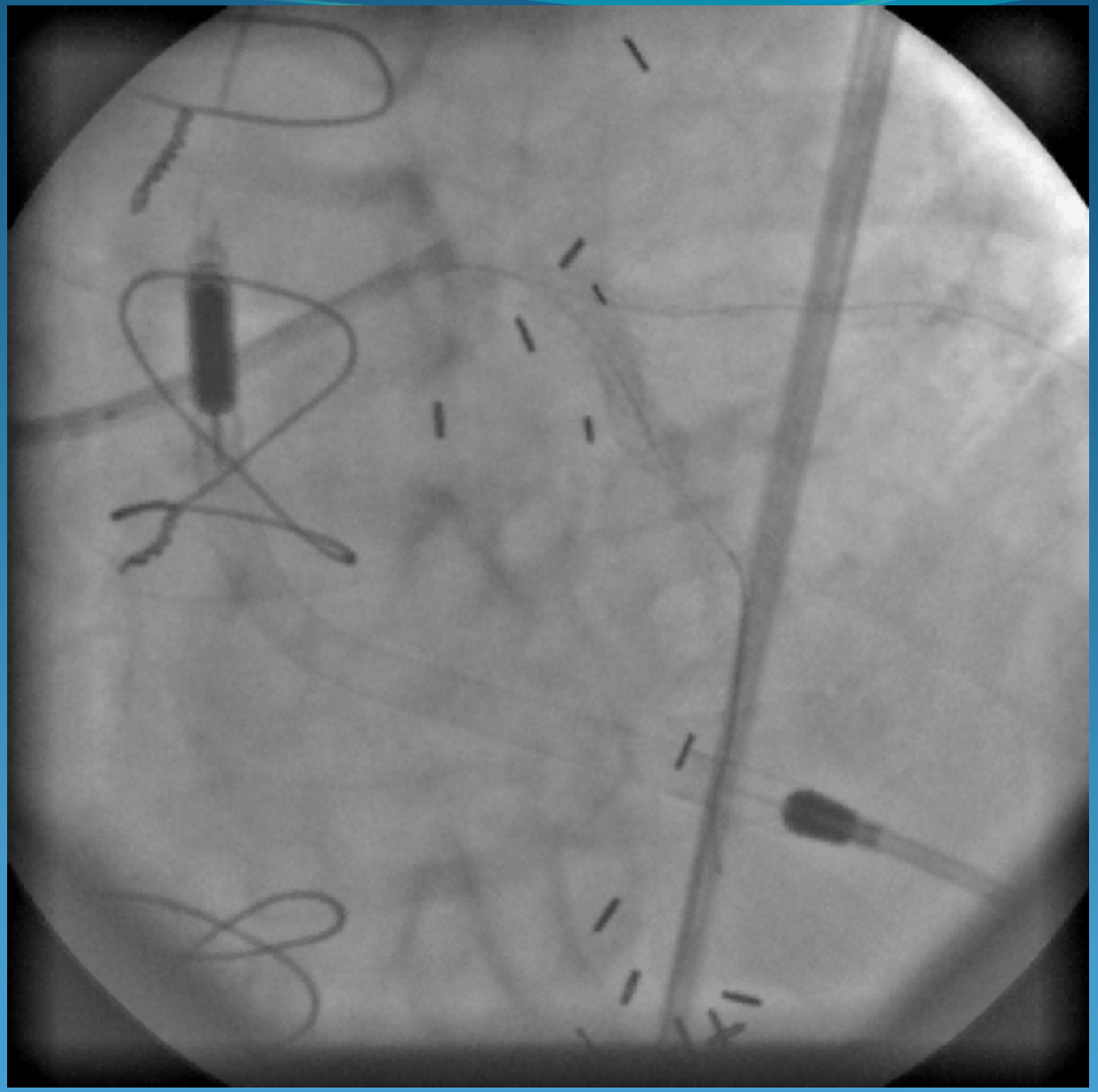
- 87 yr-old h/o HTN presents with class IV angina. Daily events. Refused CABG 9 yrs ago.
- Therapy is maximized, HR 55. Positive trop T.
- Normal creatinine and lung function.
- **CATH: 90% LM, 3 v CAD, EF 70%.**
- Bilateral Carotid stenosis: R 95%, L 70%
- Bilateral Renal stenosis: R 90%, L 60%

Unprotected L Main with occluded RCA:
85 yr old, refused re-do CABG



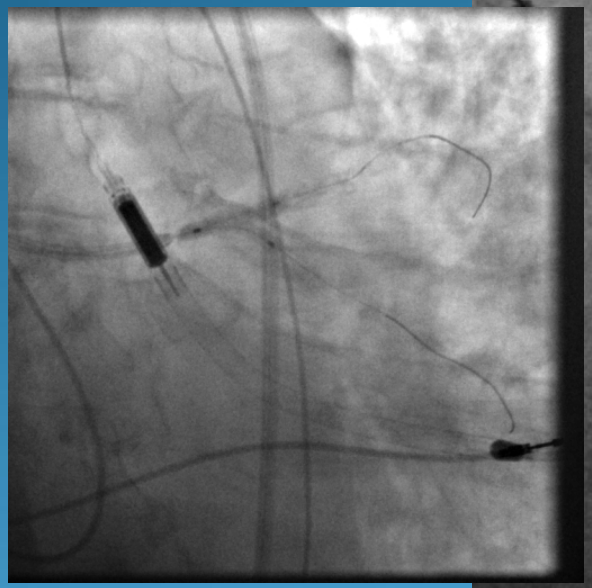


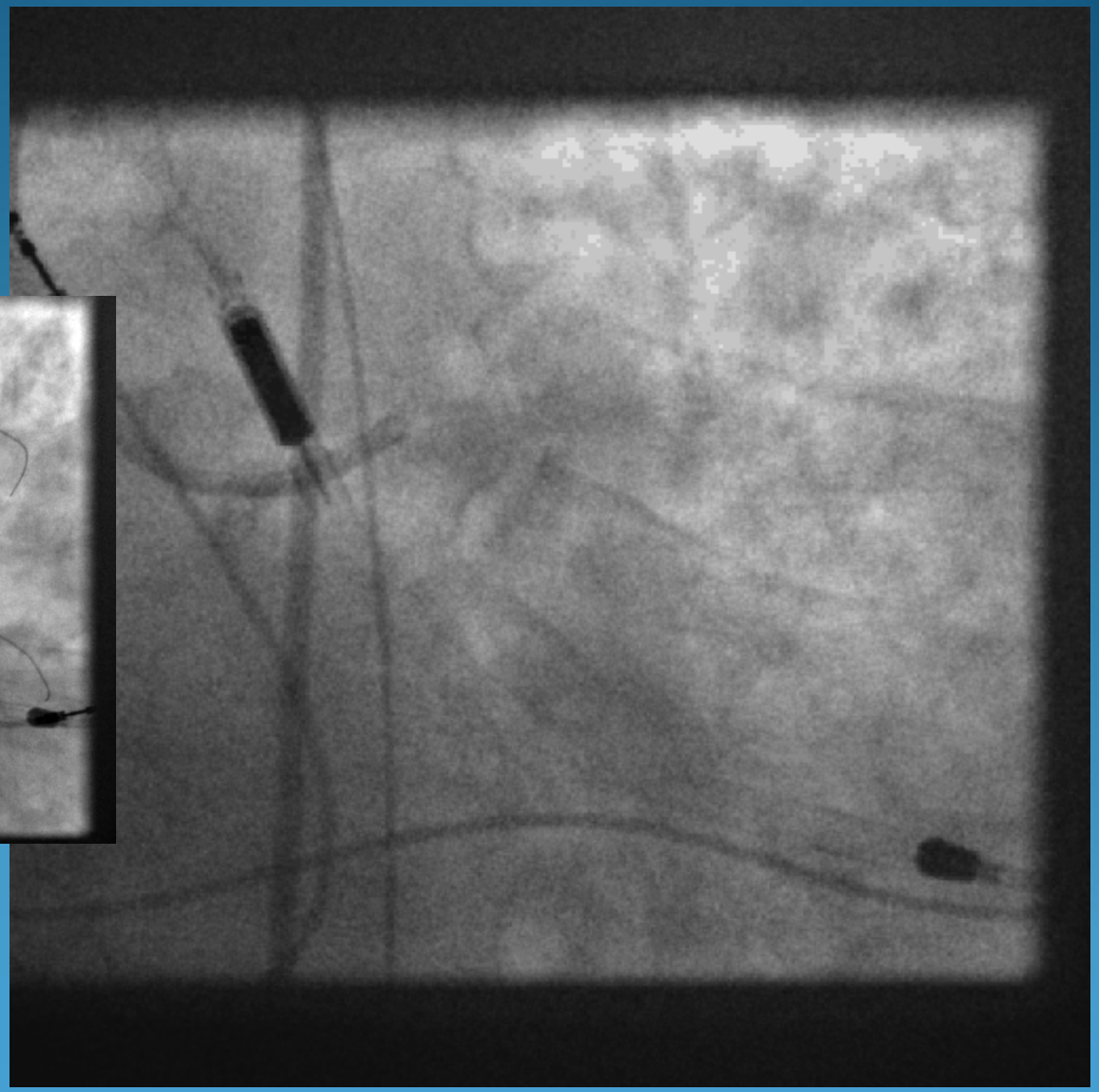
L Main: Bifurcation stenting



L Main Bifurcation:

- Patient with NSTEMI/CHF who has been on chemo for MM. Refused CABG.





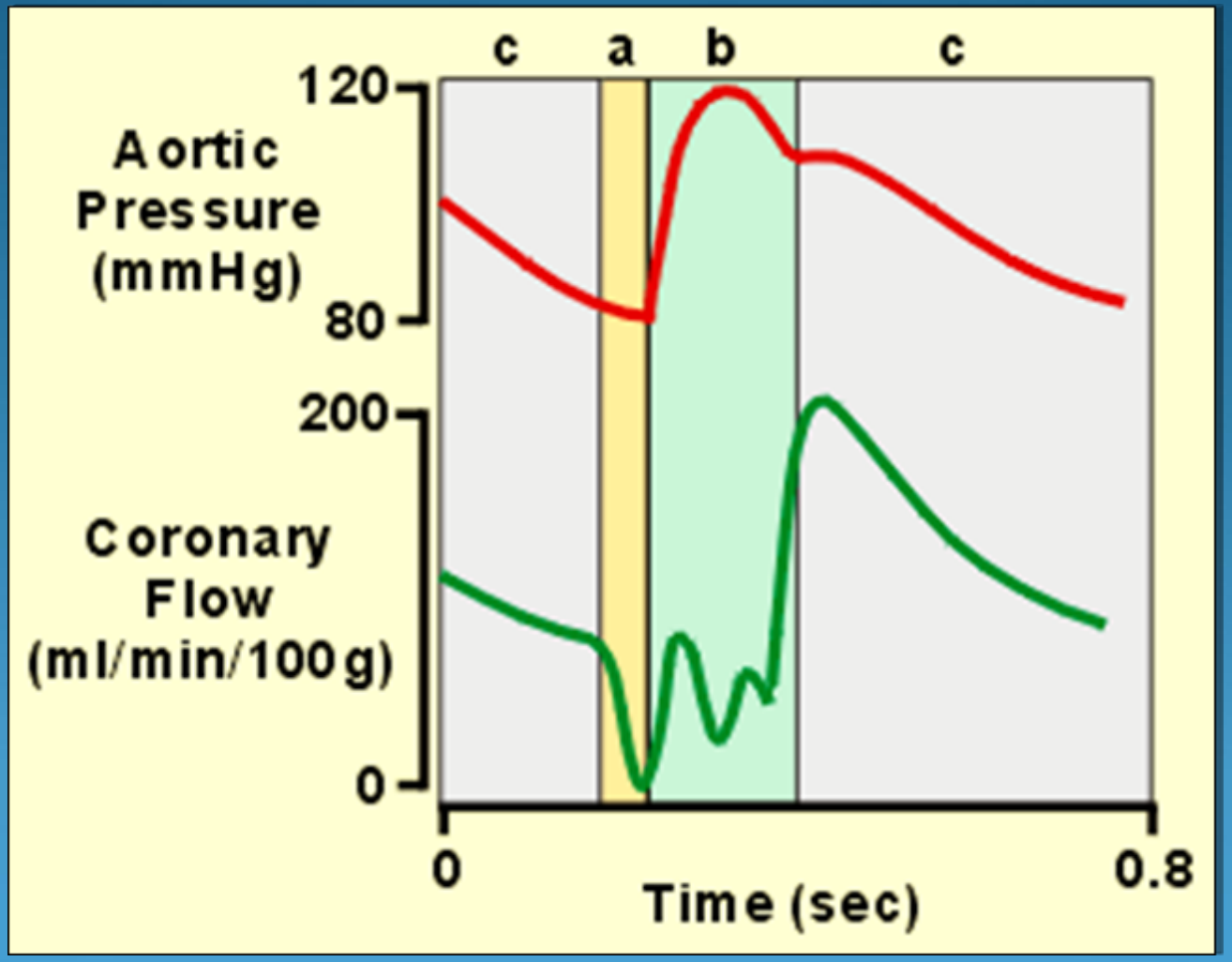
Short-term Circulatory Support

- IABP
- LVAD
  - CPS
  - Tandem Heart, CardioAssist, Inc.
  - Impella, Abiomed™

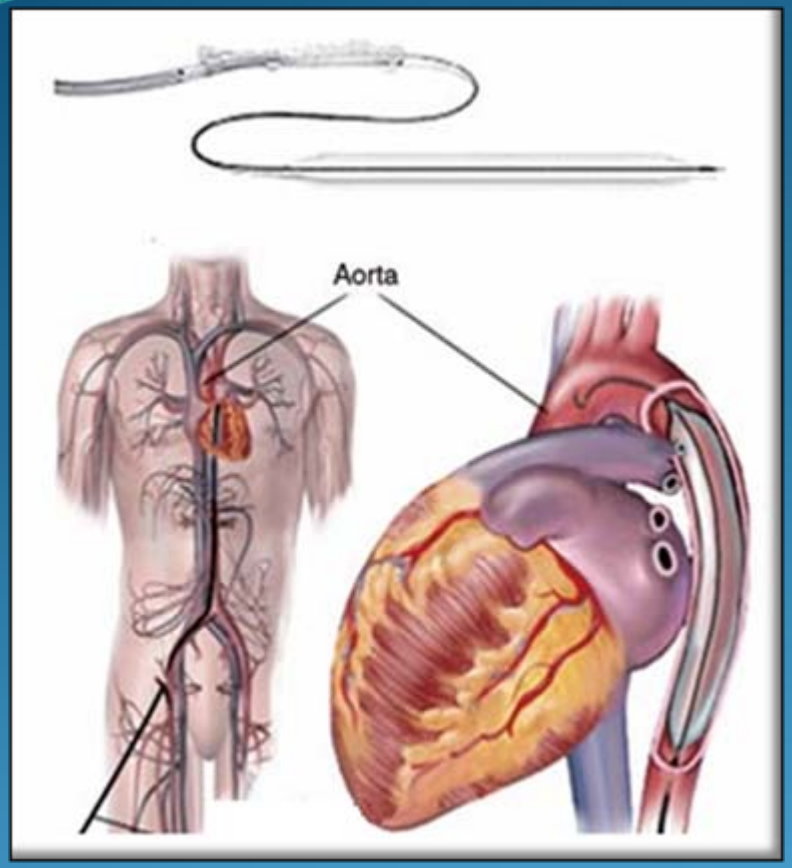
IABP

- First use in 1968, surgical, 12-14F
- 7F (Datascope) 7.5 F (Arrow)
- Fiberoptic technology
- Most widely available LV support device
- Sizes: 30,40,50 cc

Normal Coronary Flow



IABP: Effects



Rapid Inflation in early diastole ("Augmentation") increases coronary flow

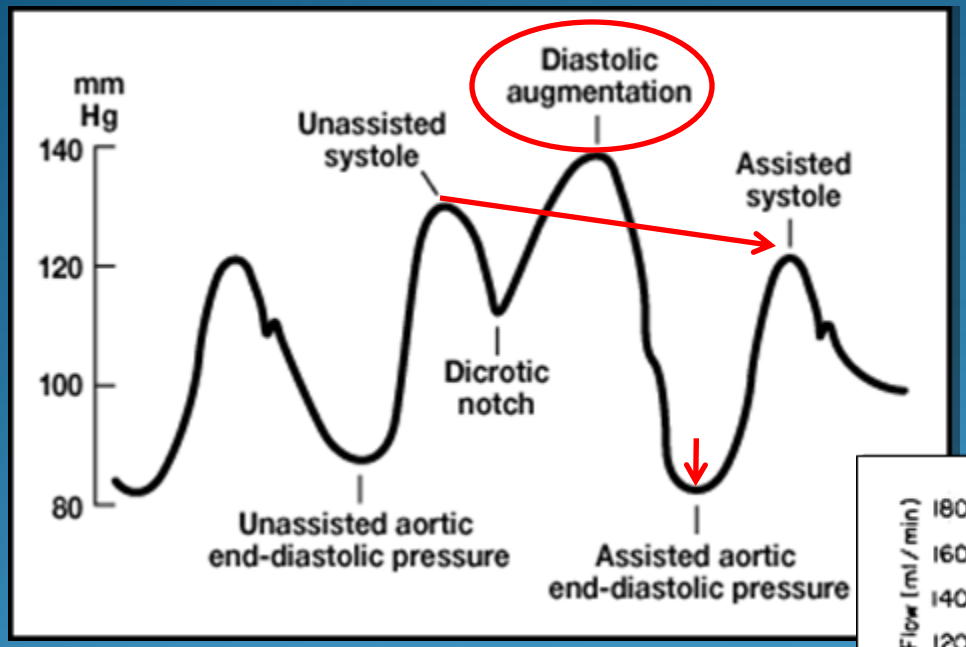
↑ SUPPLY

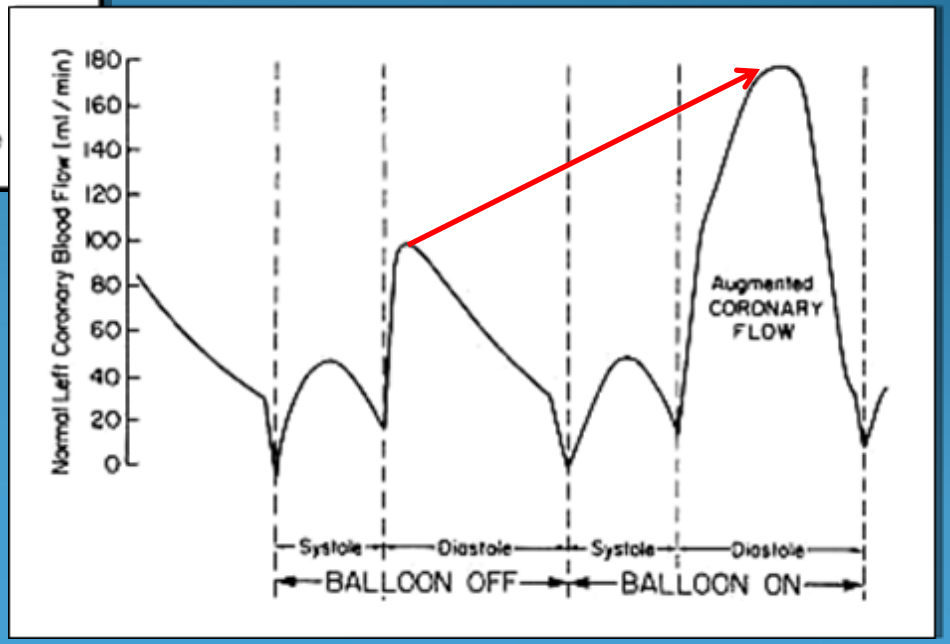
Increases C.O (0.5 L/min)

Deflation just before systole, decreases aortic pressure and LV afterload / wall tension

↓ DEMAND

Coronary Flow





IABP:

- Assess peripheral arteries and planned placement to avoid subsequent complications
- When IABP in place, do not use femoral arteries to assess central arterial pressures
- Titrate pressors to augmented pressures or mean pressures (not to systolic pressures). Assess clinical tissue perfusion: urine output and CNS function.
- Use IV heparin to prevent thrombotic complications. Keep balloon 1:1 if heparin is off.

Cardiogenic Shock

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shoc the Cath
Lab. ABP
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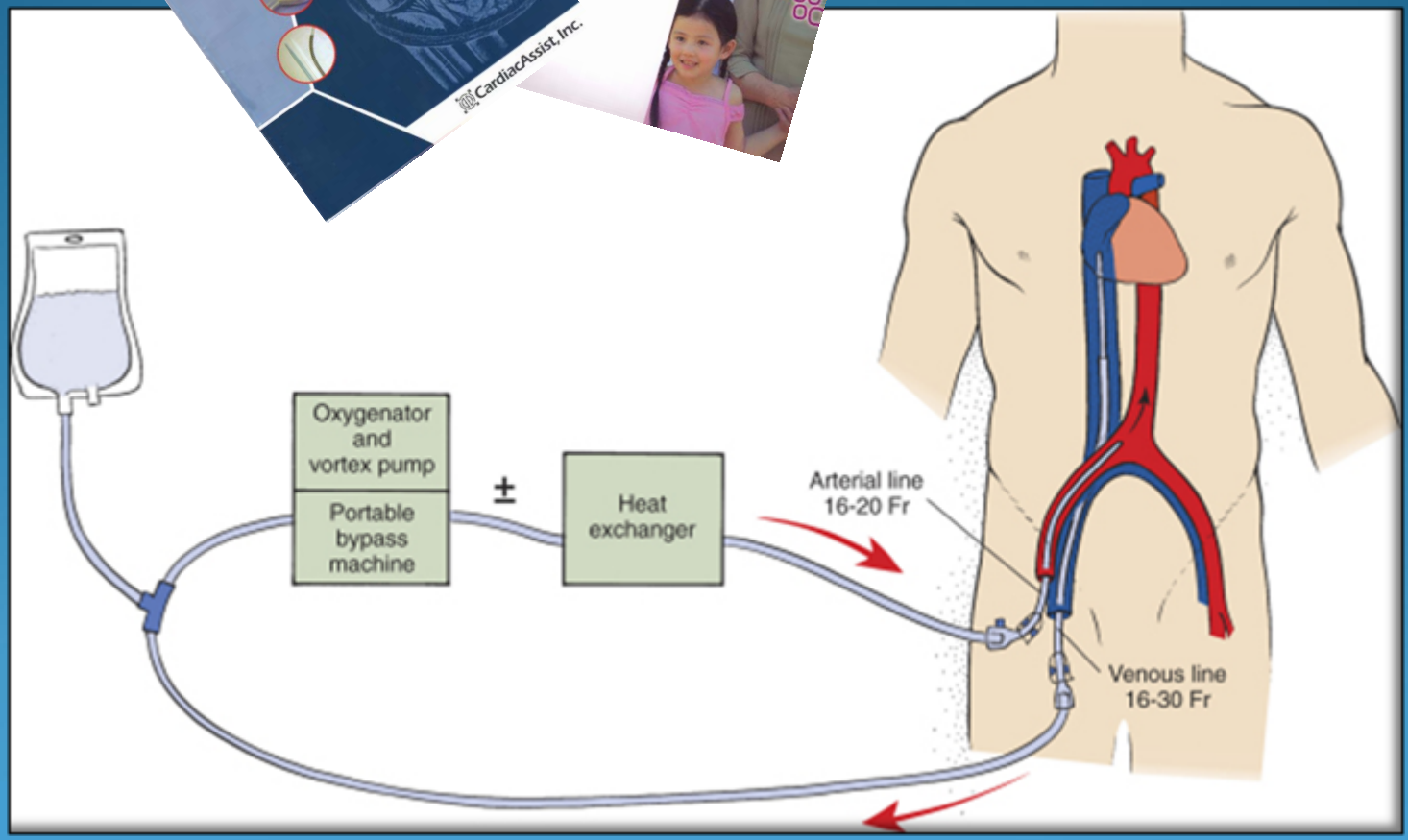
IABP sheath: Assessing distal flow

Secure device properly


TandemHeart
PTVA System
CardiacAssist, Inc.
ABIOMED
Recovering hearts.
Saving lives.


Oxygenator and vortex pump
Portable bypass machine
±
Heat exchanger
Arterial line 16-20 Fr
Venous line 16-30 Fr

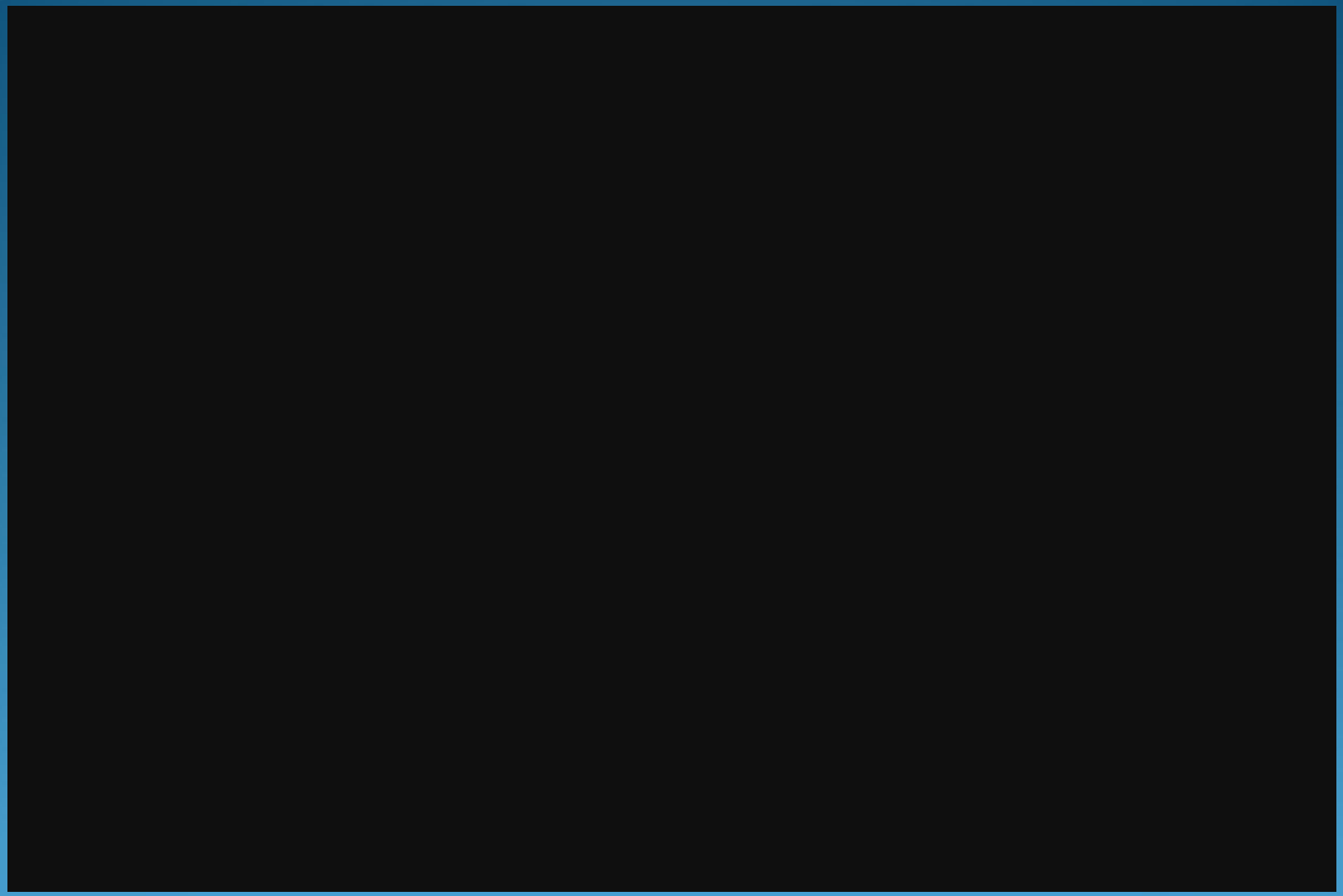
Percutaneous LVAD Transvalvular : Impella

- Approved by the FDA
- Unloads LV directly via a micro-rotary pump and expelling blood to aorta.
- Electromagnetic motor rotates a helical impeller
- First an echo: Exclude LV thrombus and aortic stenosis. Look at the iliacs and CFAs
- 12F device can placed across aortic valve. Rotates at 50,000-90,000 rpm and provides up to 2.5 L/min of support. Can be left in place safely up to 5 days

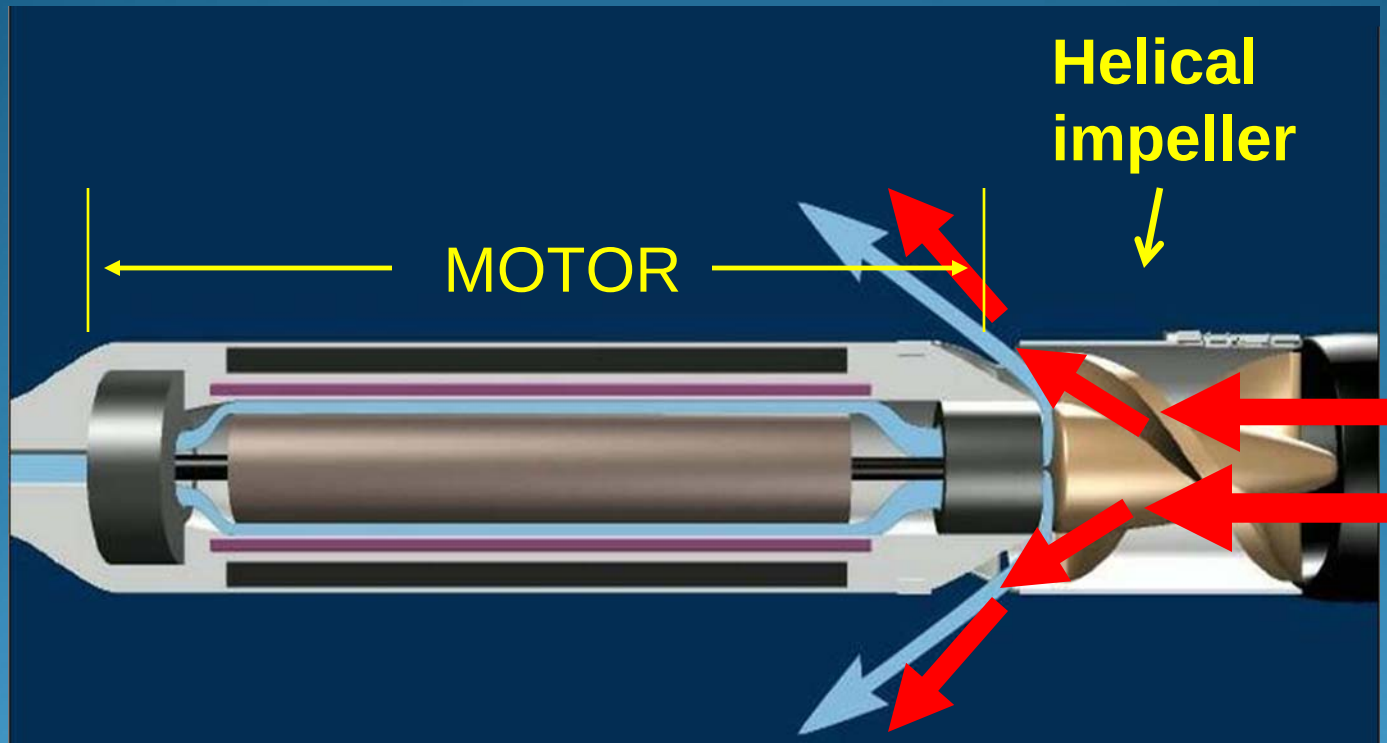
Impella 2.5 Circulatory Support System

Console System

Lp 2.5 Catheter

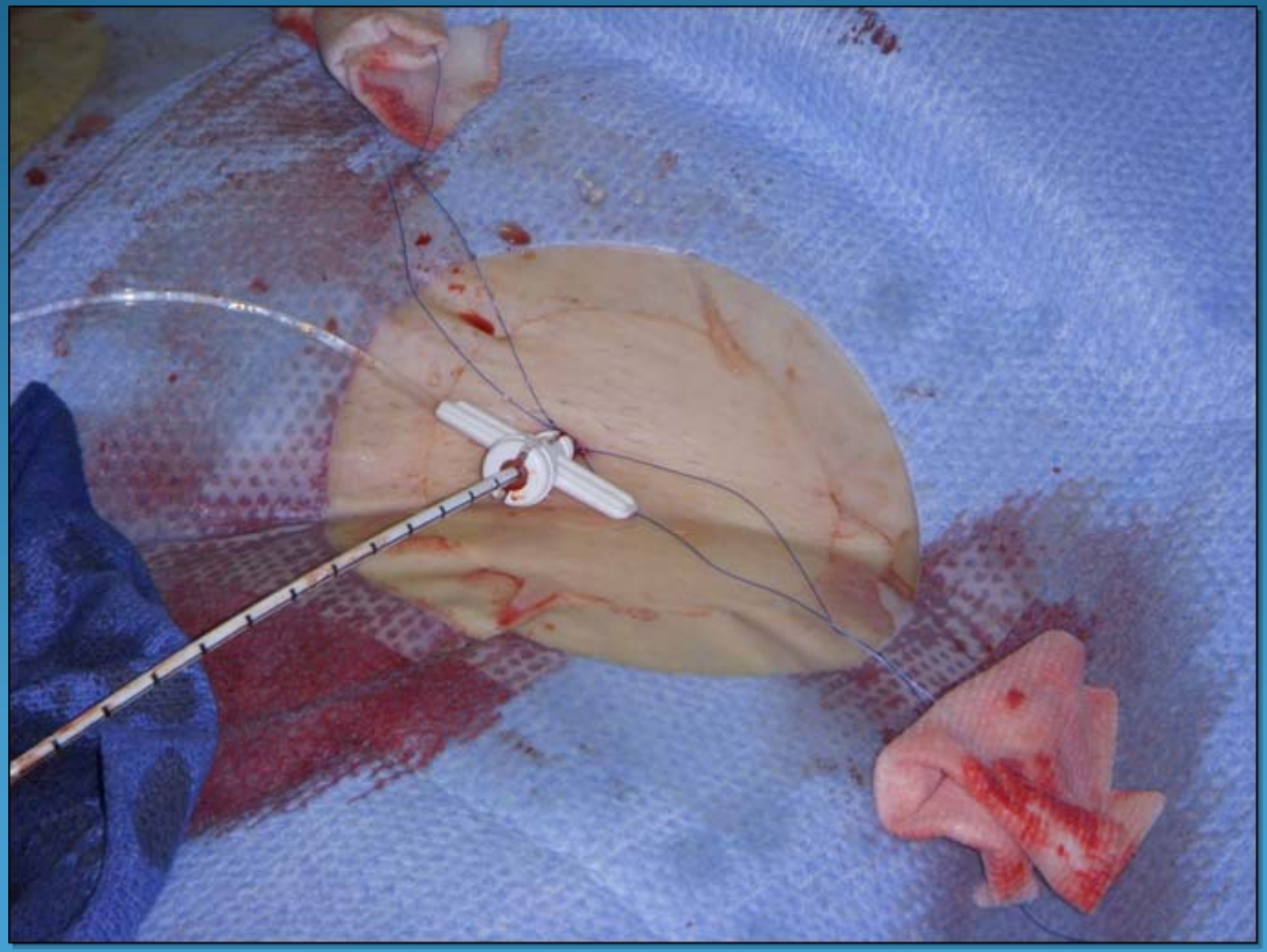


Electromagnetic Motor



- 20% Dextrose IV solution is purged through the motor area
- Purge Pressure > 300mmHg, preventing blood from entering the motor a rea

Impella 13F sheath - preclose



Impella device removed

Final