CCU aspects of post-TAVI management

What not to be missed!

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Conflict of Interests

- Proctor
  - Edwards Lifesciences
  - Medtronic
- Advisory Board
  - Sanofi
  - Lilly
  - AstraZeneca
  - Bayer Israel
  - Medtronic
  - Pfizer

Outline

- Background
- Vascular complications leading to hemorrhagic shock
- Late tamponade
- AV blocks

“High Risk” AS Patients

- Octogenarians with multiple co-morbidities
  - COPD
  - Diabetes
  - PVD
  - Reduced LVEF
  - Renal failure
  - Previous cardiac surgery
- Euroscore >20% (~10% mortality@30 days)
- STS >10%

Inoperable AS Patients

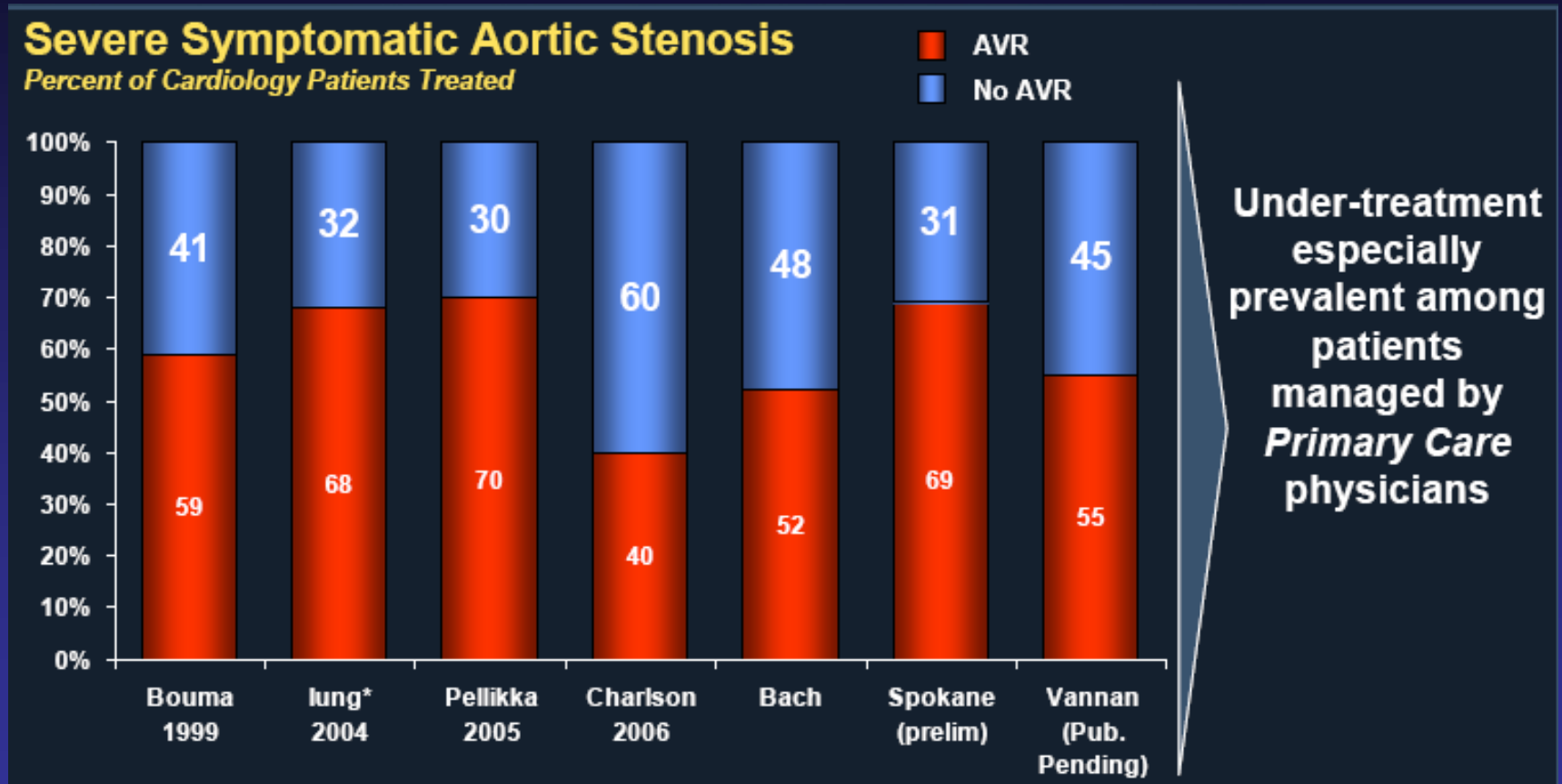
- Radiation chest wall / heart disease
- Severe chest wall deformities
- End-stage COPD
- Cirrhosis with portal hypertension
- Porcelain aorta
- Degenerative neurocognitive dysfunction
- High “frailty” index (qualitative assessment)
- >50% chance of mortality or never leaving a chronic care facility

Surgeons are gatekeepers !!!

Assess for frailty

≠

At least 30% of severe AS pts. are untreated

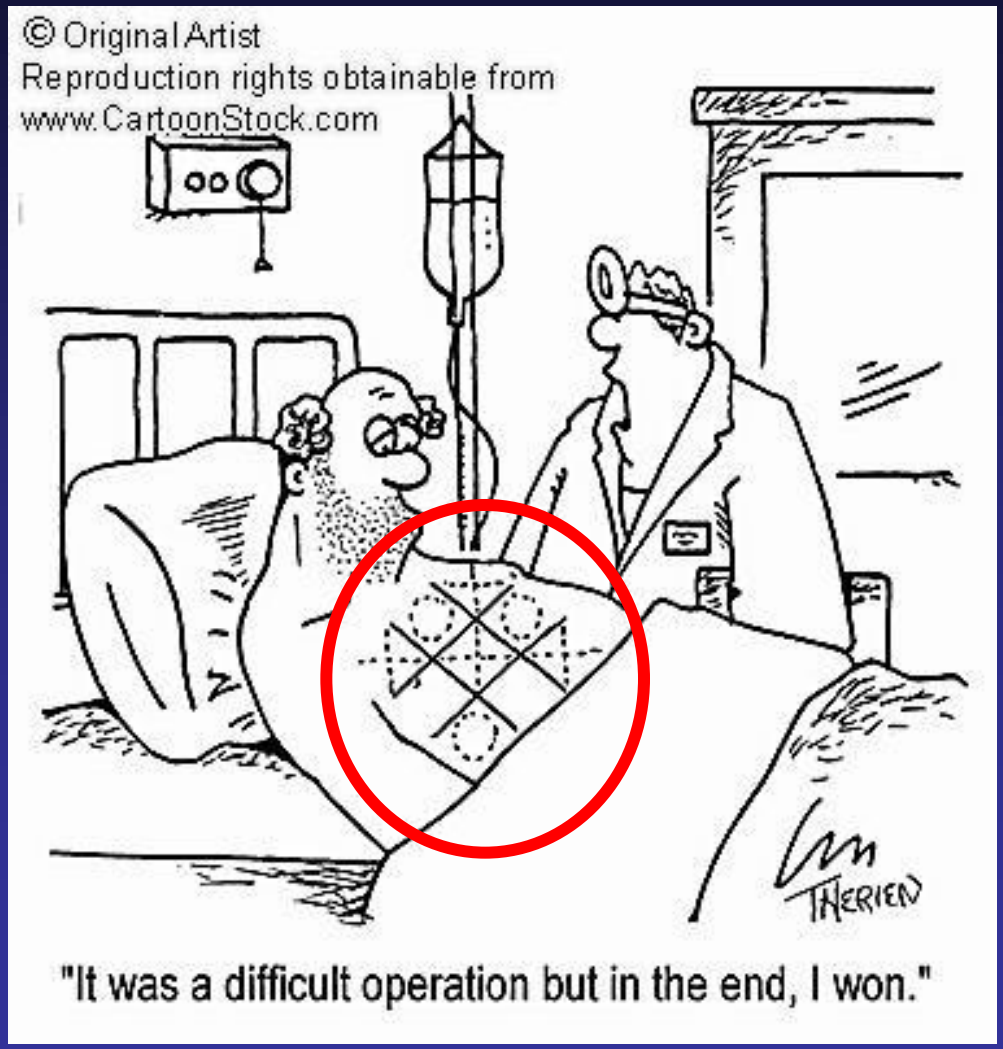


1. Bouma B J et al. To operate or not on elderly patients with aortic stenosis: the decision and its consequences. Heart 1999;82:143-148
2. Iung B et al. A prospective survey of patients with valvular heart disease in Europe: The Euro Heart Survey on Valvular Heart Disease. European Heart Journal 2003;24:1231-1243 (*includes both Aortic Stenosis and Mitral Regurgitation patients)
3. Pellikka, Sarano et al. Outcome of 622 Adults with Asymptomatic, Hemodynamically Significant Aortic Stenosis During Prolonged Follow-Up. Circulation 2005
4. Charlson E et al. Decision-making and outcomes in severe symptomatic aortic stenosis. J Heart Valve Dis2006;15:312-321

Vascular Access

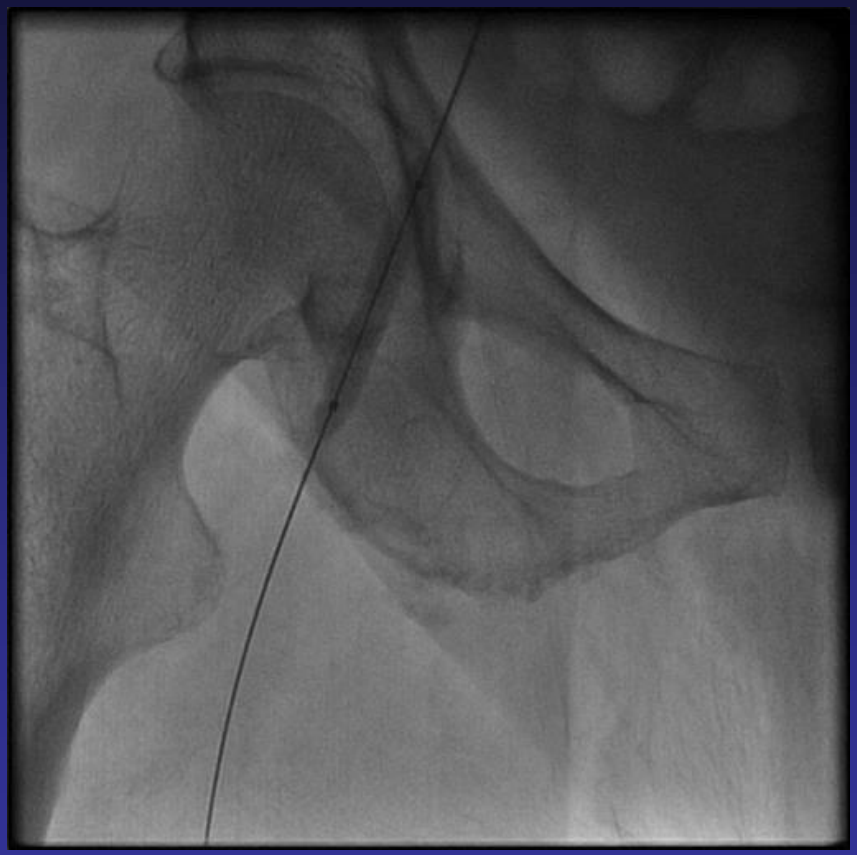
- Pre-procedural assessment
  - CFA AND ILIACS >6mm
  - No severe calcifications
  - Trans-axillary /apical / aortic are good alternatives
- Puncture – CFA above bifurcation
  - Use pigtail technique
  - Prostar
- Be prepared to be the best peripheral interventionalist!!!

Be Prepared for Significant Vascular Complication!!!



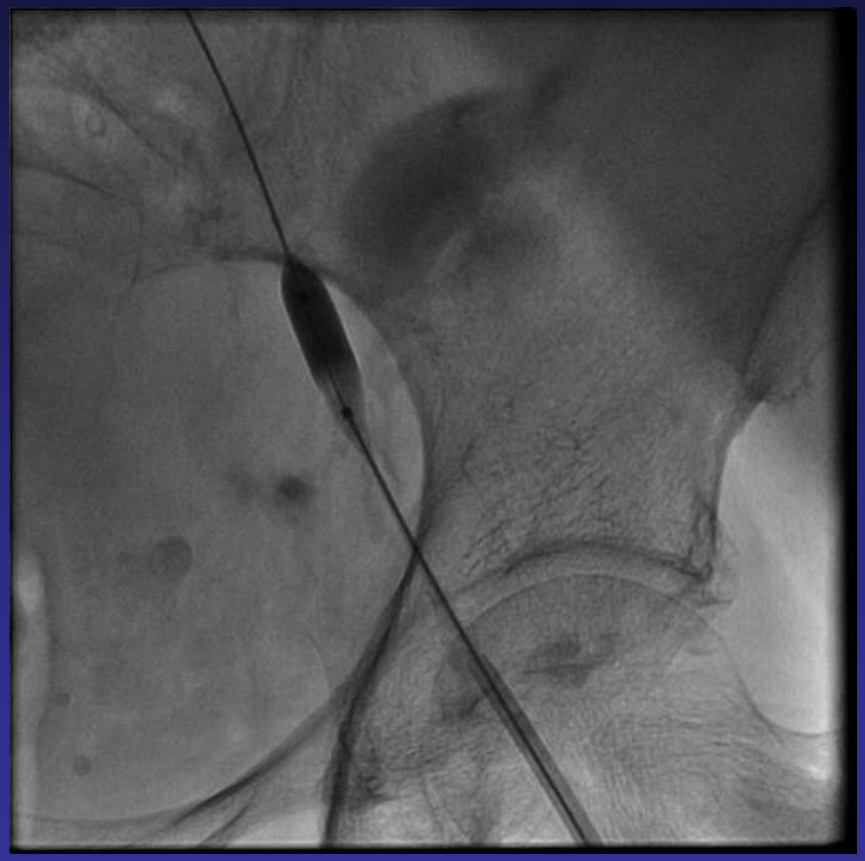
Tight CFA Stenosis after ProStar

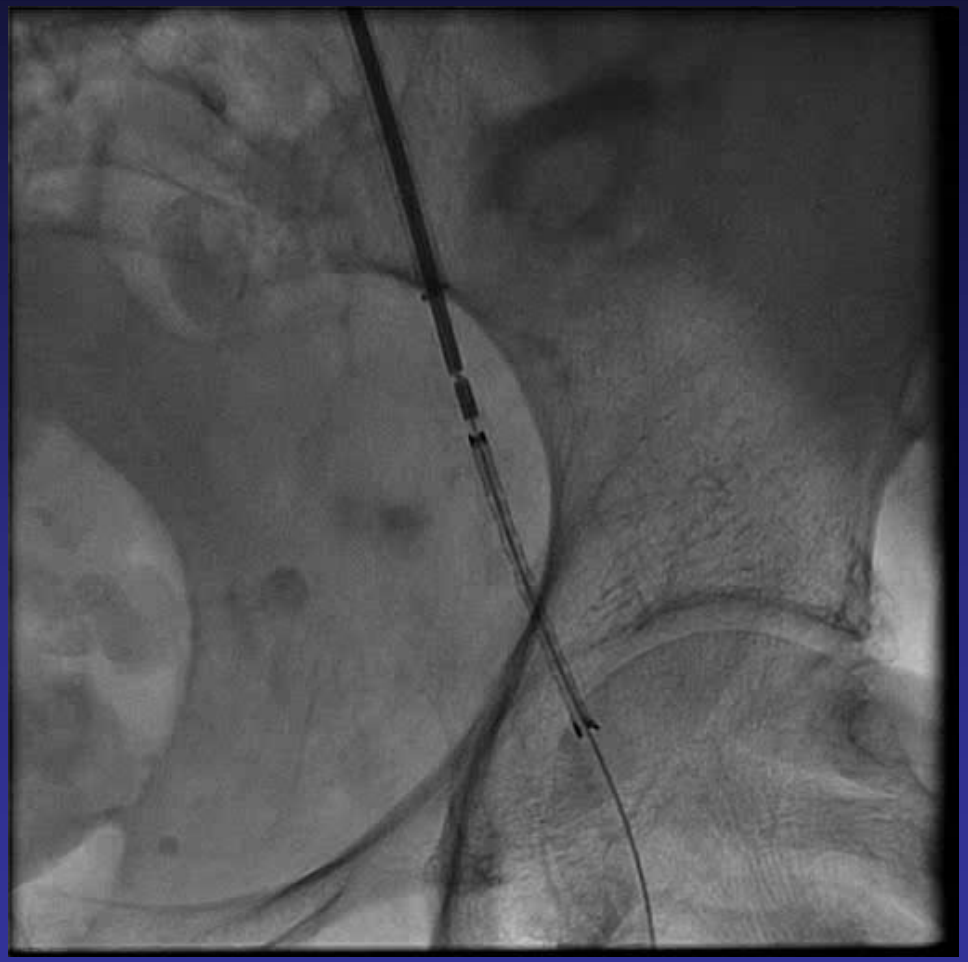
Repaired by Gentle Balloon Inflation



Iliac / Femoral Perforation
Uncontrolled Bleeding!!!

First block Iliac Artery by Balloon → Covered Stent

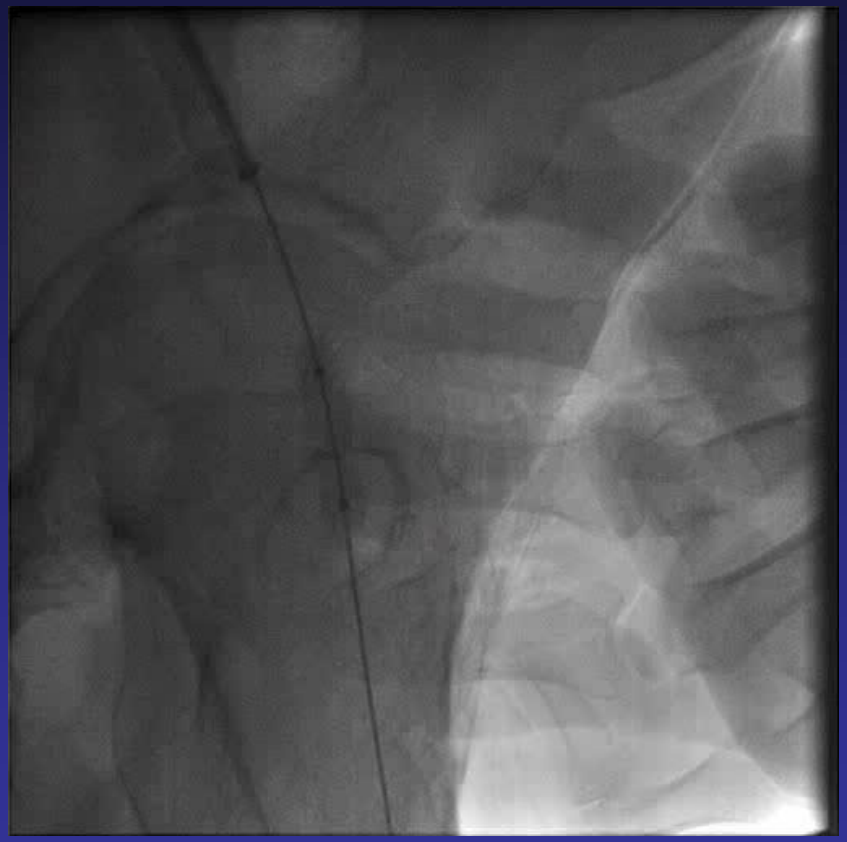


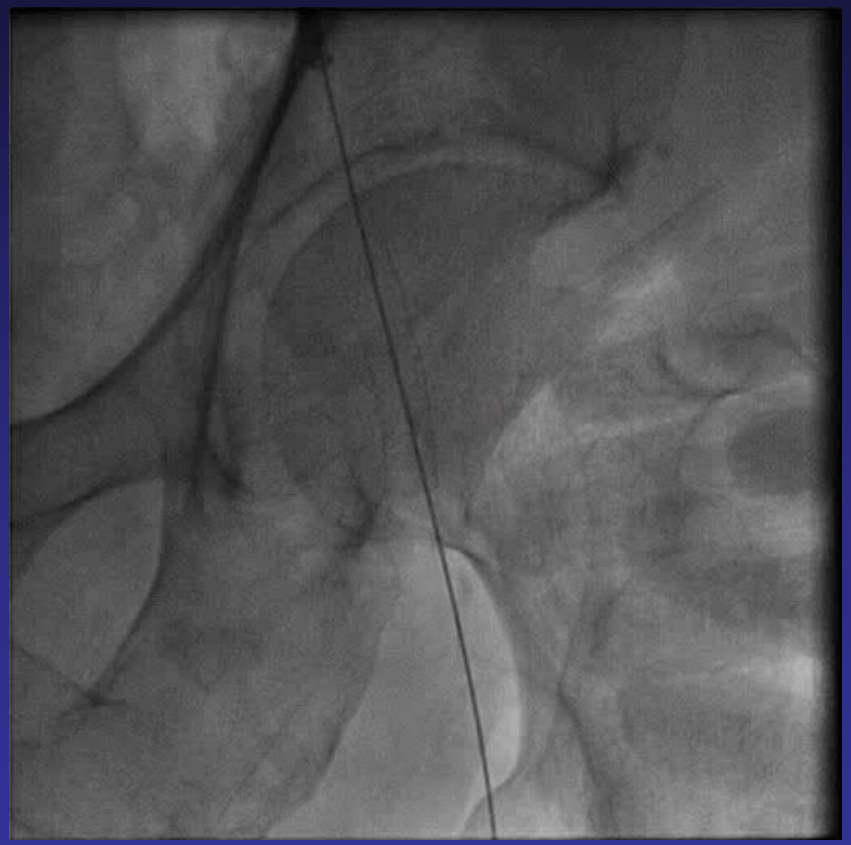


Residual Leakage from Artery!!

Repaired by Additional Stent

CFA Rupture due to Prostar Failure – Covered Stent



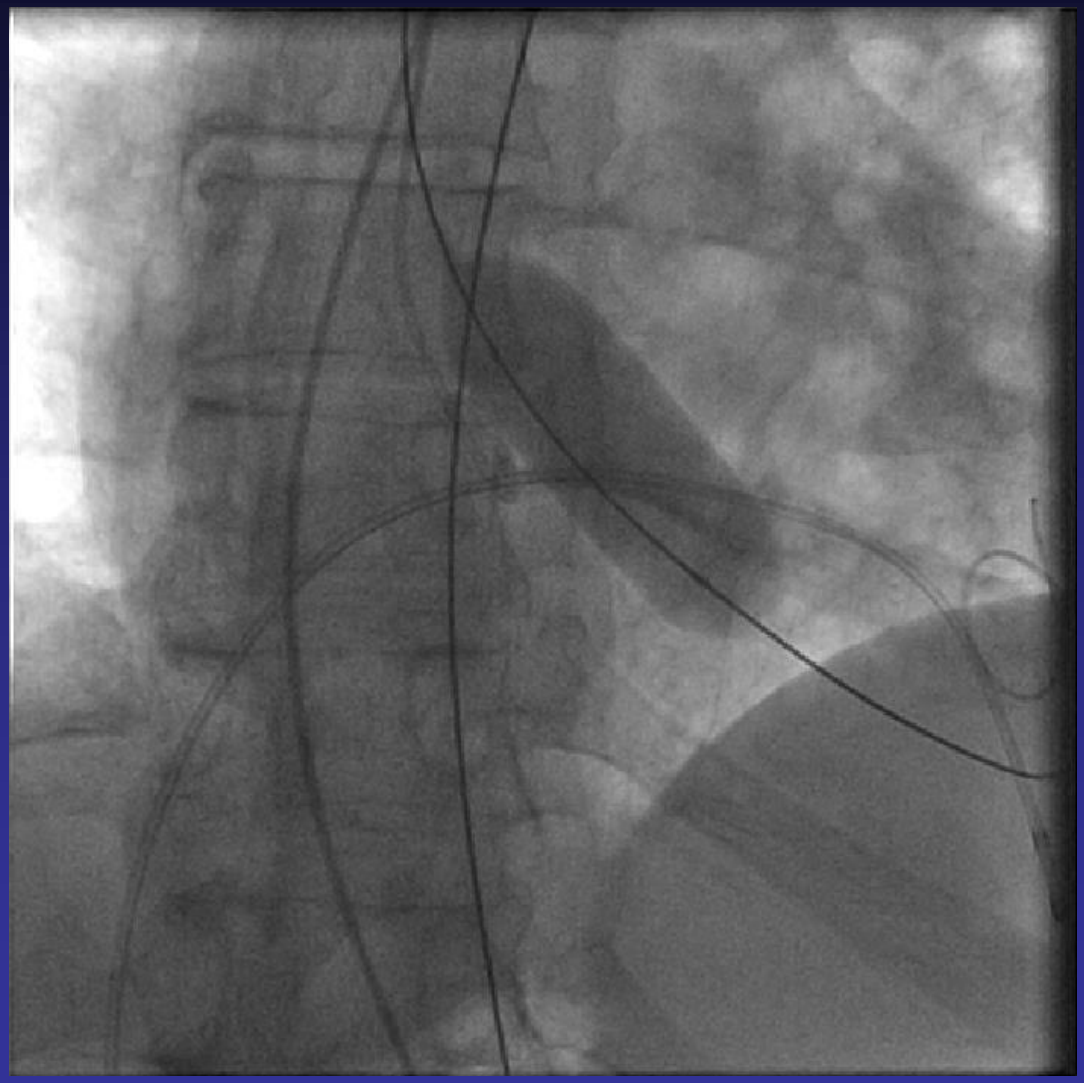


Case Presentation

Be Prepared to Repair Any Complication…

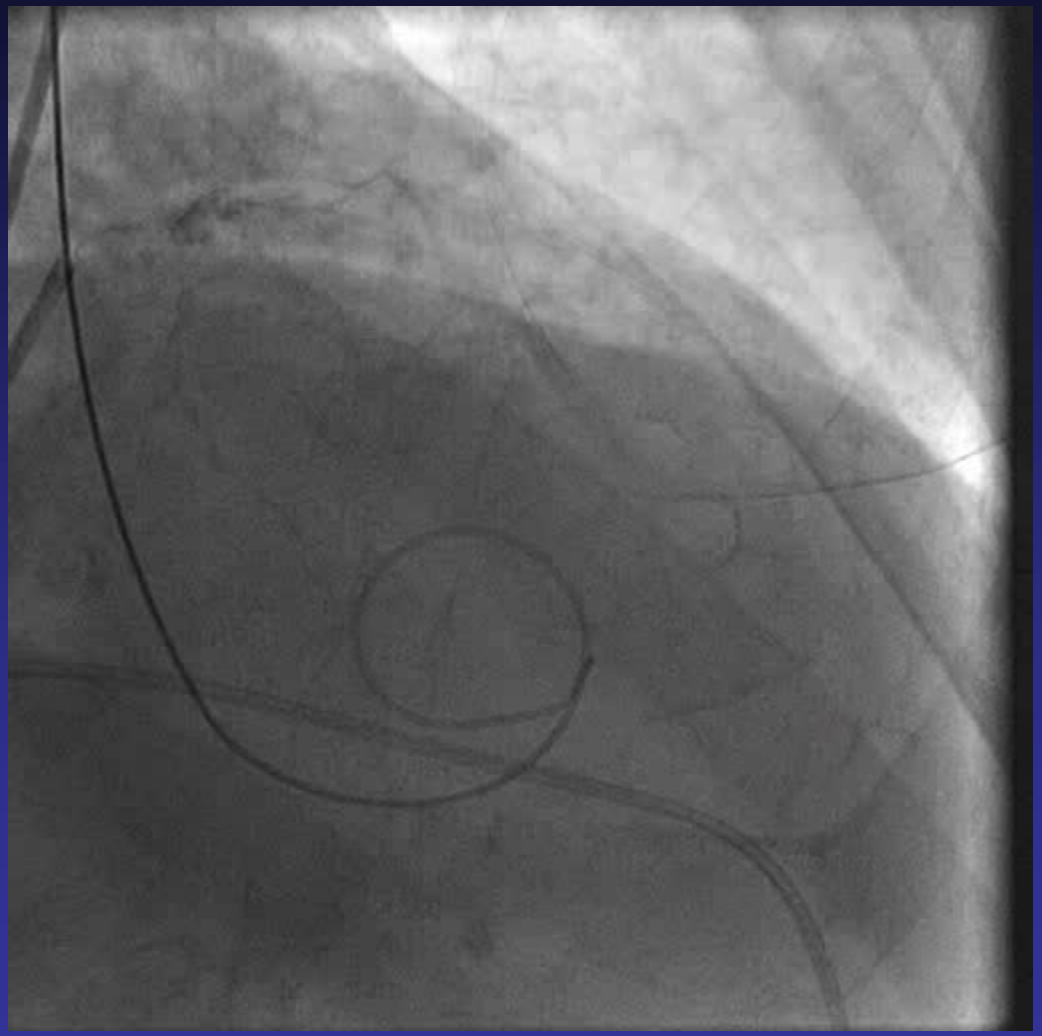
- 81 year old male
- HTN, DM, COPD
- Severe AS
- LVEF 55%, Grad 88/46, AVA 0.7, SPAP-65
- Aortic annulus 23mm by TEE
- Euro-score 22
- → Trans-femoral TAVI with Edwards 26mm

BAV

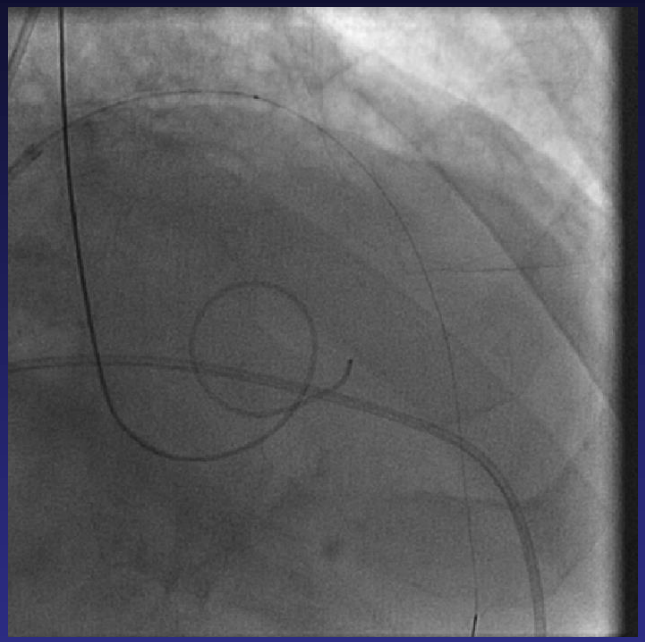


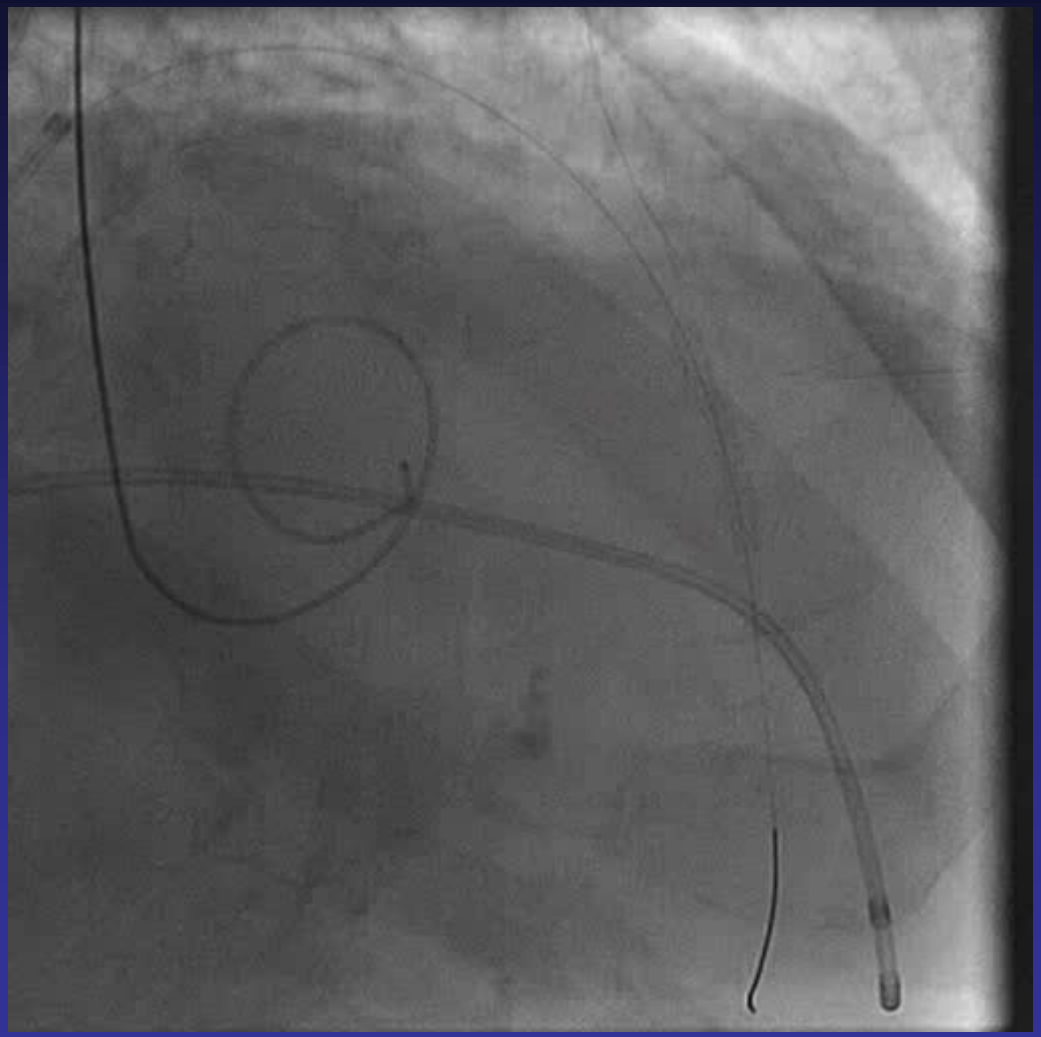
After BAV → Severe Chest Pain

Coronary Angio…..

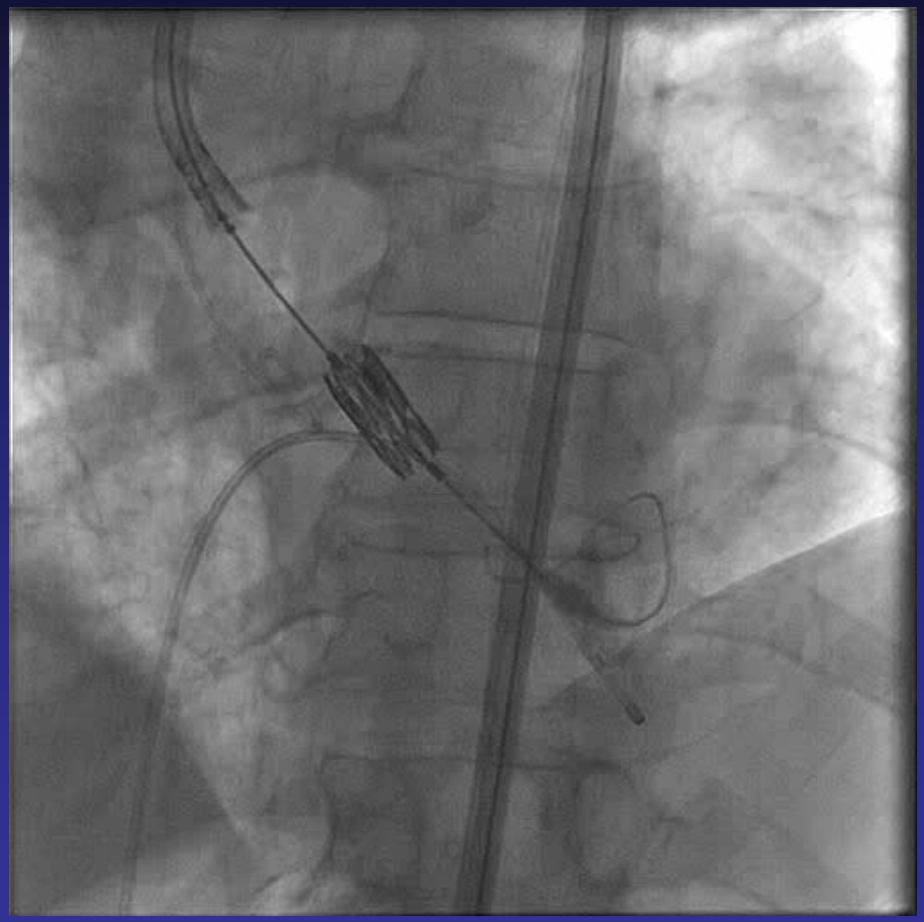


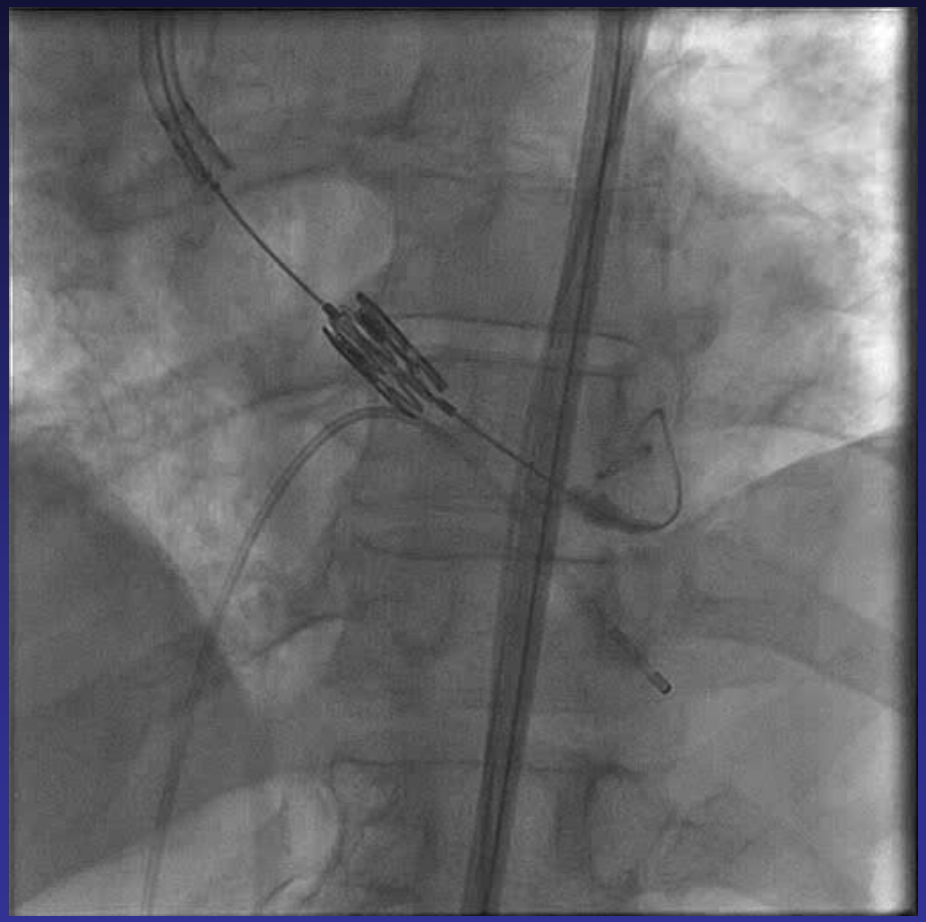
Immediate aspiration and stenting



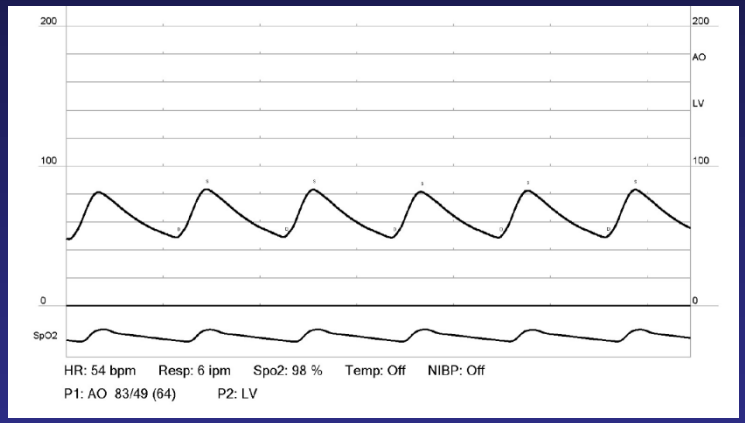


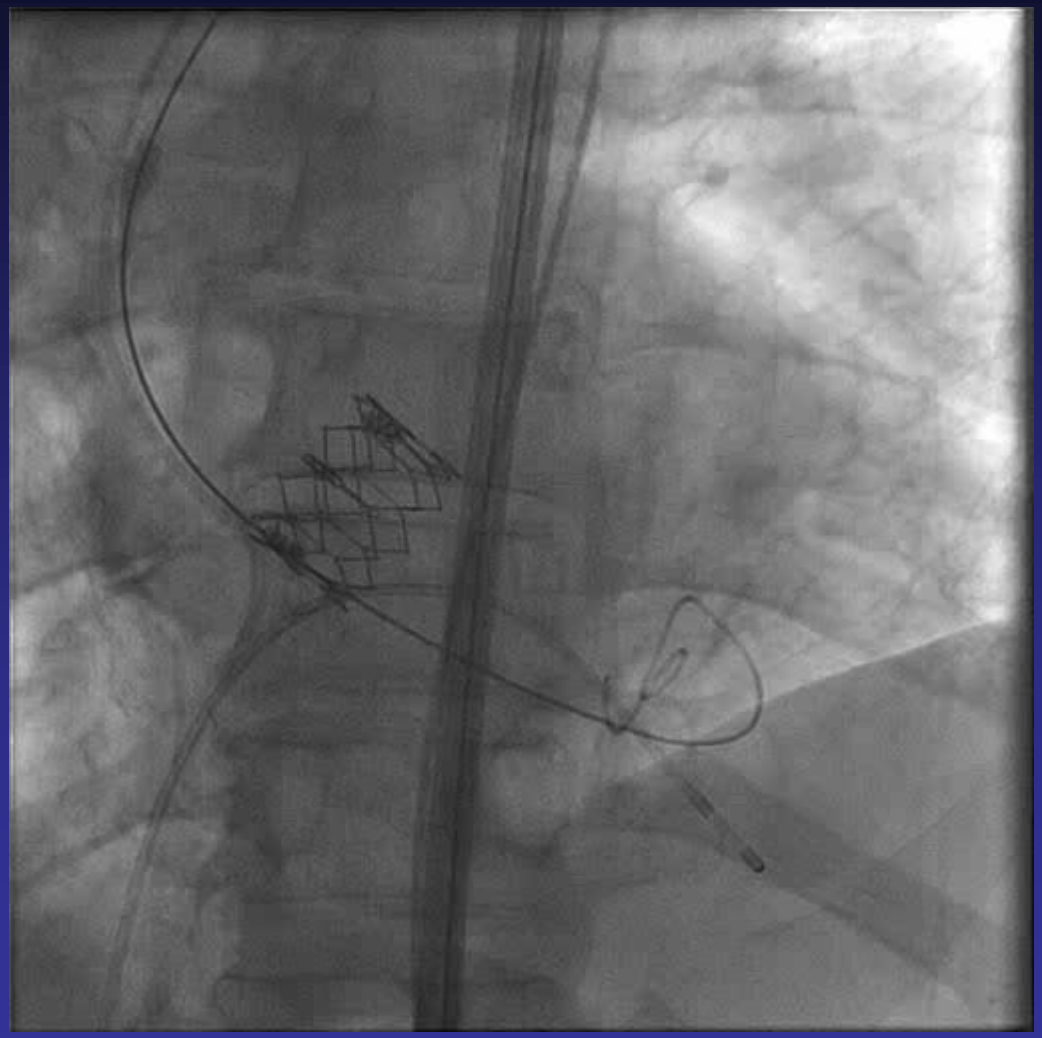
Valve Positioning & Implantation



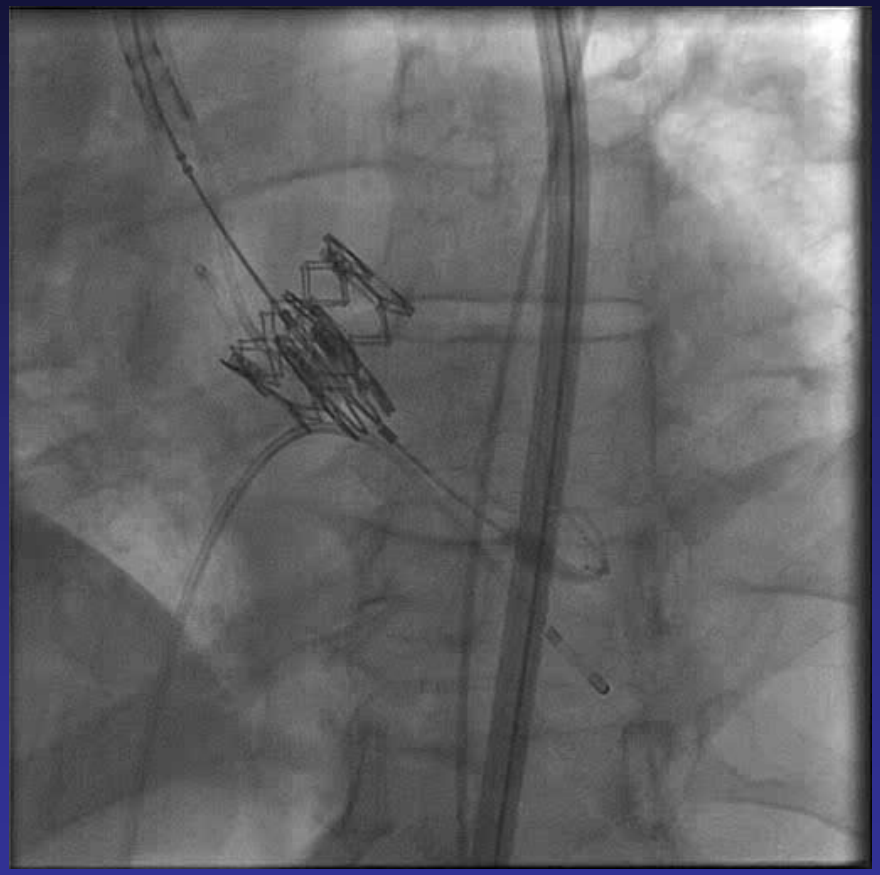


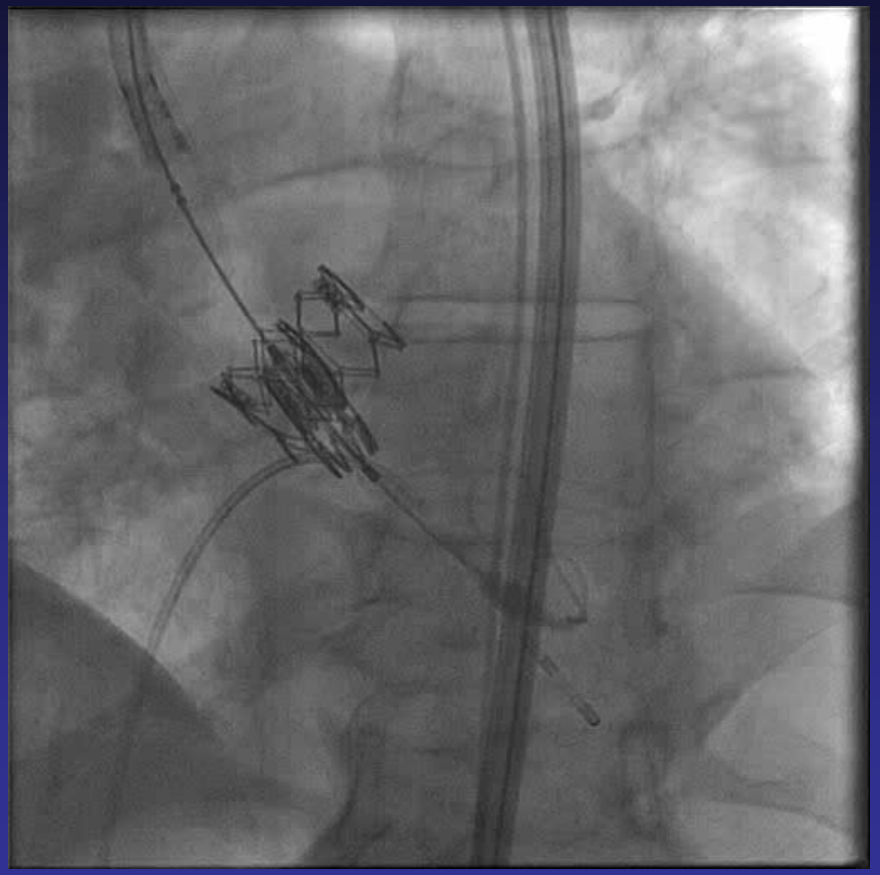
Supra-Annular Implantation with Severe AR



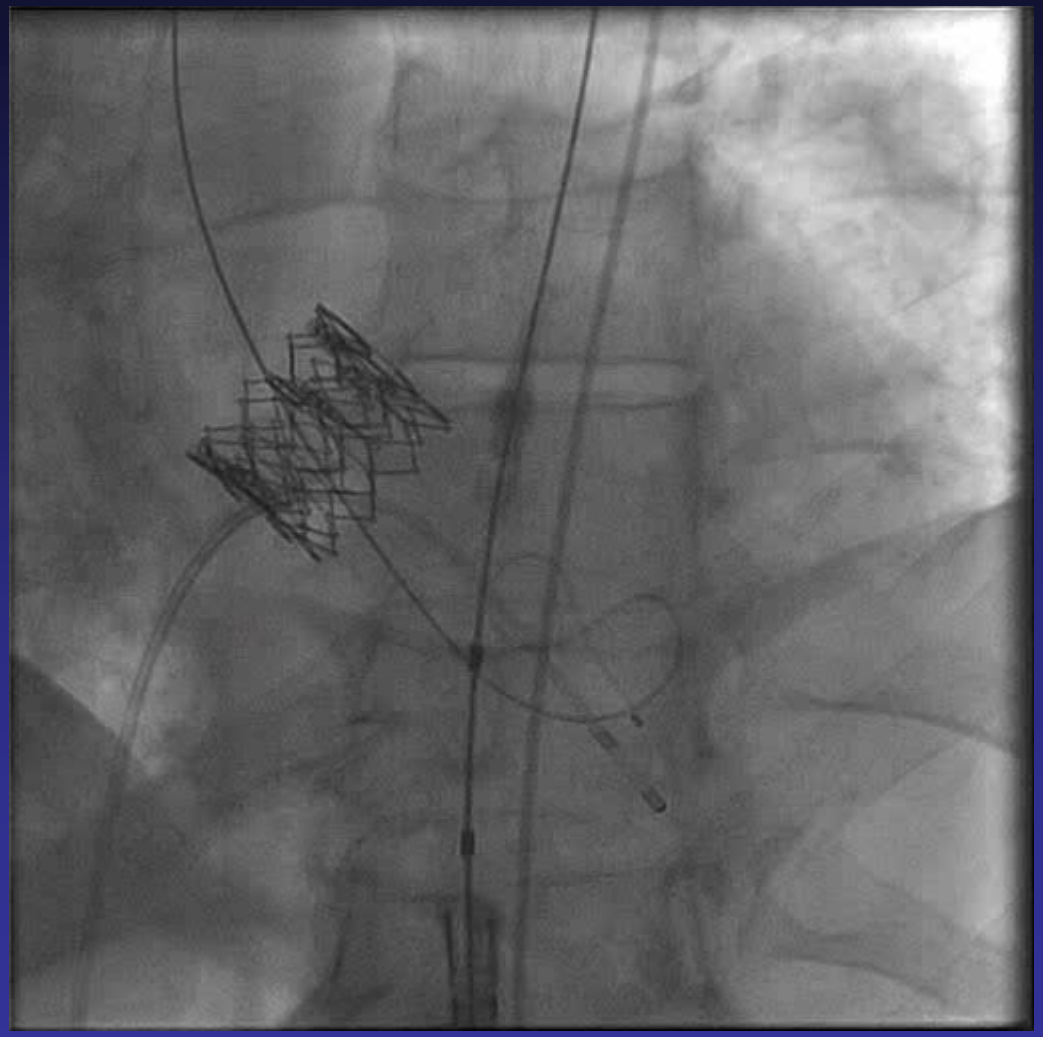


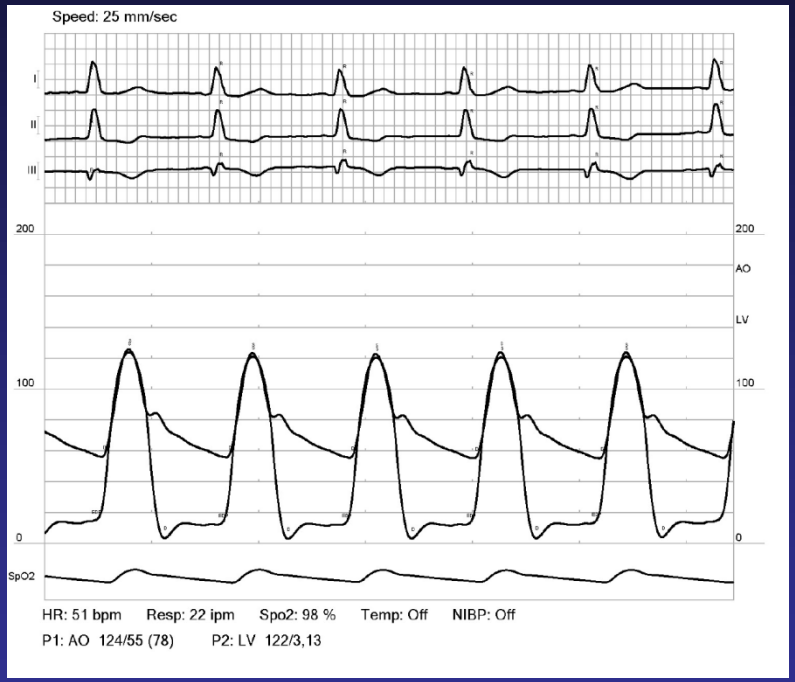
Valve-in-Valve



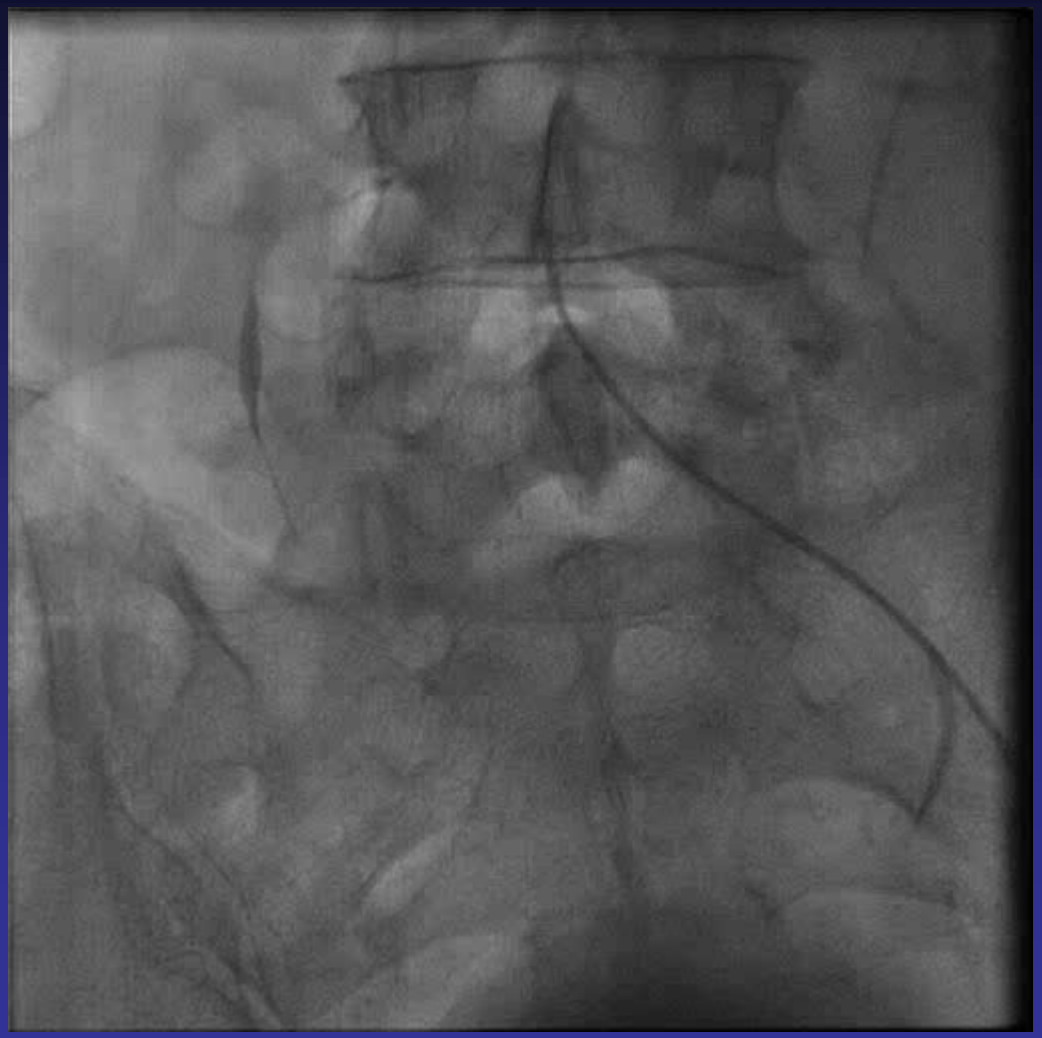


Final Results

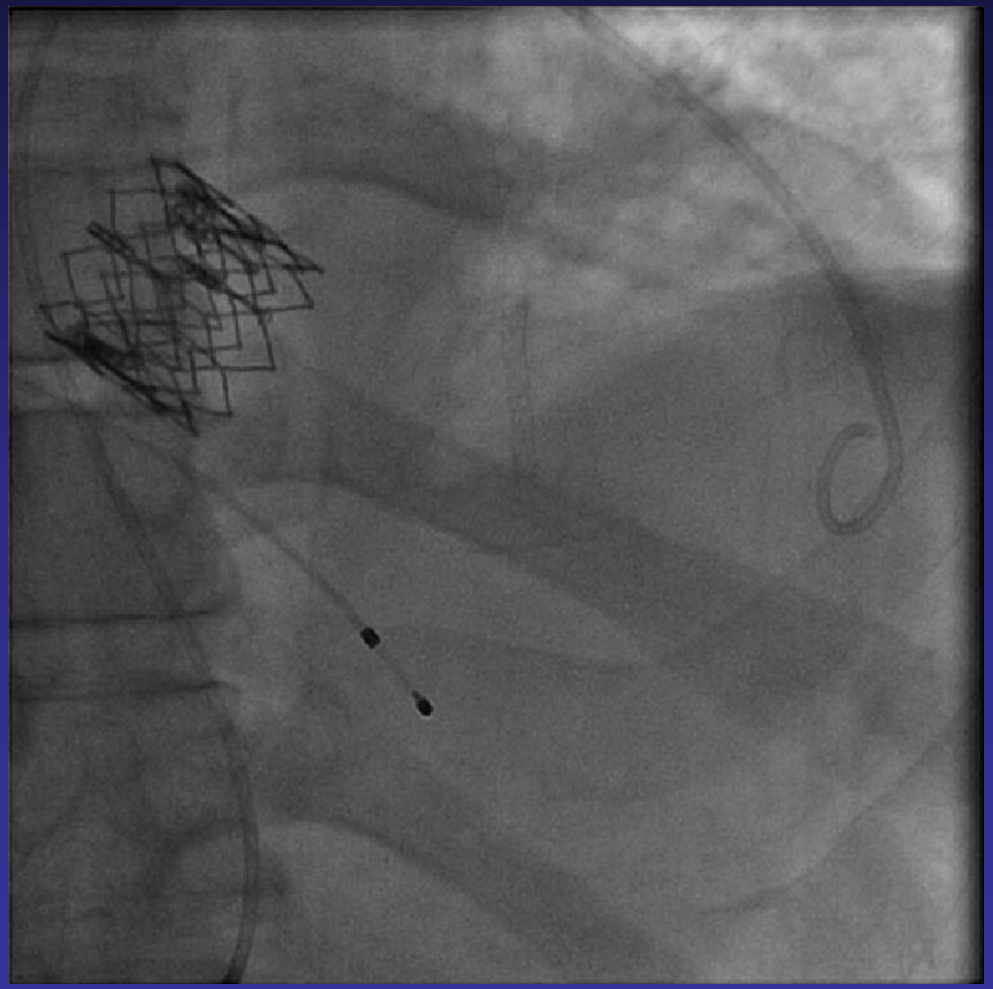




Final Femoral Angio



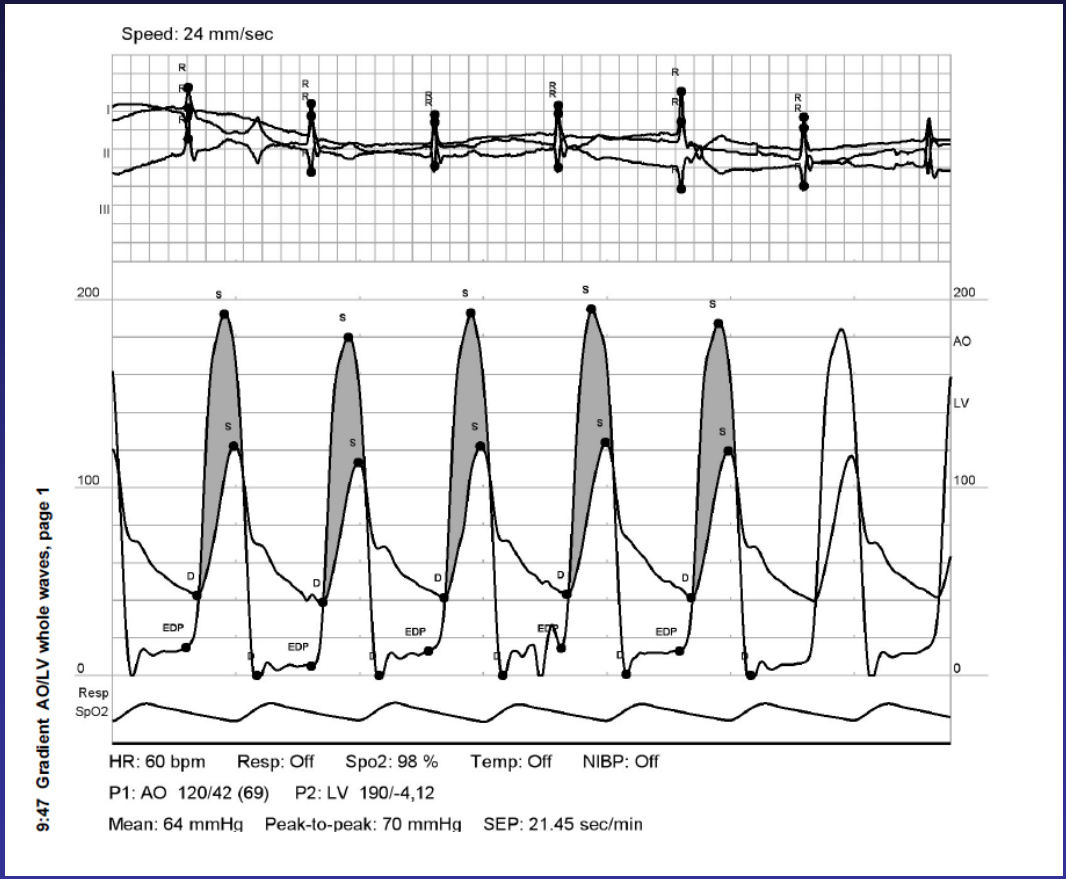
Not the end of the story…..
10 min later – sudden hypotension
STAT echo → Tamponade



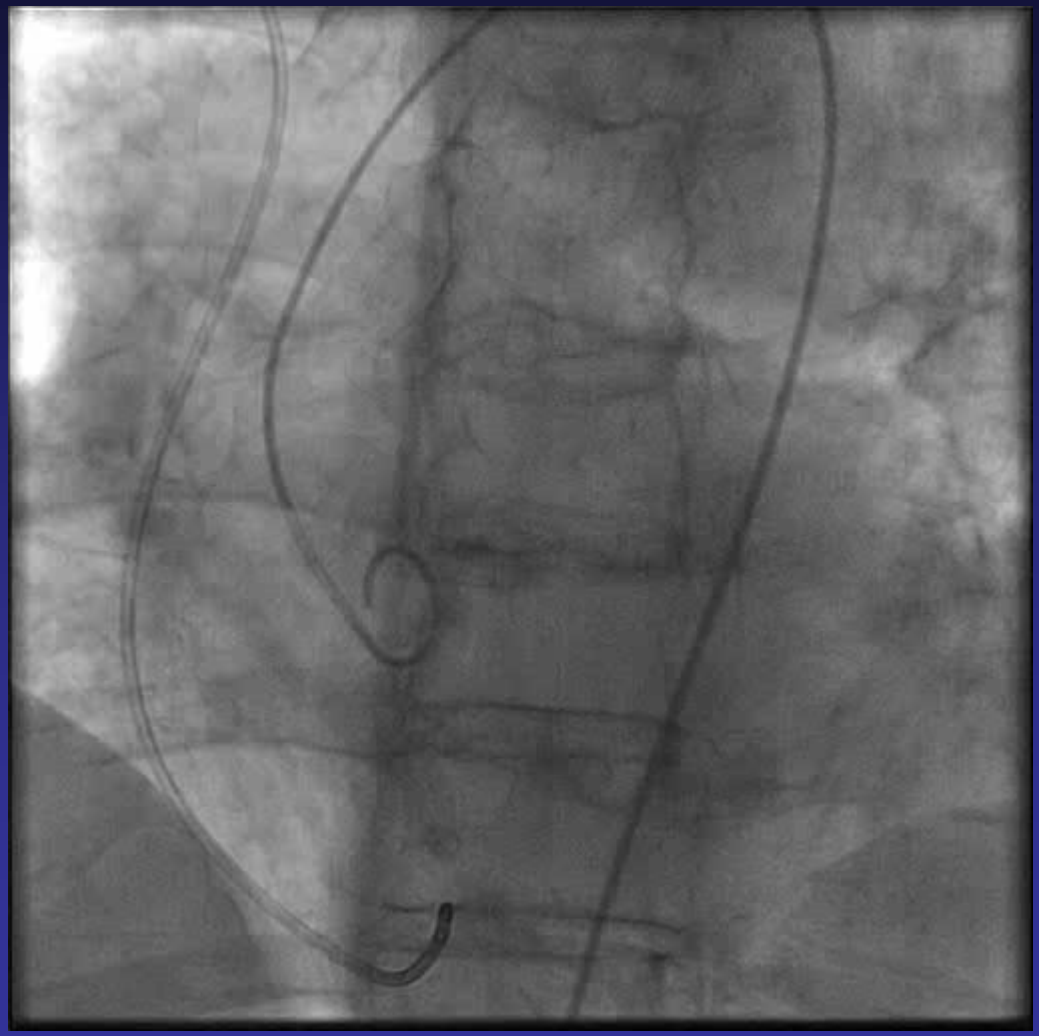
A case of late tamponade

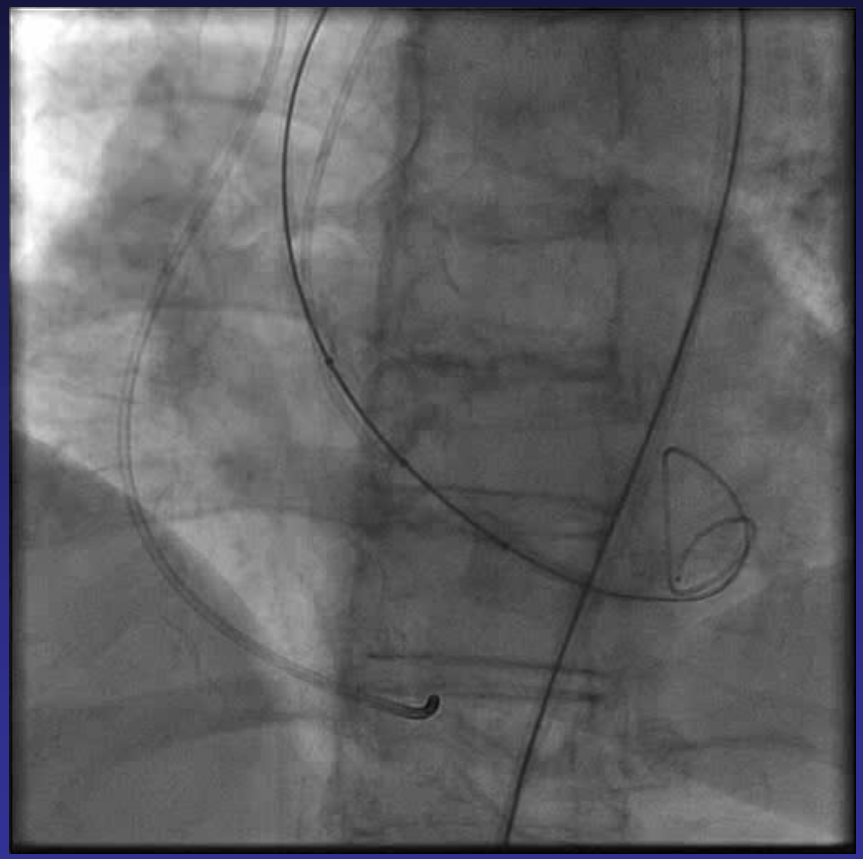
- **81y old female**
- **COPD**
- **High frailty index**
- **Severe AS**
  - **LVEF 60%**
  - **Grad 80/60**
  - **AVA 0.64**
  - **SPAP 55**

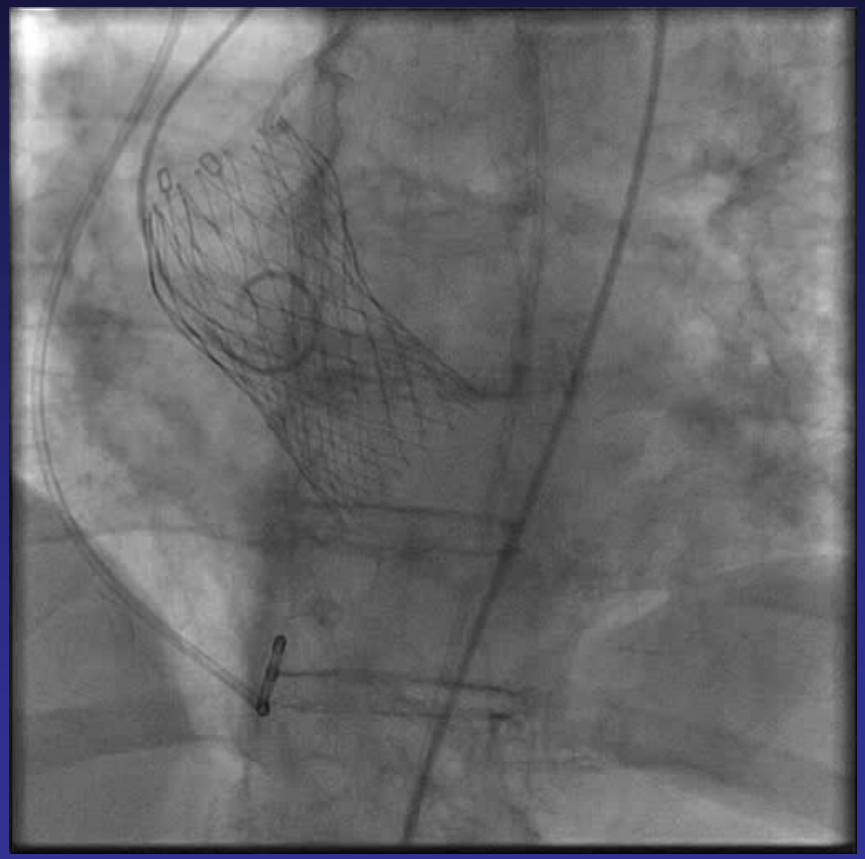
Severe AS

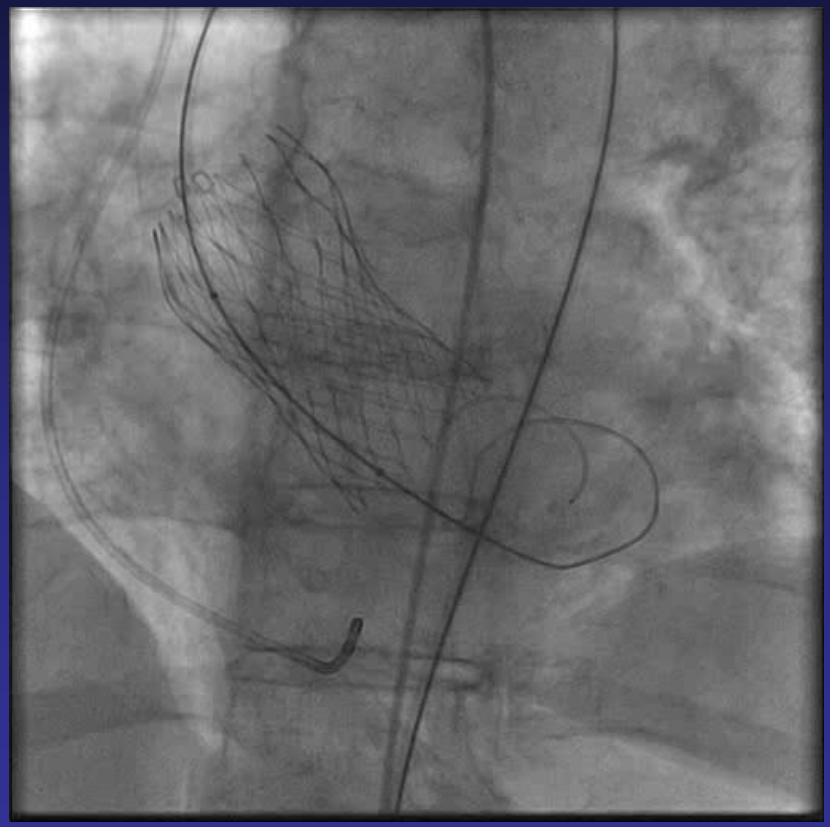

Speed: 24 mm/sec
I
II
III
200
100
0
AO
LV
EDP
Resp
SpO2
9:47 Gradient AO/LV whole waves, page 1
HR: 60 bpm Resp: Off Spo2: 98 % Temp: Off NIBP: Off
P1: AO 120/42 (69) P2: LV 190/-4,12
Mean: 64 mmHg Peak-to-peak: 70 mmHg SEP: 21.45 sec/min

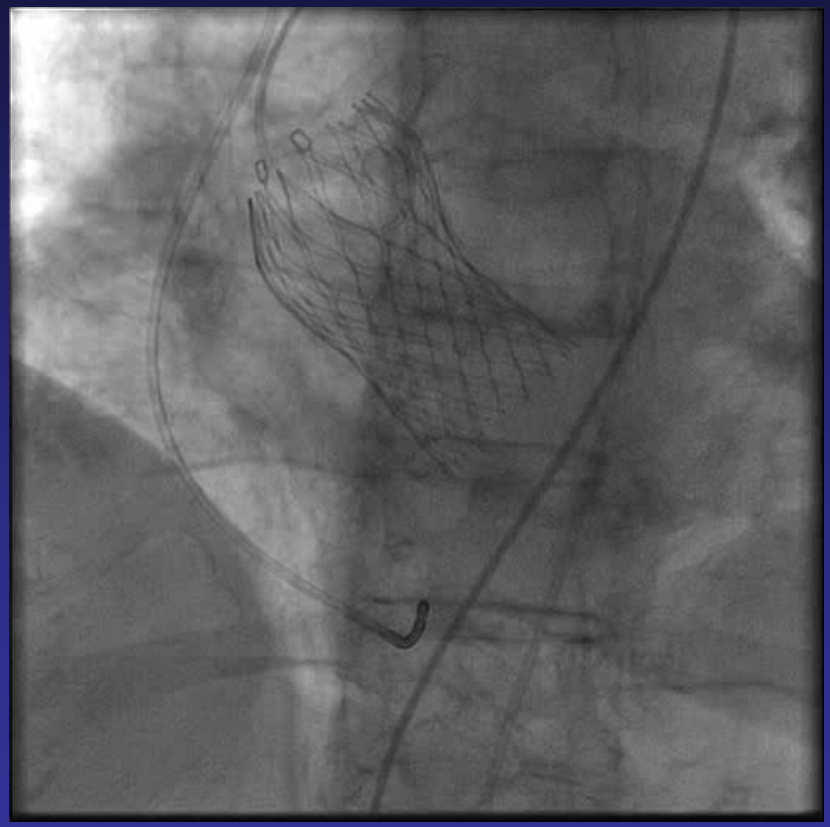
Temporary pacemaker



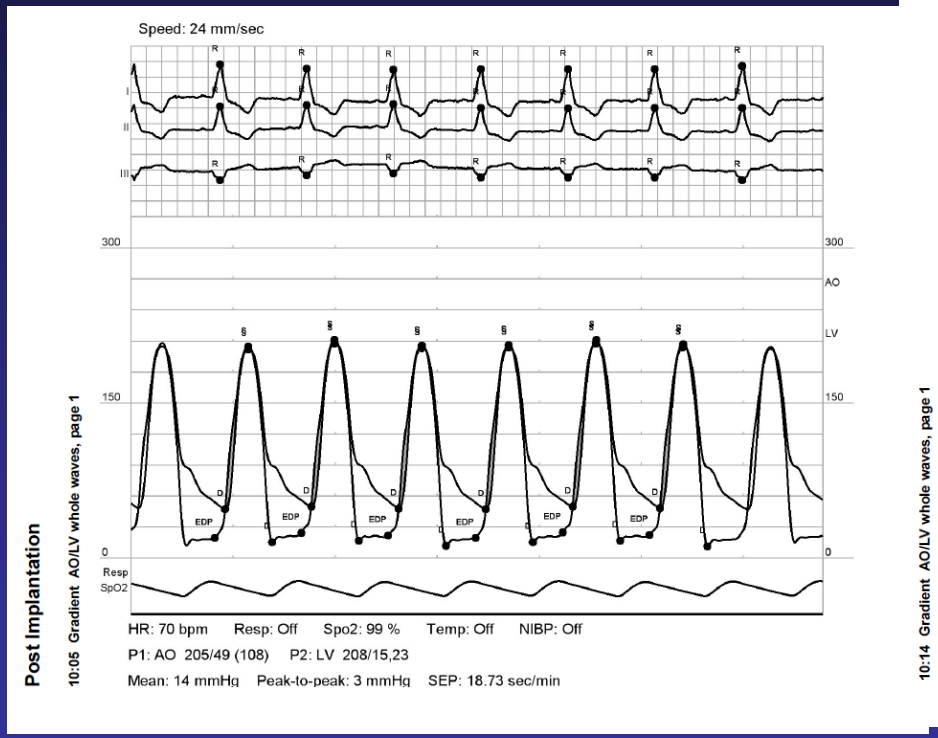


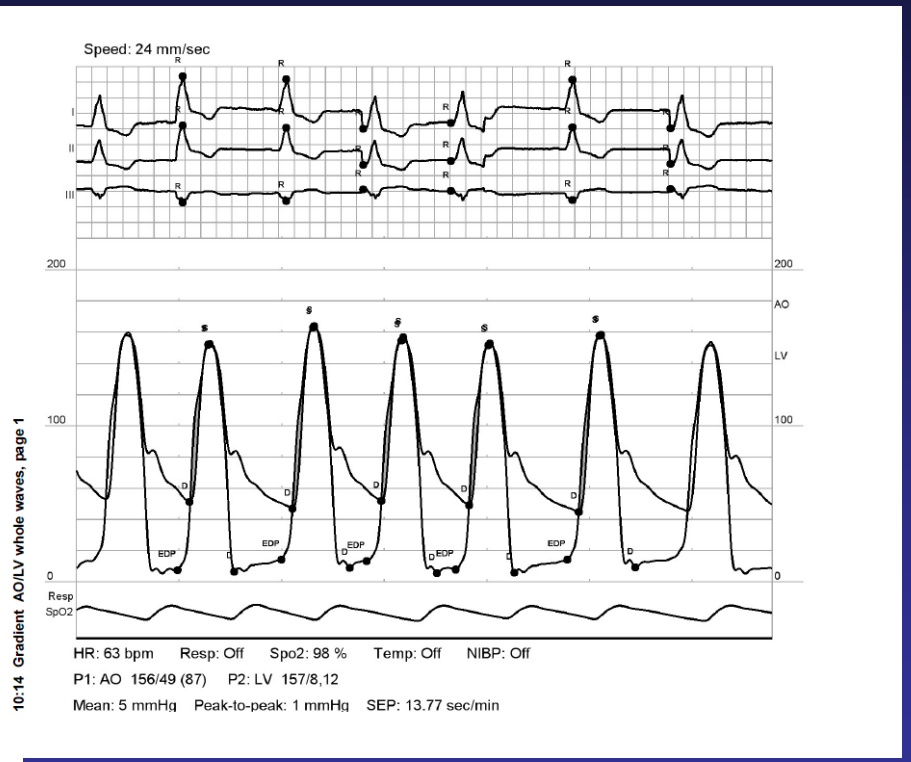






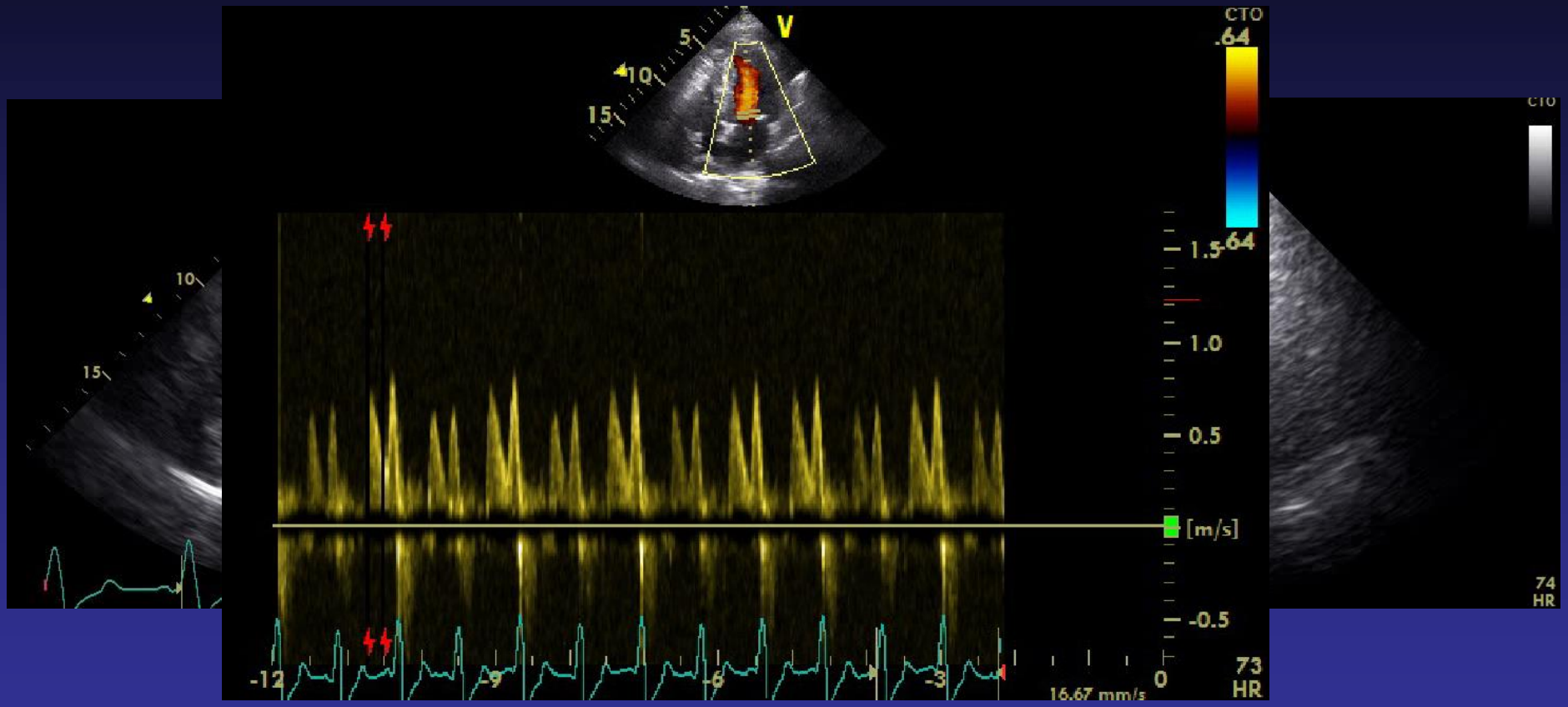
Hemodynamics
pre and post dilation



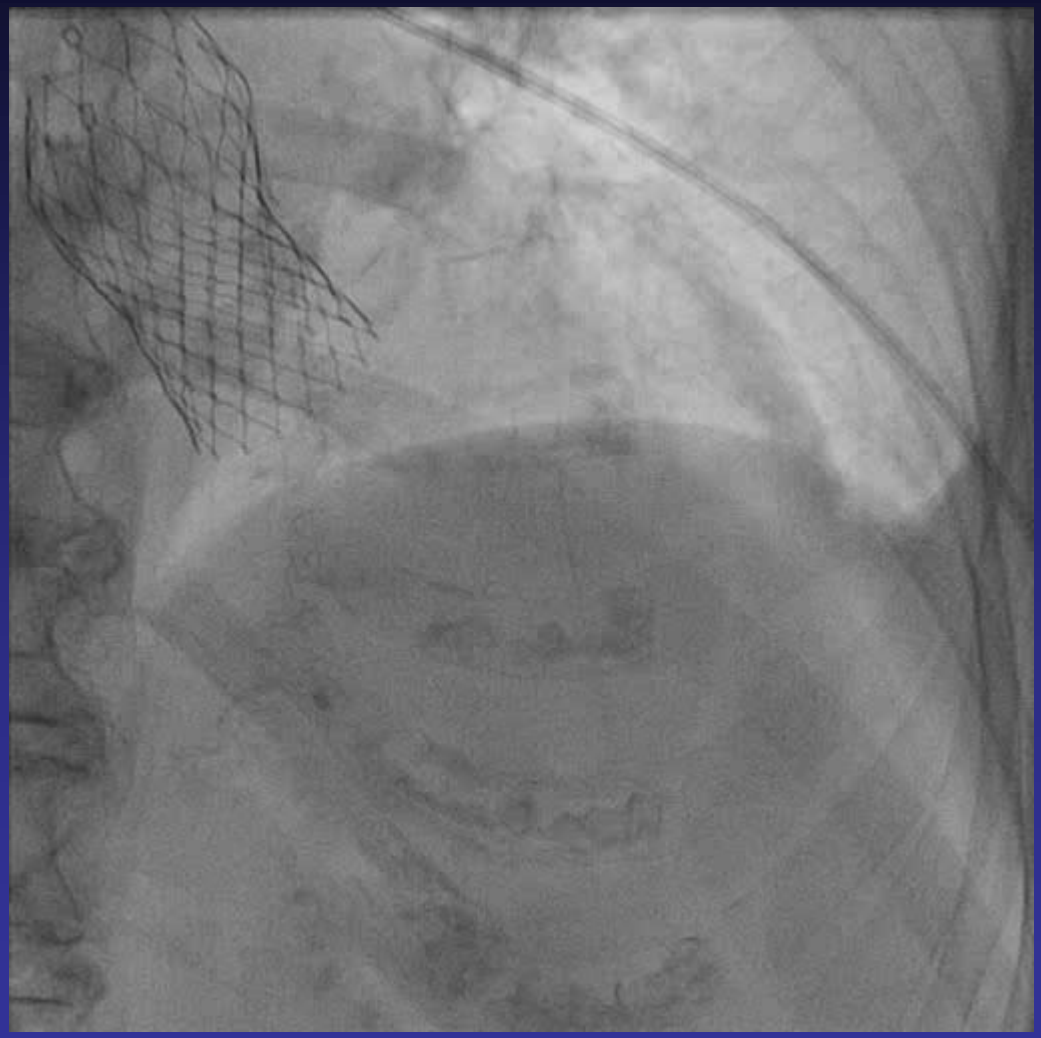


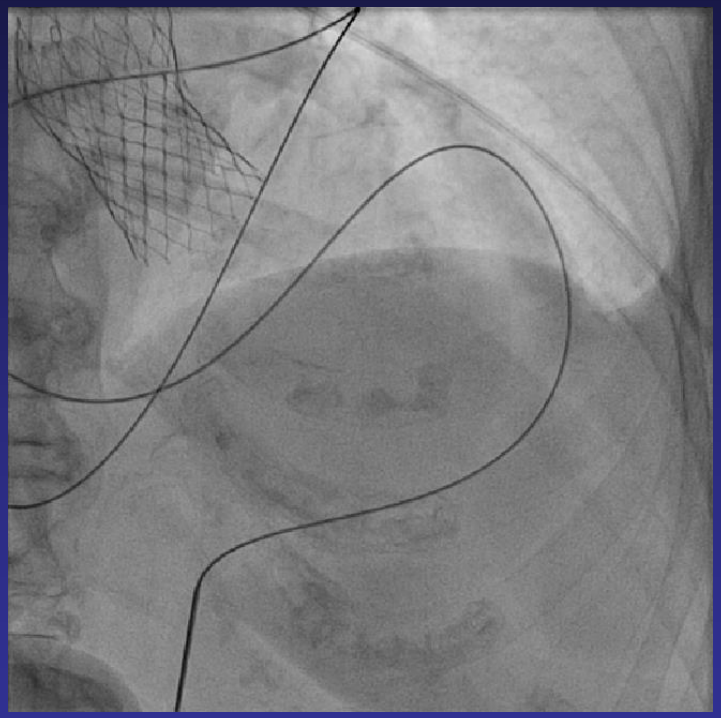
Follow-up CCU

- Stable
- No heart blocks
- On day2 – removal of pacemaker
- 1 hour later
  - Collapse
  - BP 40-50, tachycardia 140
  - STAT echo → tamponade

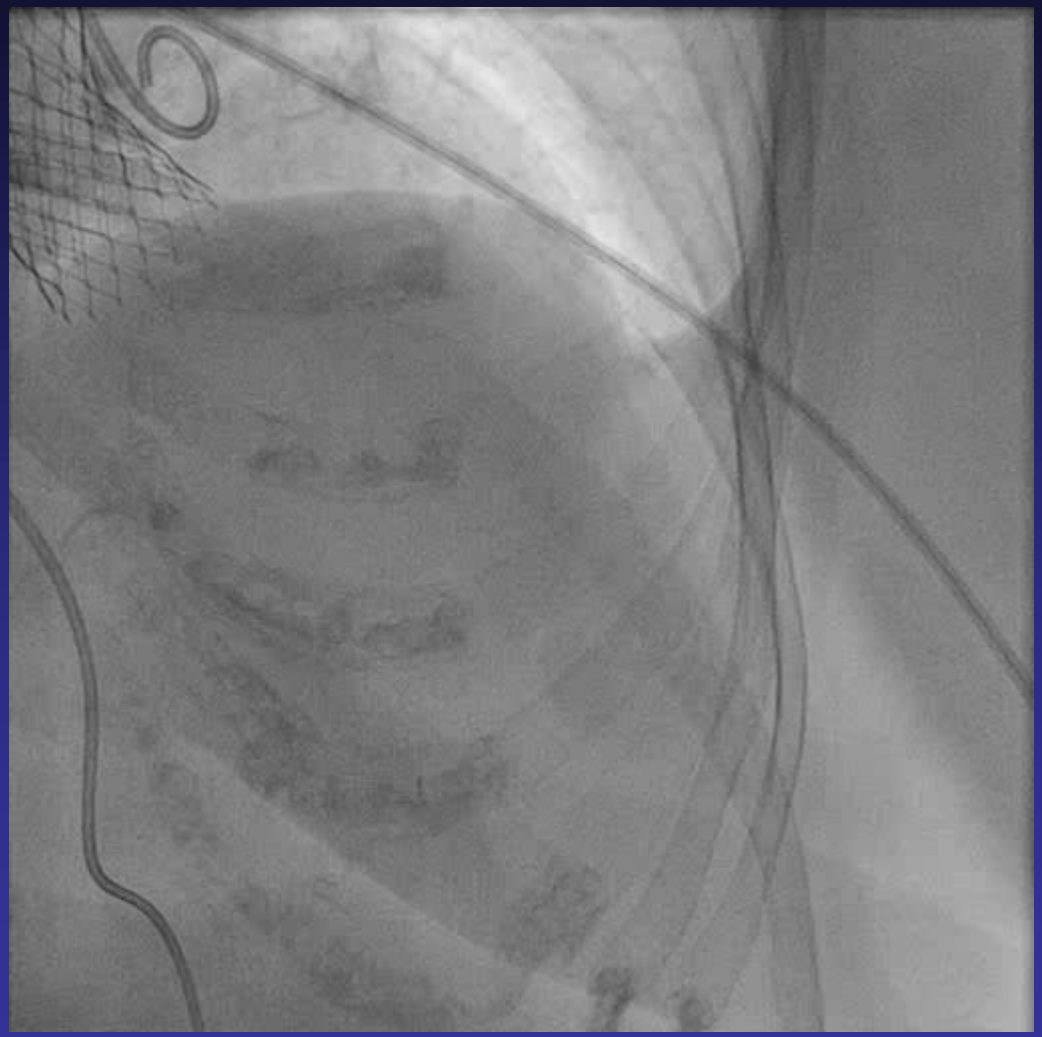

V
5
10
15
CTO
.64
-.64
1.5
1.0
0.5
[m/s]
-0.5
0
73
HR
-12
-9
-6
-3
16.67 mm/s
74
HR

Cardiac tamponade on angio





Post tap

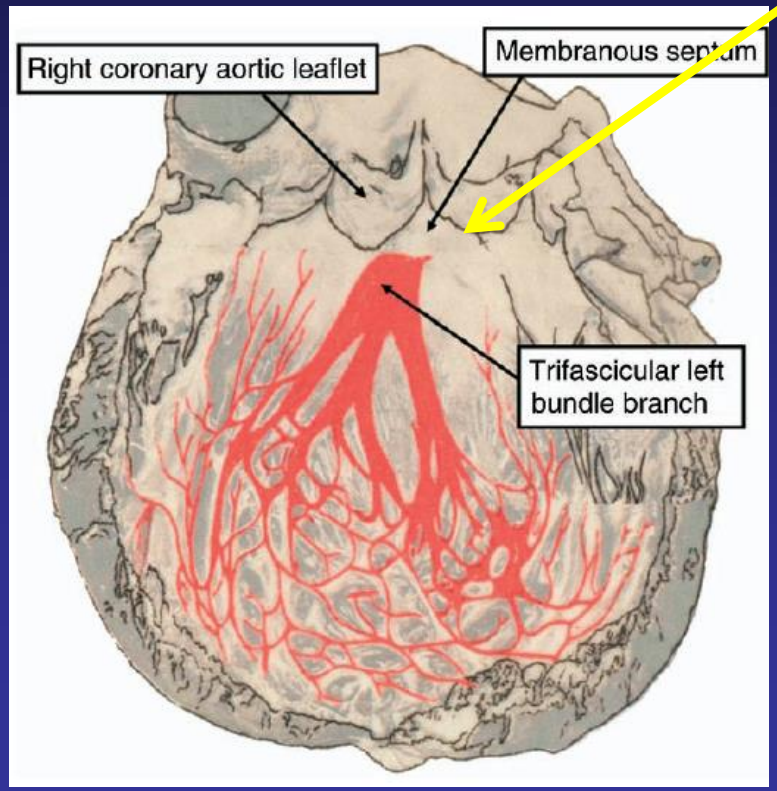


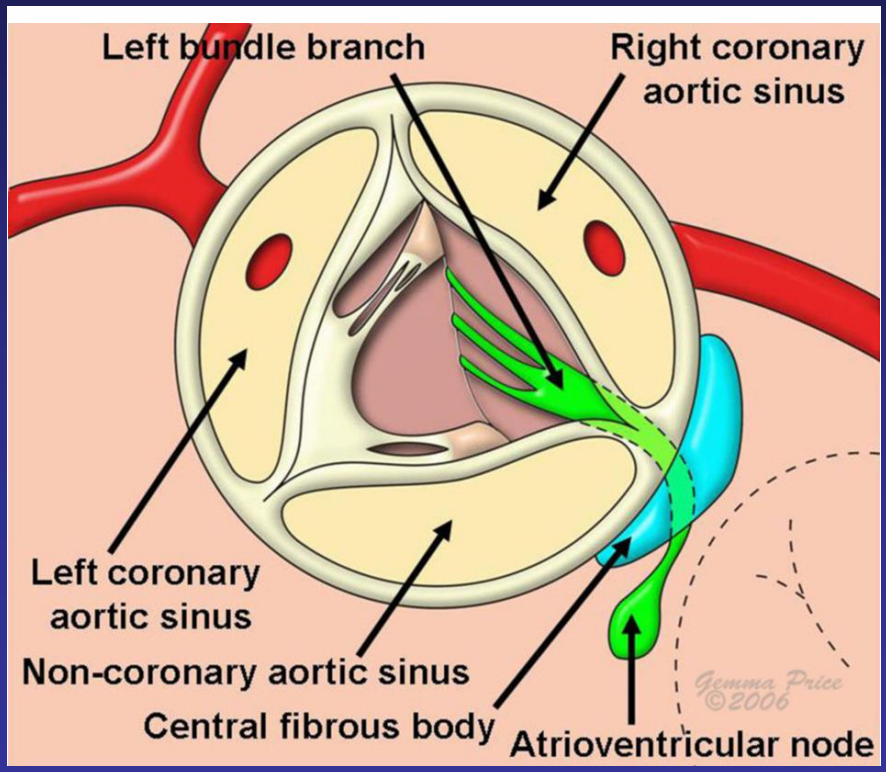
Discharged on day7

How to Avoid A-V Blocks?

Location of the Conduction System

6 mm from bottom of NCC to emergence of LBB





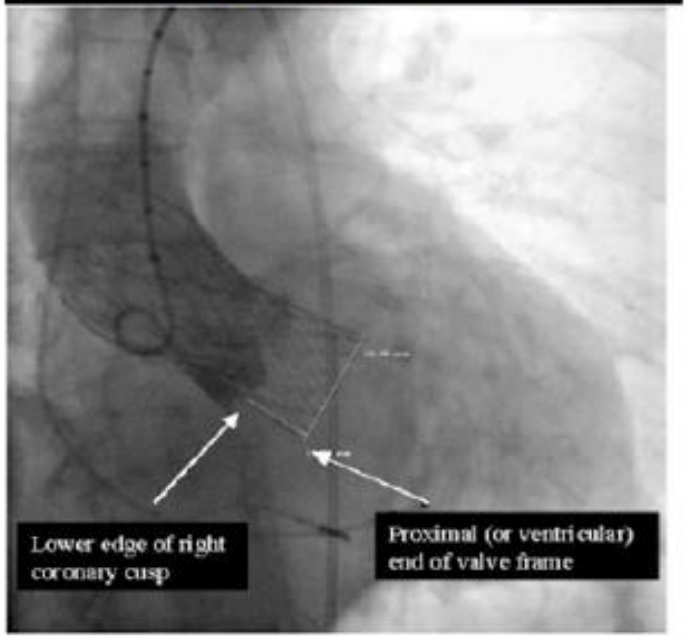
Depth of Implantation and LBBB

New-onset LBBB:

10.3 ± 2.7 mm

(range, 6.7 to 14.6 mm)

Related to depth of implantation



No LBBB:

5.5 ± 3.4 mm

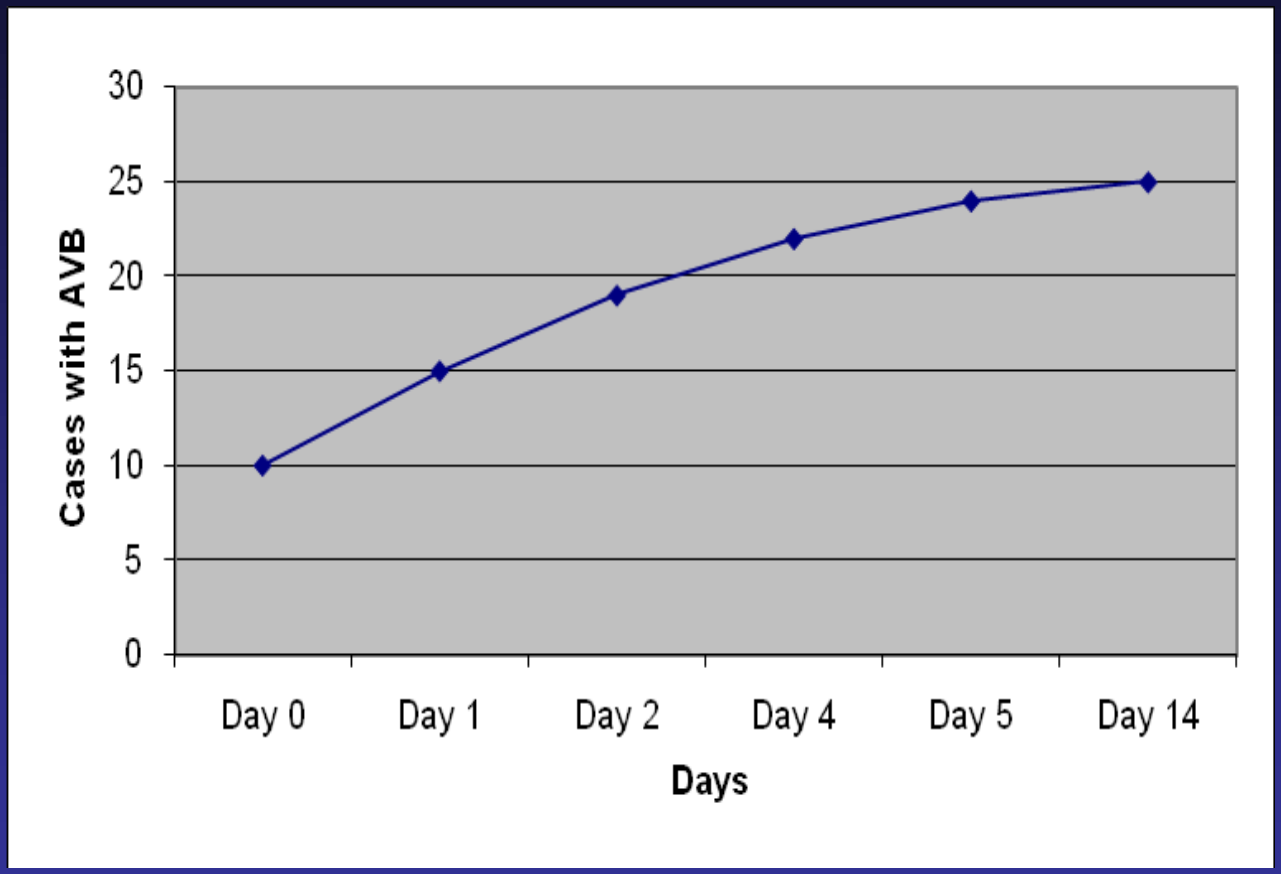
(range, 0.7 to 12.2 mm)

Early and Persistent Intraventricular Conduction

P = 0.005

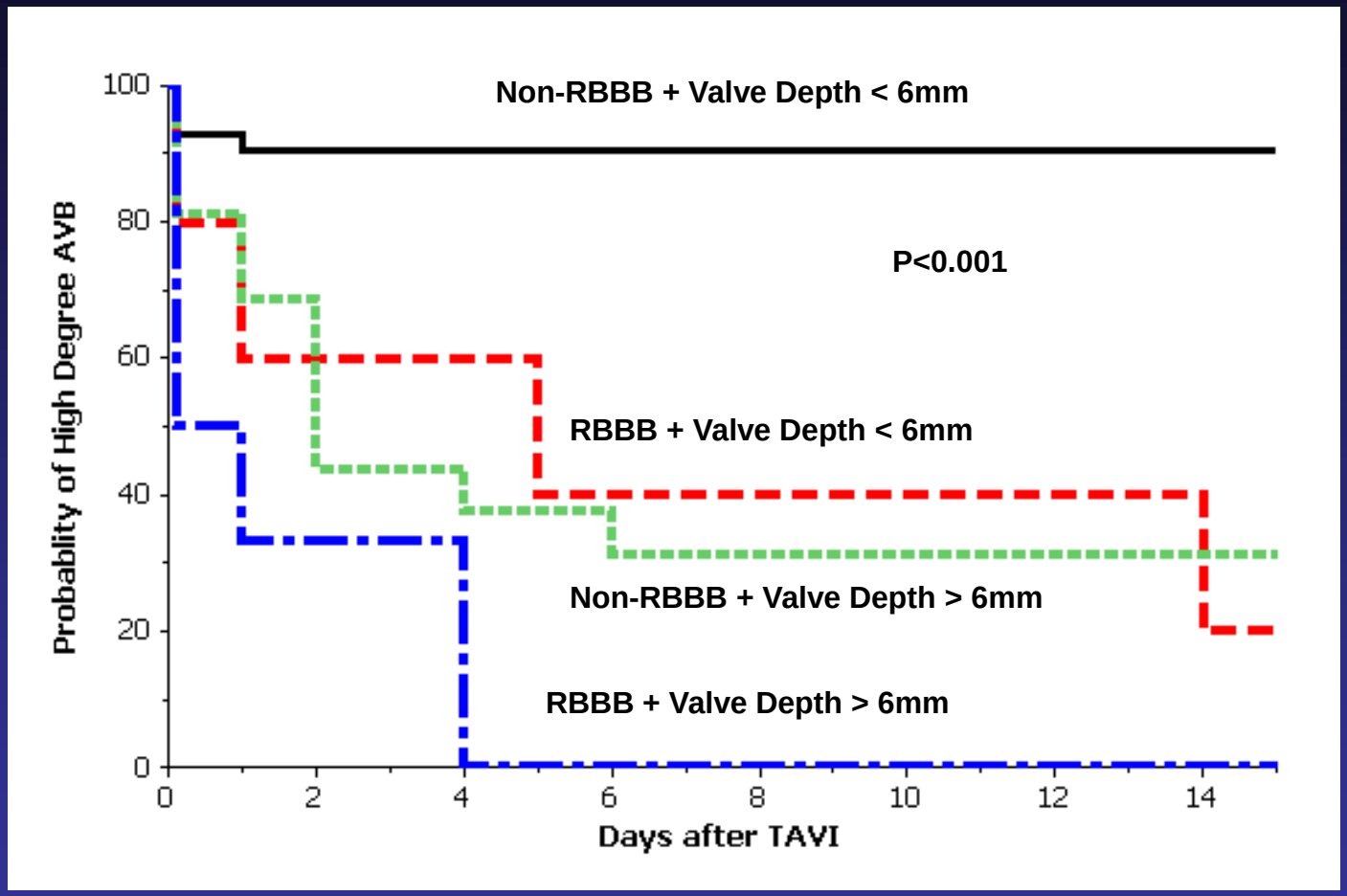
Time to Development of High Degree AV Block

n = 25/70



Guetta V, Goldenberg G, Segev A et al AJC 2011

Time to Development of High Degree AV Block Related to CRBBB and Depth of Valve Implantation



Guetta V, Goldenberg G, Segev A et al AJC 2011

Permanent Pacing After TAVI

- Absolute :
  - **New high degree AV block of any duration (early or immediate implantation)**
  - **Alternating BBB**
- Relative:
  - **Preexisting LBBB+ 1st degree AVB with any change ?**
  - **Preexisting RBBB with any change ?**
  - **New LBBB + 1st degree AV block ? ?**
- **Role of EPS ?**
  - **Prophylactic pacing ?**
  - **Early decision after procedure ?**

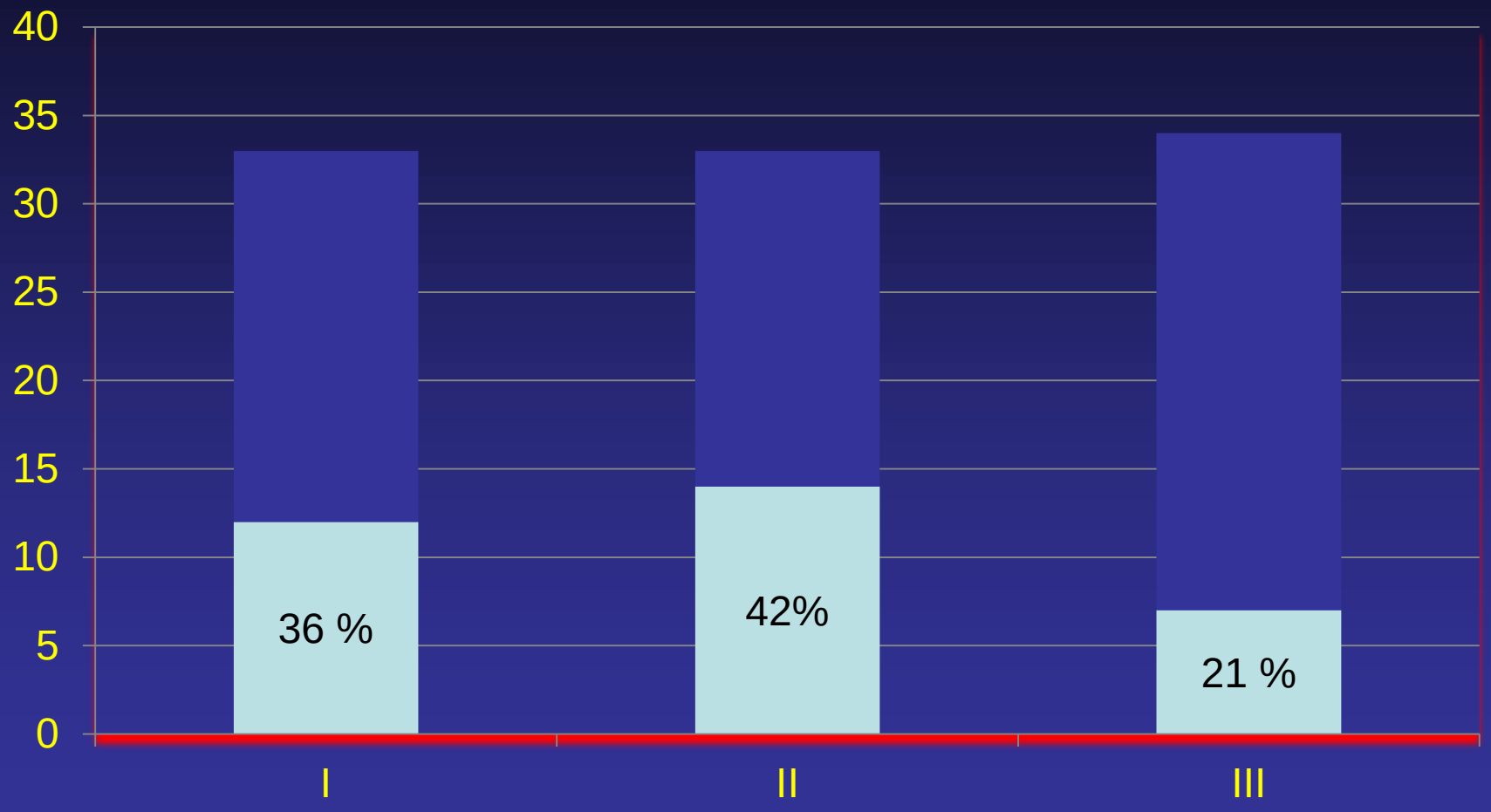
Monitoring After TAVI

- In-hospital monitoring for 5 days
- 3 days for “low risk” patients ?
- Holter before discharge in borderline cases
- Role of pre discharge EPS ?

Preventive Measures

- Use Edwards Sapien in RBBB
- High position of Corevalve
- Preventive permanent pacing before TAVI:
  - Absolute :
    - Preexisting indications for PPM (History of syncope , holter !)
  - Relative :
    - All patients with RBBB undergoing CoreValve implantation ?
    - All patients with preexisting LBBB + 1st degree AV block undergoing CoreValve implantation??

PPM by Tertiles
Sheba MC 9/2008 – 6/2011



Conclusions

- Be prepared for severe vascular complications and treat hemorrhagic shock
- Cardiac tamponade may occur during and late after procedure
- Monitor for heart blocks

Thank You !