

Pulmonary Vein Angioplasty for PV Stenosis after AF ablation

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National Heart Centre Singapore

Disclosure

- No COI related to this talk.

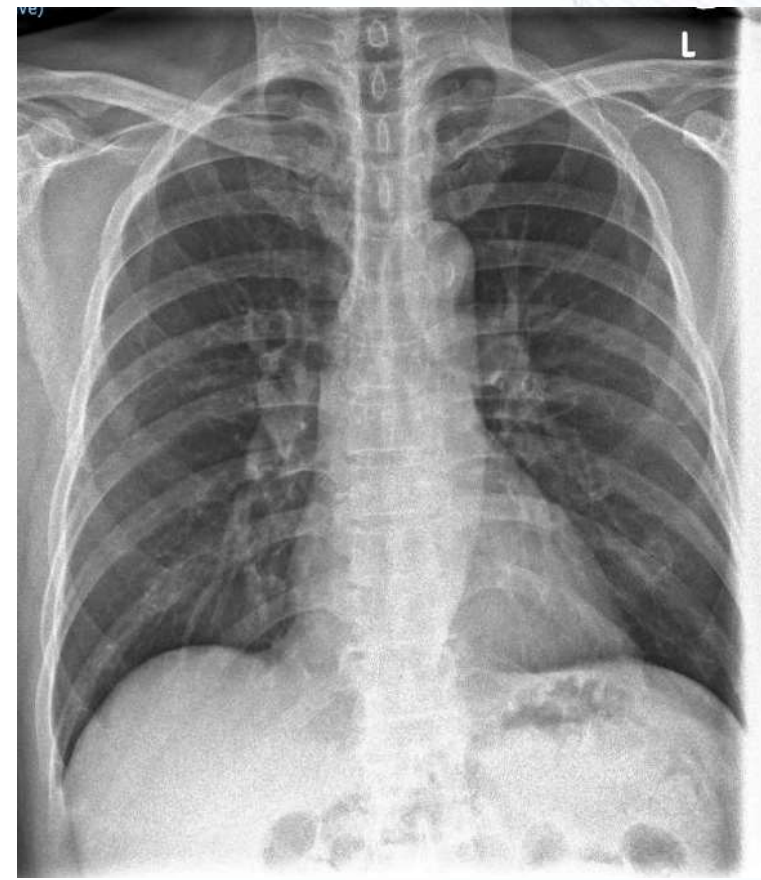
Pulmonary Vein Stenosis after AF Ablation

- A rare complication of AF ablation (estimated **0.3-3.4%** incidence)
- May have delayed or misdiagnosis – *non-specific / no symptom; no routine post-ablation surveillance CT*
- What is known:
 - PV angioplasty improves the symptom and hemodynamics of PV stenosis
 - moderate-to-high restenosis rate after stenting or BA, with stenting having lower restenosis rate (33 vs 72% in one series)
(Prieto LR et al. J Cardiovasc Electrophysiol 2008;19: 673–8.)
 - procedure complication can be catastrophic

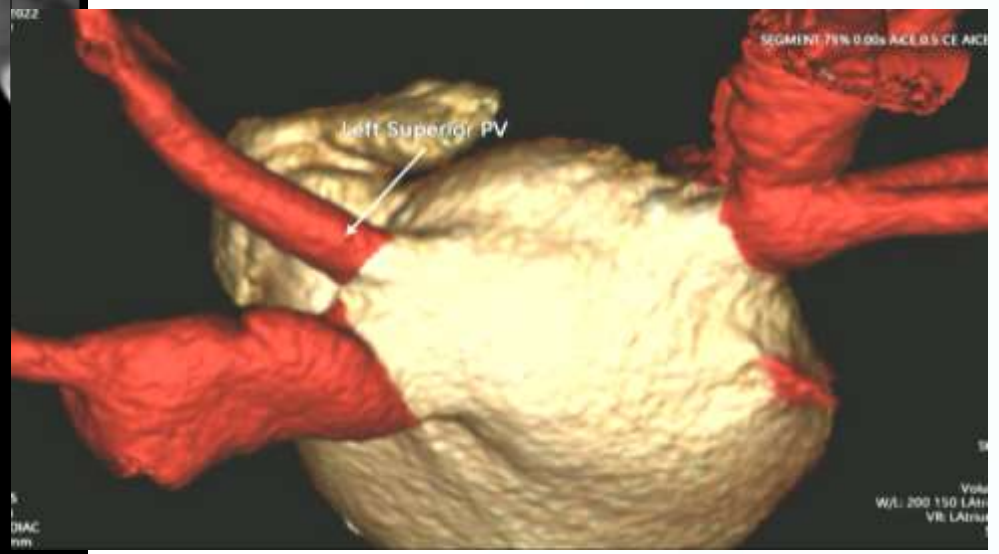
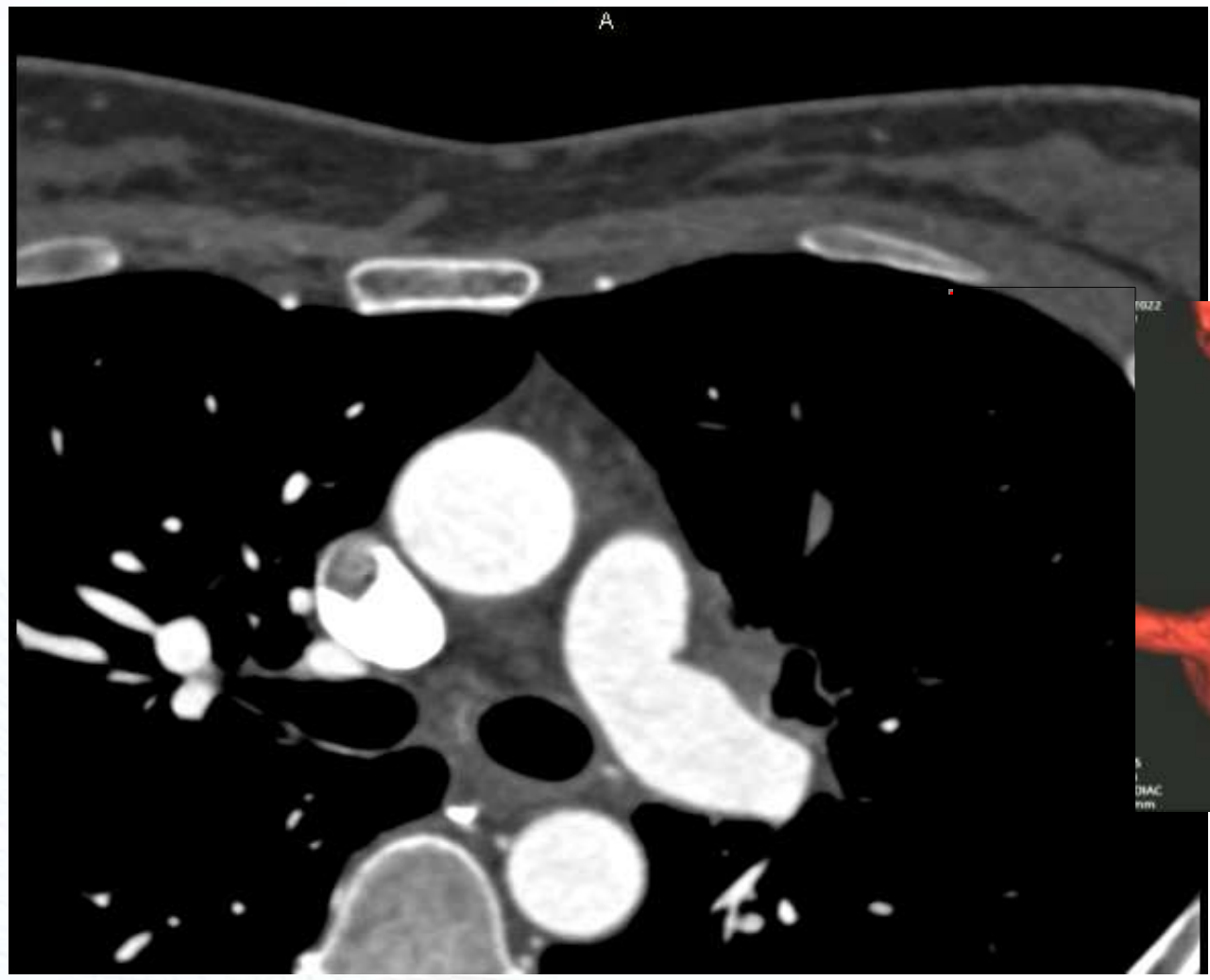
National Heart Centre Singapore Pulmonary Vein Angioplasty for PV Stenosis after AF Ablation

- Single centre experience from year 2020-2023
- 4 patients, 10 pulmonary vein stenoses, 6 intervention procedures → 7 PV stenting; 3 balloon dilatation.
- 2 PV restenosis after previous stenting → balloon dilatation
- 4 patients
 - all males; mean age 55
 - 7 AF ablation sessions; 4 with RF energy; 3 cryoablation
 - presenting complaint: exertional dyspnea (4); cough (3); pulmonary edema (2); hemoptysis (3); pulmonary hypertension (2)
 - diagnosed on contrast CT after developing symptoms
 - No major procedural complication

CXR

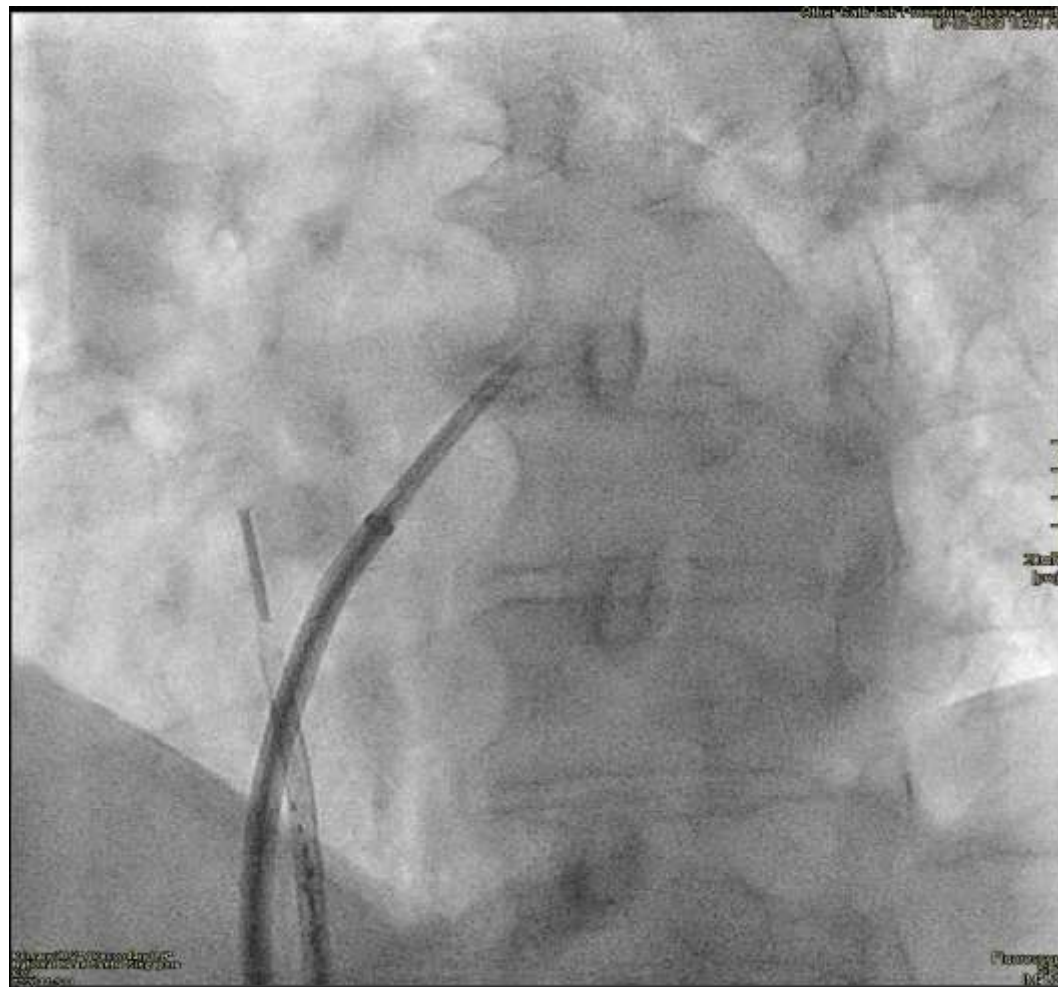


National Heart Centre Singapore Pulmonary Vein Angioplasty for PV Stenosis after AF Ablation



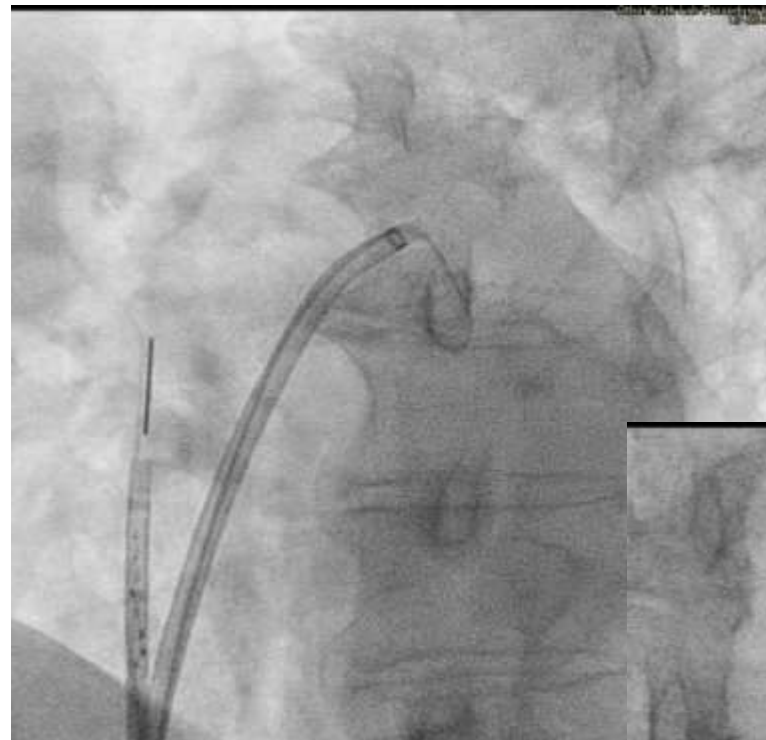
PV Angioplasty -- Procedure

1. Combined team: EP + Interventionist
2. Bilateral femoral vein access
 - 10 F → **ICE** (intra-cardiac echo);
 - 8.5F → **SL1** or **Agilis**
3. **Transseptal puncture**

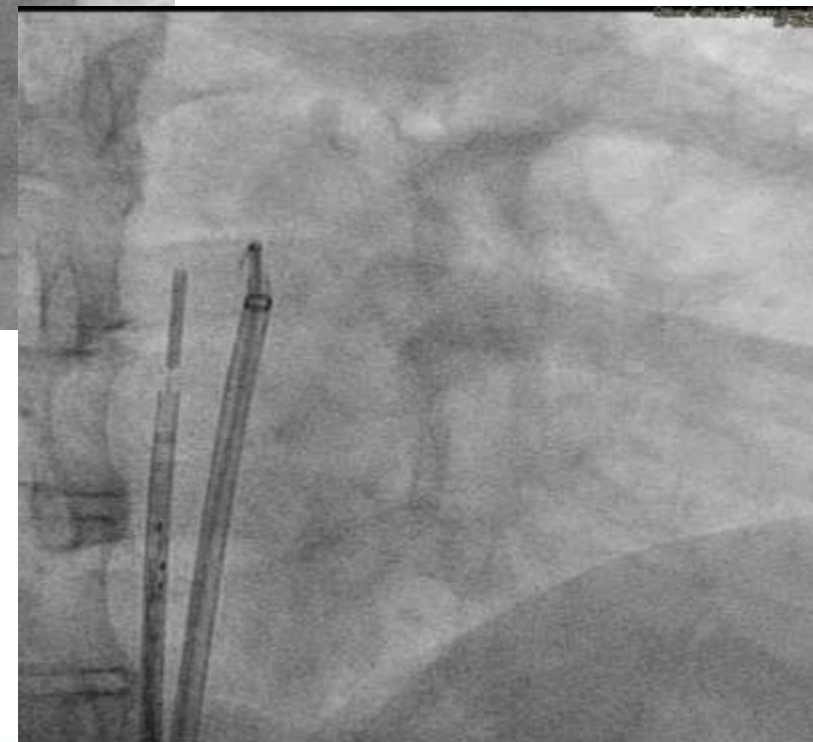


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4. Catheter / introducer – **SL1** or **Agilis**:
5. 5F or 6F **Multipurpose** catheter to direct the guidewire into the PV
 - **0.035" guidewires** – Glidewire; Supra Core etc
 - 0.014" guidewire sometimes used for CTO/subtotal occlusion of PV

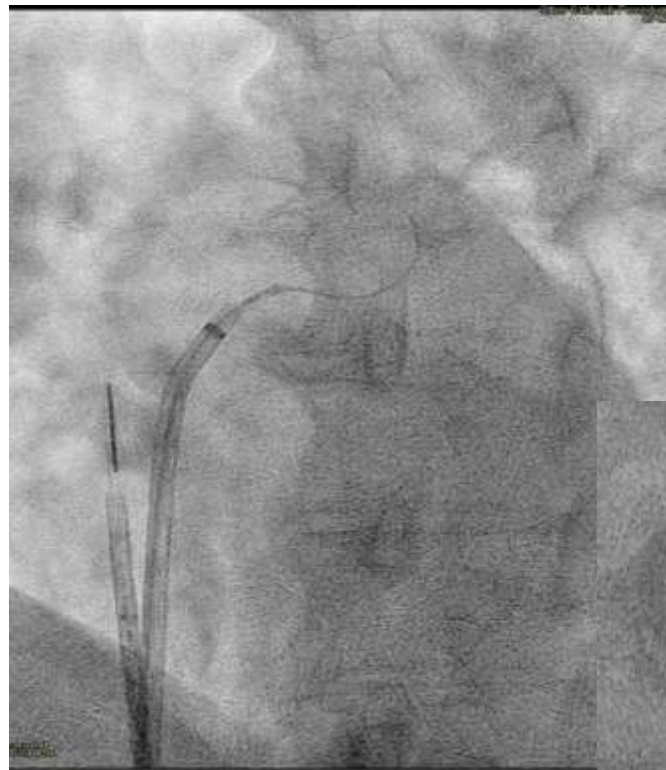


- stump of the occluded LSPV

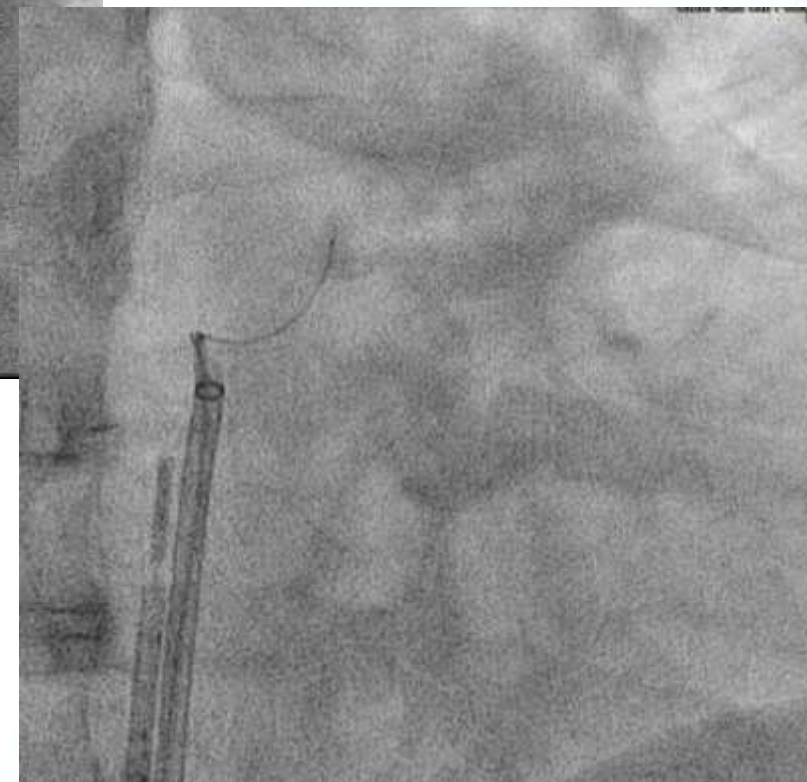


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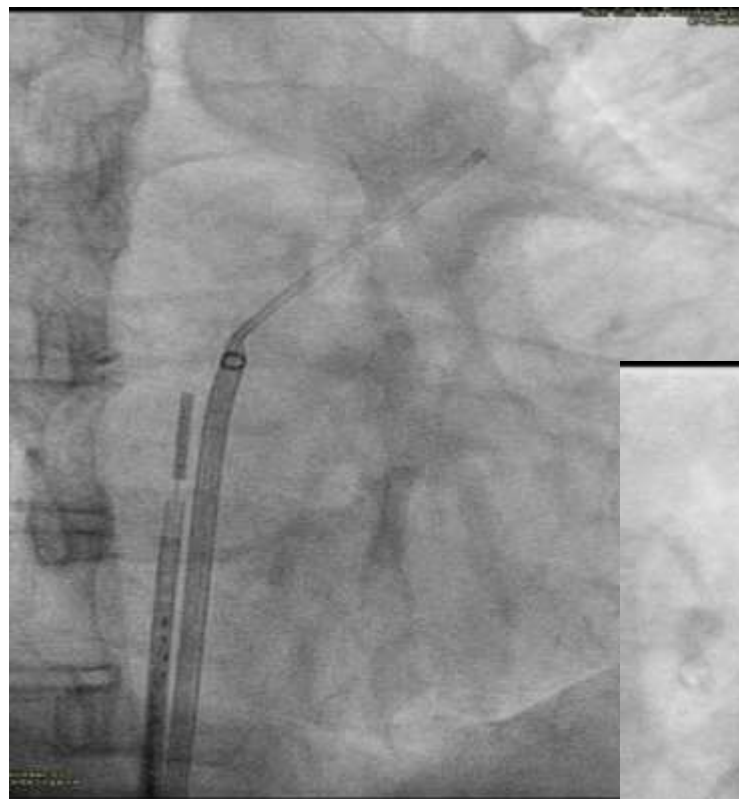


penetration with .035" Glidewire



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- +/- measure pressure gradient
- angiography

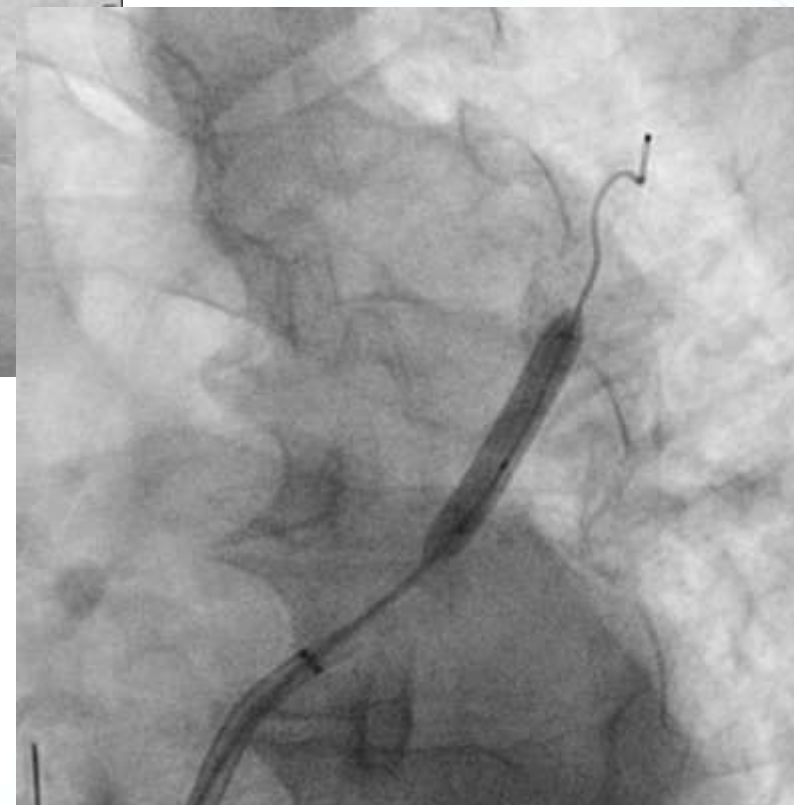


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6. **Balloon dilatation**

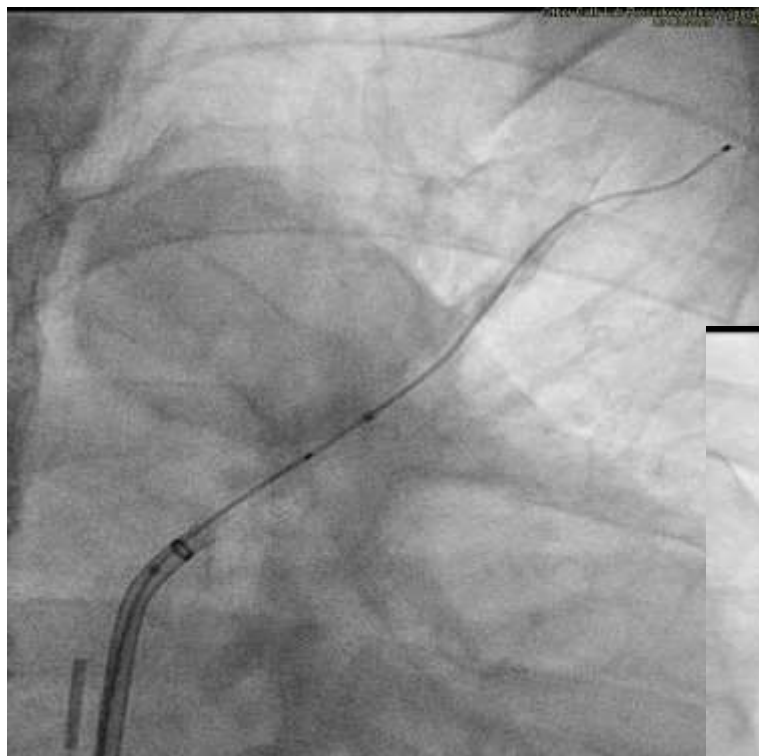


- **0.035" Supra Core GW**
- **balloon dilatation → as big as safely possible**

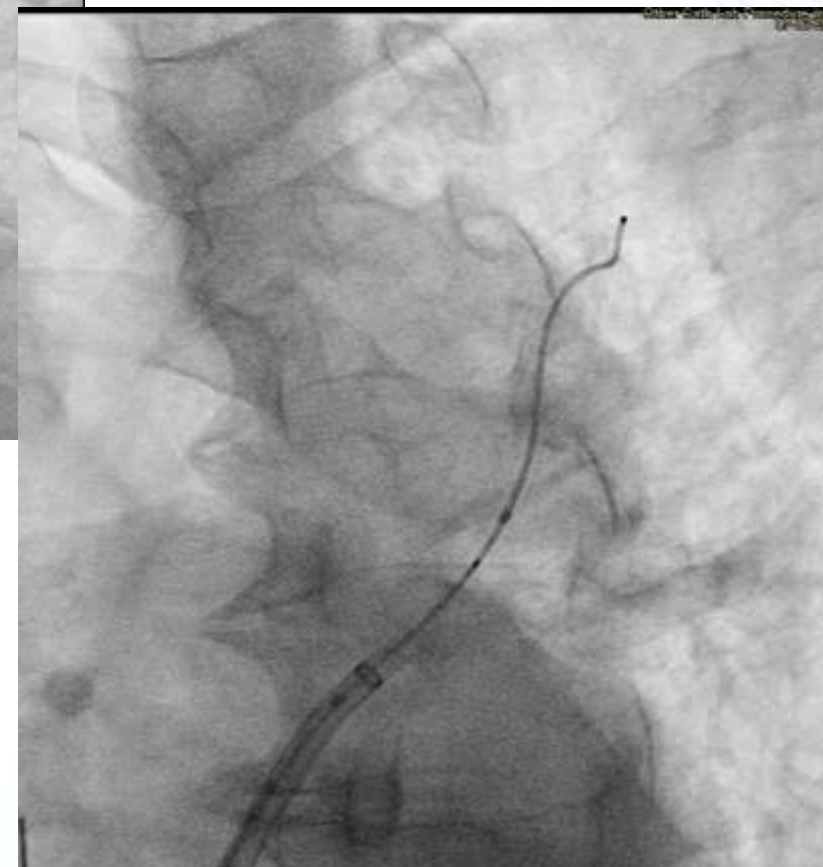


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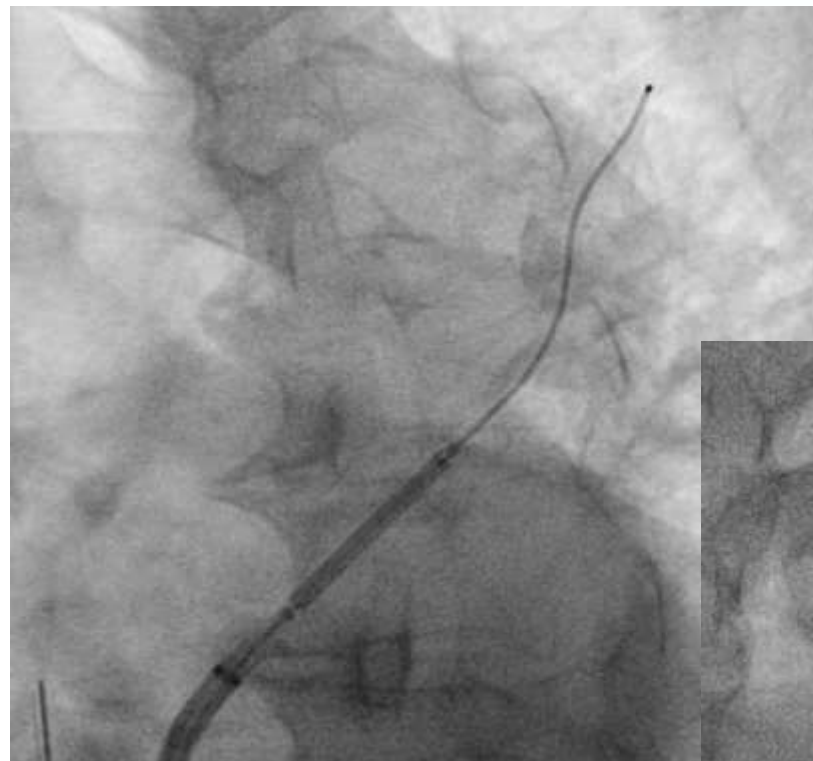


- **Post-dilatation angiography**

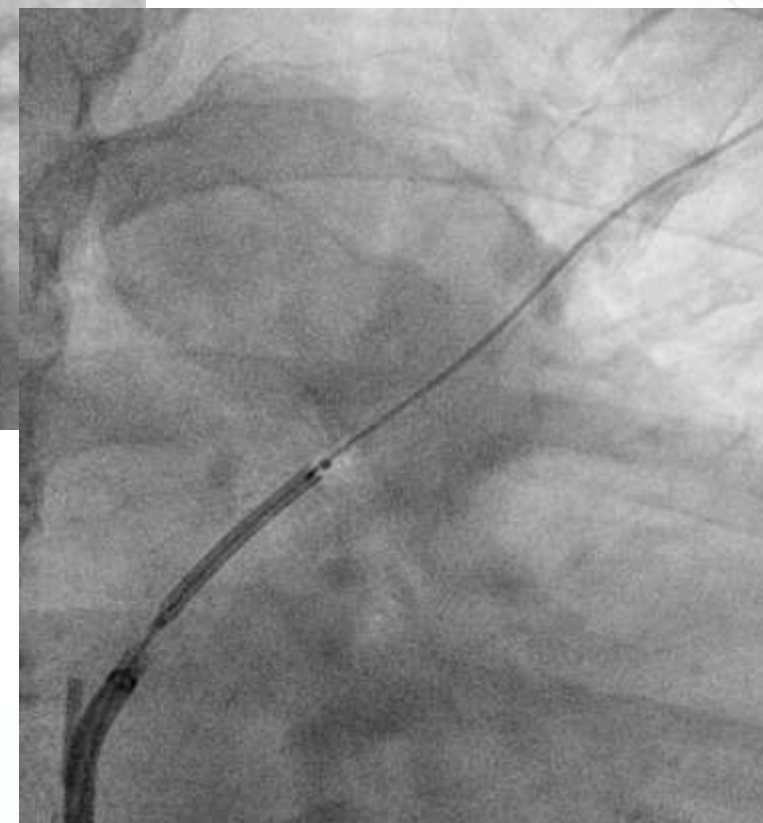


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7. **Stenting**

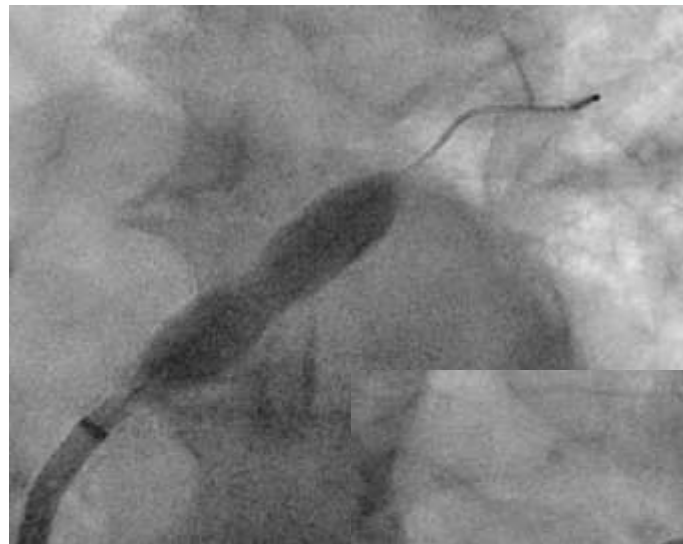


- **Visi-Pro® 10x27 mm stent**

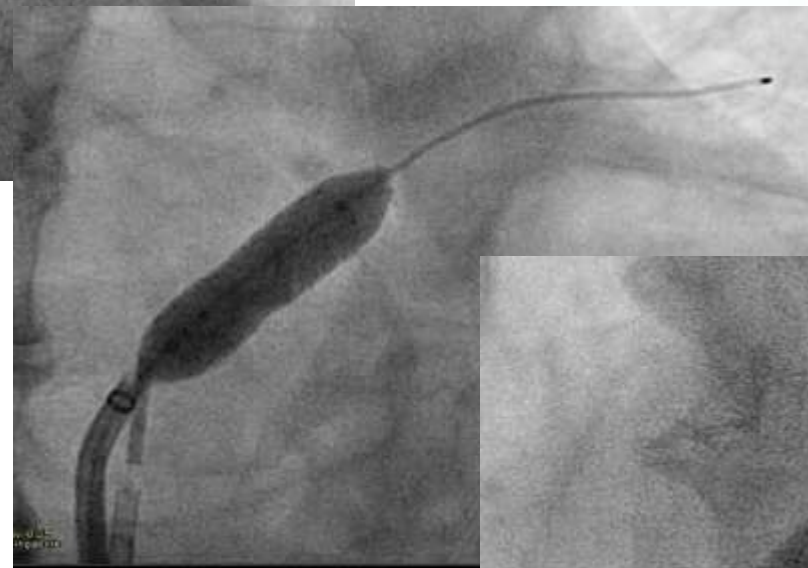


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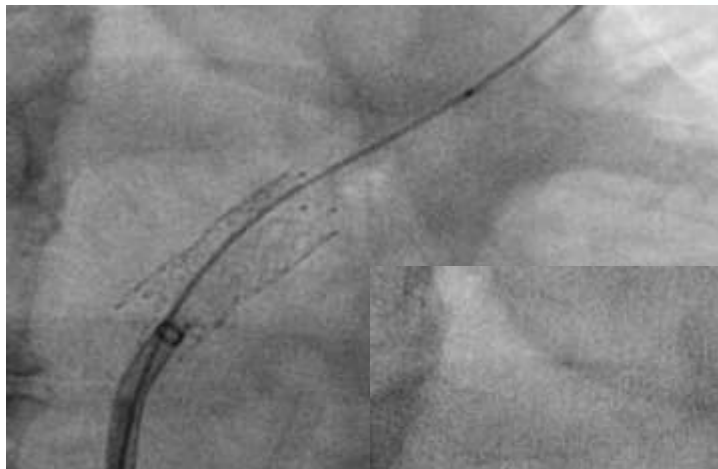


- **Visi-Pro® 10x27 mm stent**
- **post-dilated with 12 mm balloon**



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7. **Stenting**



- residual thrombus in LSPV



***Patient has no neurological deficit
at 4-month follow-up.***

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6. Balloon dilatation
7. **Stenting**



Peripheral or biliary stent

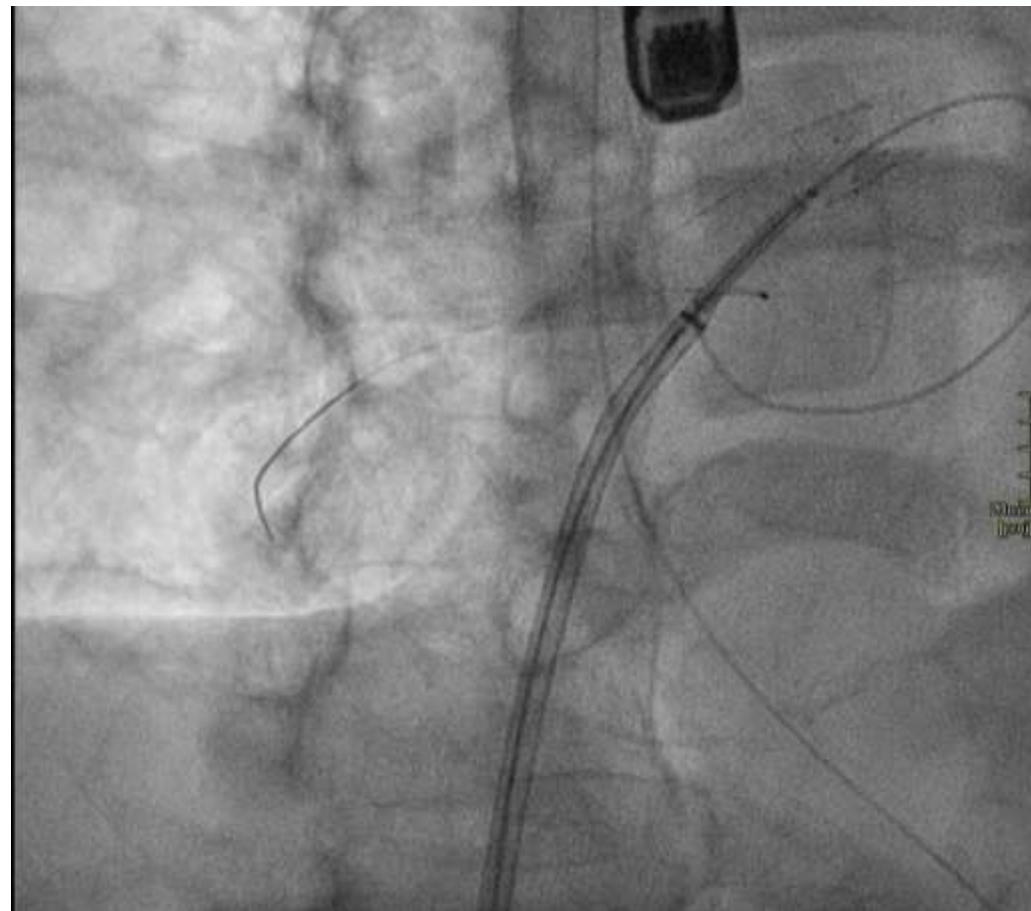
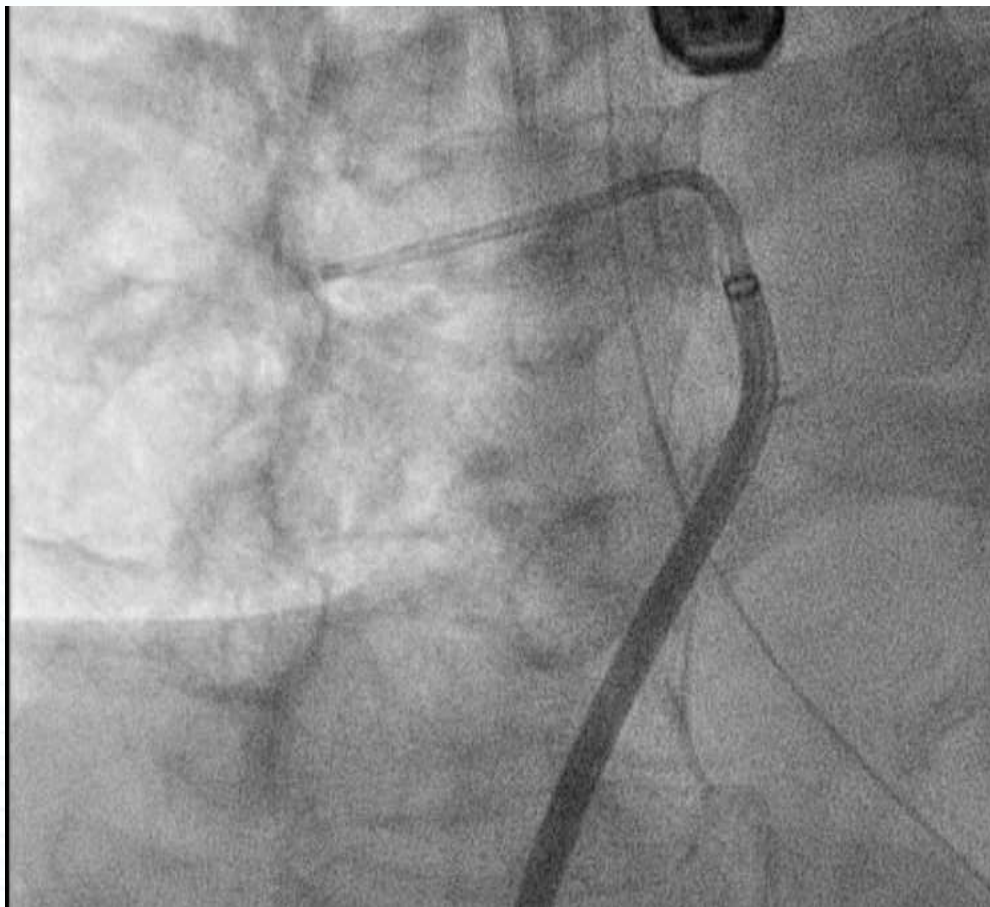
- of the **seven** stents used:
 - five -- **10 x 17 mm**
 - two – **9 x 17 mm**
 - one – 10 x 27 mm

Avoid using coronary stent unless lesion very fibrotic and cannot be dilated to larger size.

Some Other Lessons

- Choice of Guider / Introducer for **RIPV stenting**

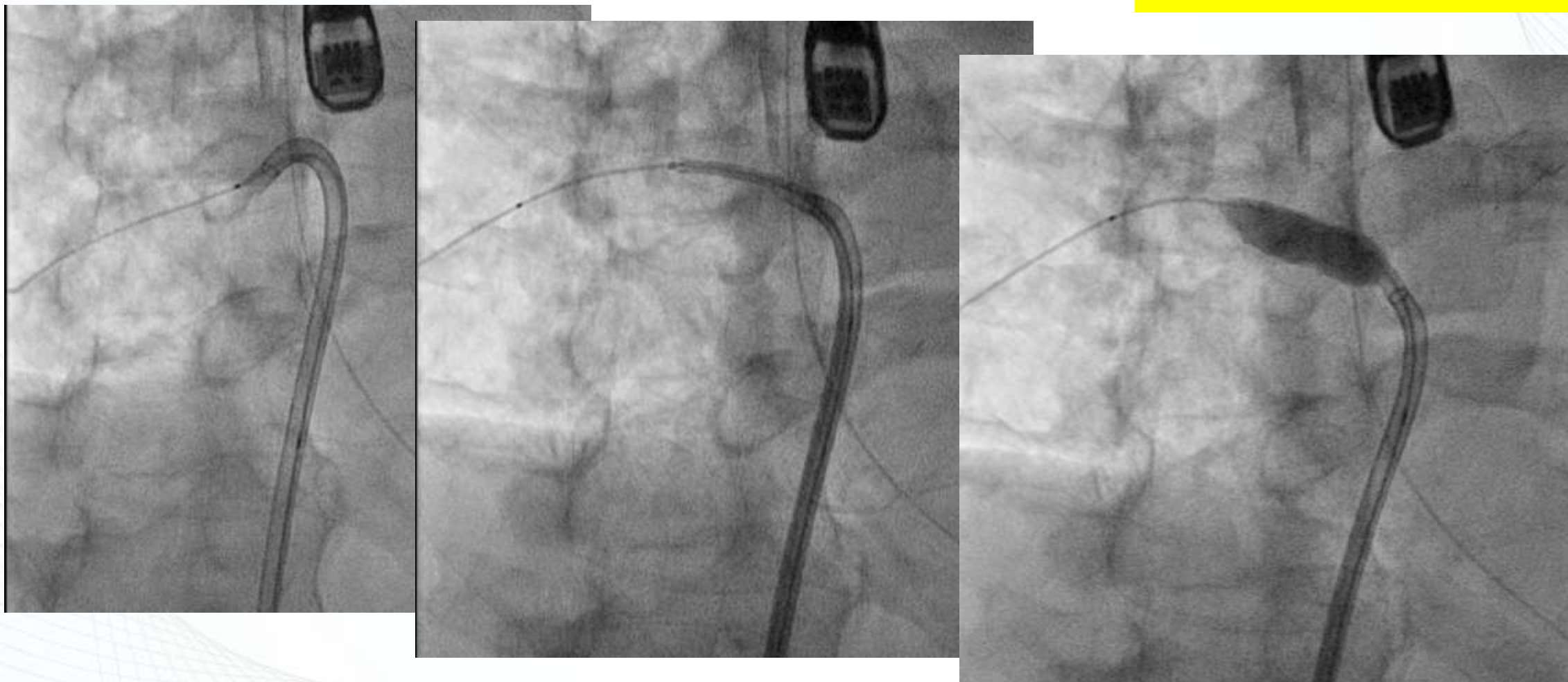
- **SL1 sheath**
- **Supra Core .035 GW**
- **Visi-Pro 10x17 mm stent**



Some Other Lessons

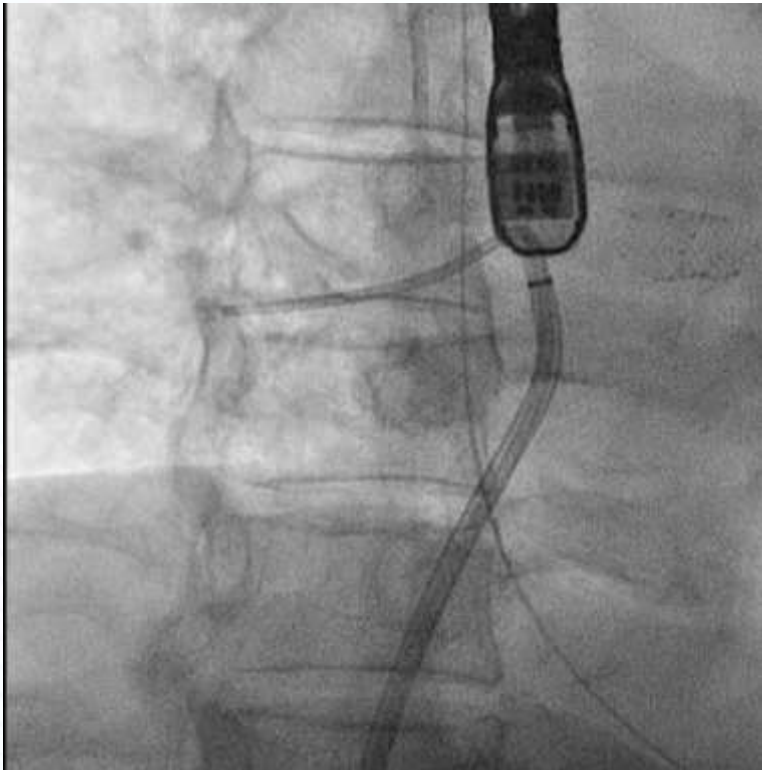
- Choice of Guider / Introducer for **RIPV stenting**

- **Agilis introducer**
- **Supra Core .035 GW**
- **Visi-Pro 10x17 mm stent**



Some Other Lessons

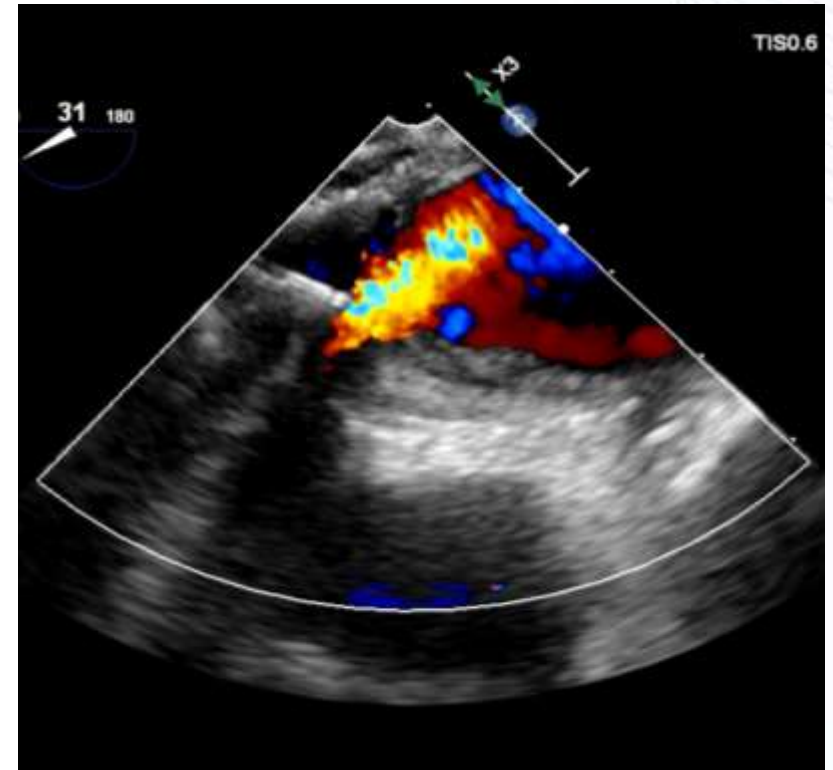
- Usefulness of adjunctive imaging modality
- **Ostial RIPV stenosis → stenting**



Ostial RIPV stenosis



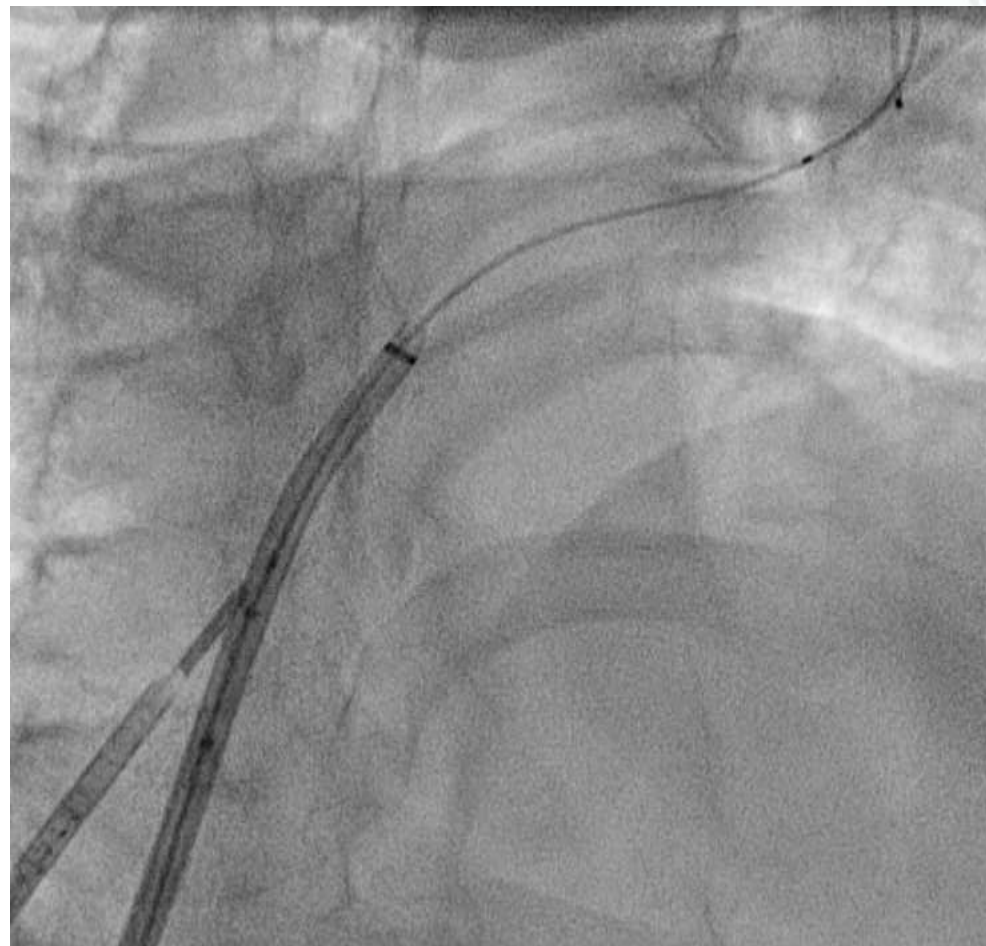
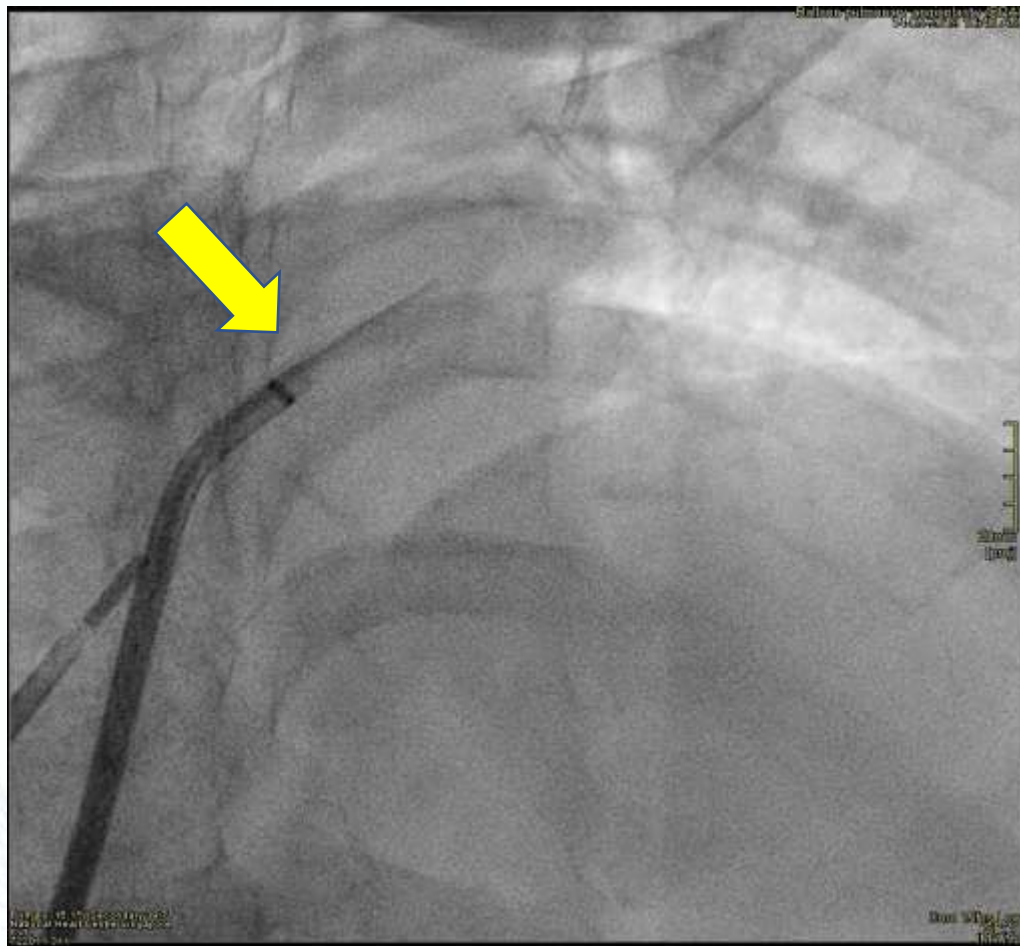
IVUS



TEE after RIPV stenting

Some Other Lessons

- Some PV stenosis anatomy is not ideal for PV stenting



(after balloon angioplasty)

Some Unanswered Questions

- Can asymptomatic severe PV stenosis be treated conservatively?
- Progression of severe PV stenosis to occlusion – incidence; rate; prognostic significance
- Thrombo-embolic risk of occluded PV angioplasty – incidence; prevention; thrombectomy; cerebral embolic protection device
- Anti-proliferative strategy -- drug-eluting stent; DCB; cutting / scoring balloon; etc
- Restenosis – follow-up strategy; diagnostic modality; management
- Anti-thrombotic Rx after PV angioplasty
- Prevention – pulsed-field ablation (PFA) ? less PV stenosis

Conclusion

- **Acquired PV stenosis**, a rare complication of AF ablation, can be treated with **PV angioplasty**, and more effectively with **PV stenting**.
- This procedure is best performed by a **multi-disciplinary team**, combining different expertise.
- New strategy is needed to minimise occurrence of PV stenosis, and to manage the relatively **high restenosis rate** after PV angioplasty / stenting.