

Successful Management of an Iatrogenic Coronary Arteriovenous Fistula Developed during CTO Intervention

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Clinical Information

1. Age/Sex; 75-year / male

2. C.C.; effort chest pain

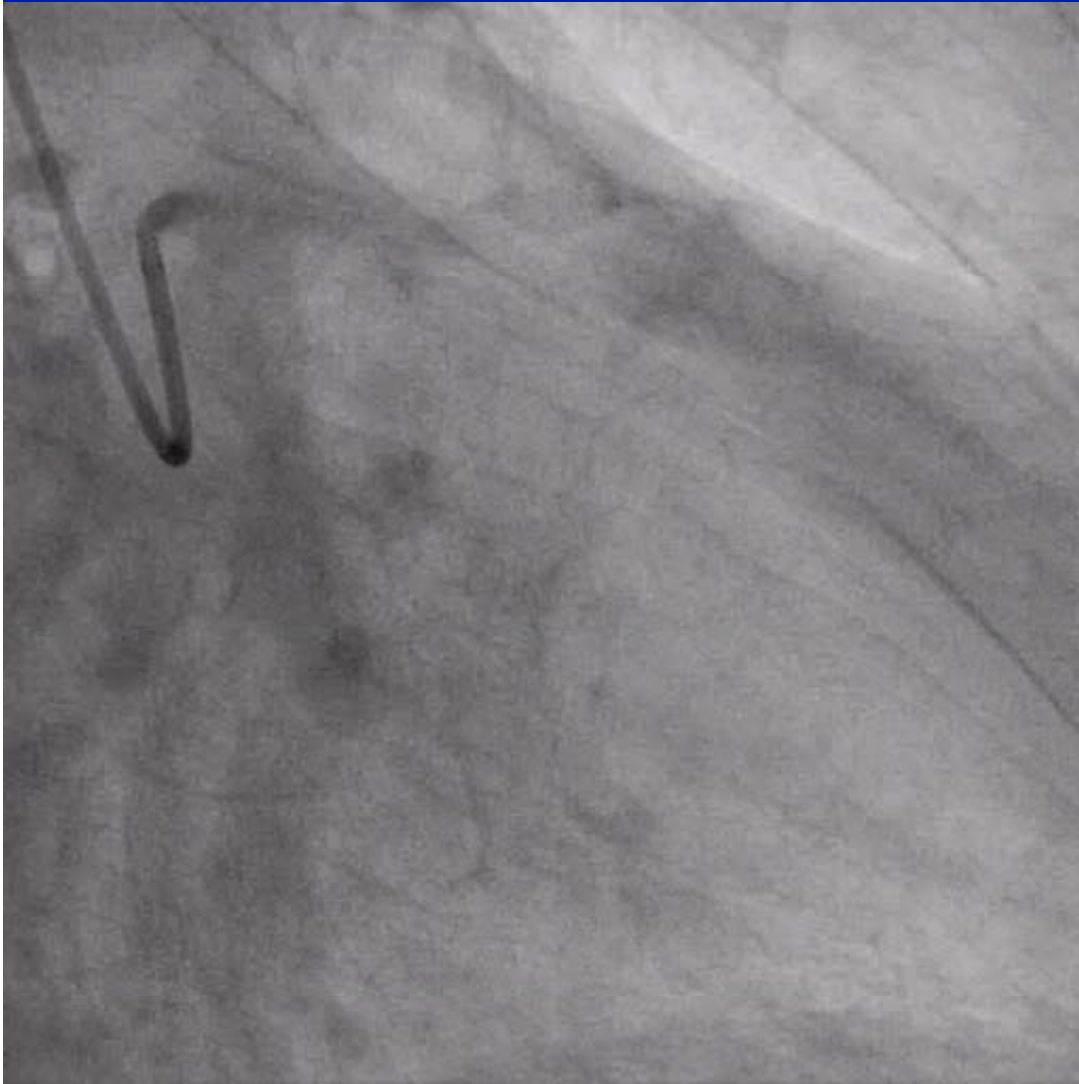
3. Risk factors

DM (-), Hypertension (+), Hyperlipidemia (-),
Smoking (-)

4. Lab: no specific finding

5. Echo: severe hypokinesia in posterolateral wall
with LVEF 50%

Coronary angiography



LAD & RCA: no stenosis

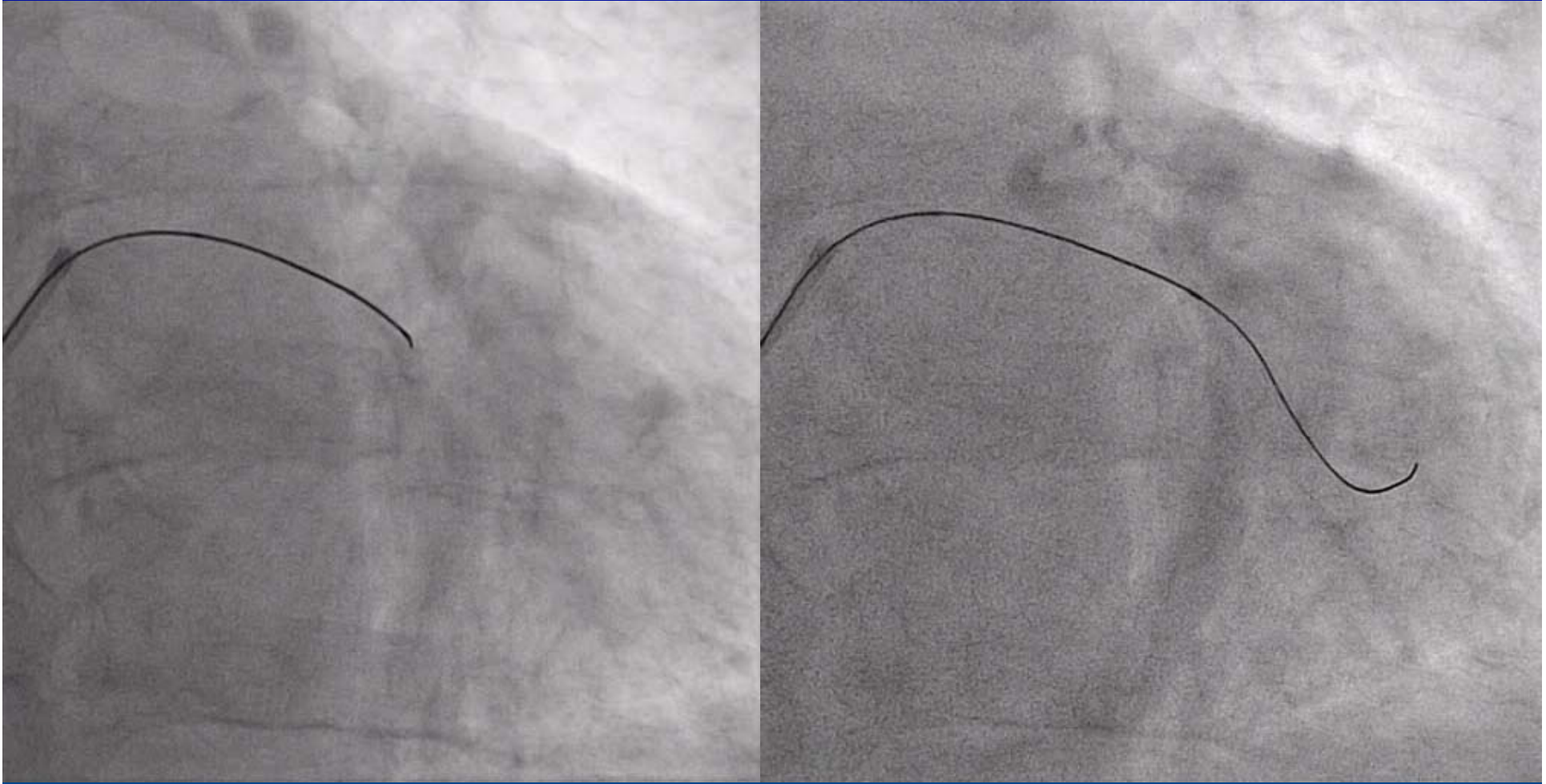
LCX: CTO at mid-LCX
with bridging collaterals
grade 1 of short segment

– Approach: Rt Radial a.

– 6Fr

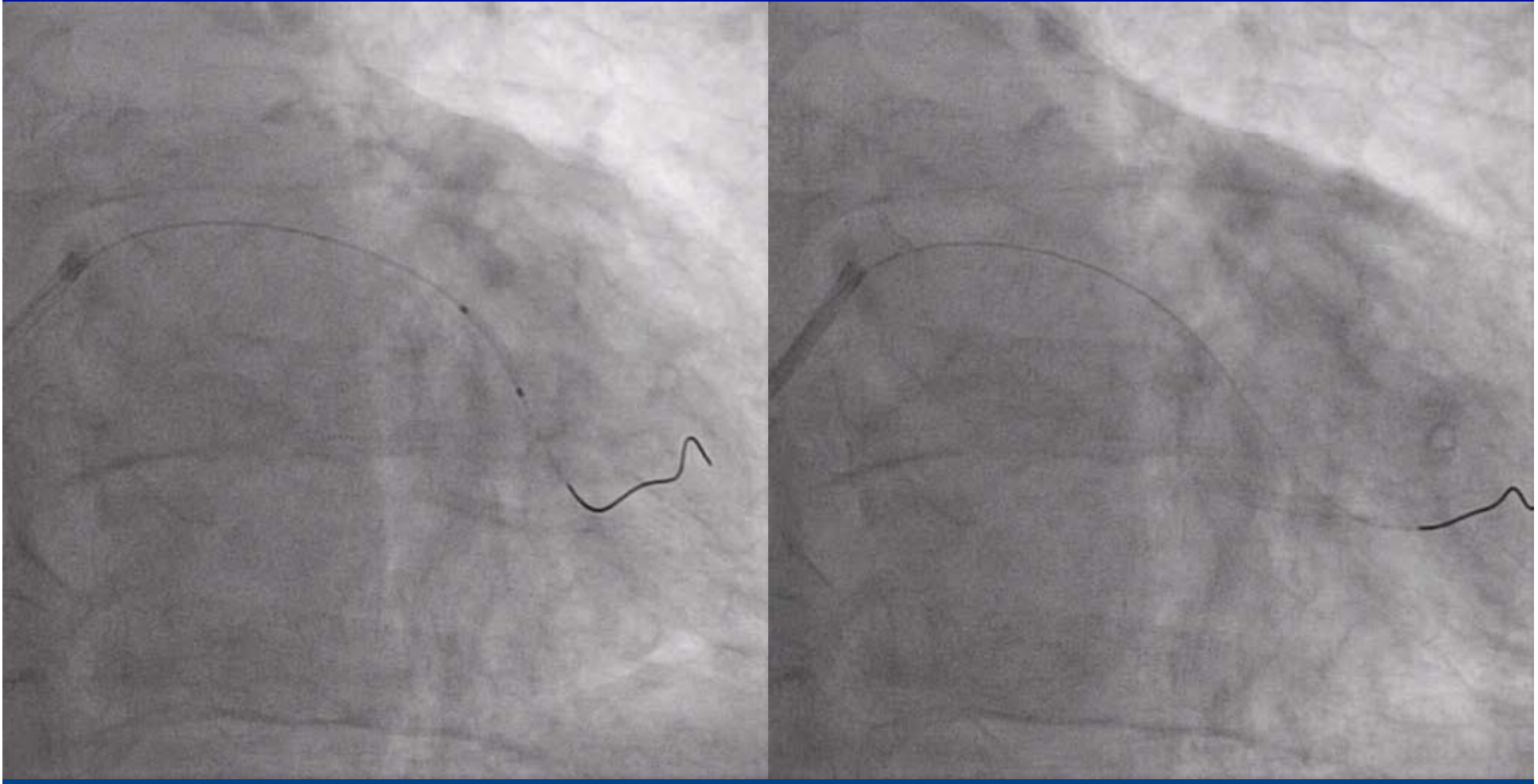
– G/C: EBU

Anterograde Wiring



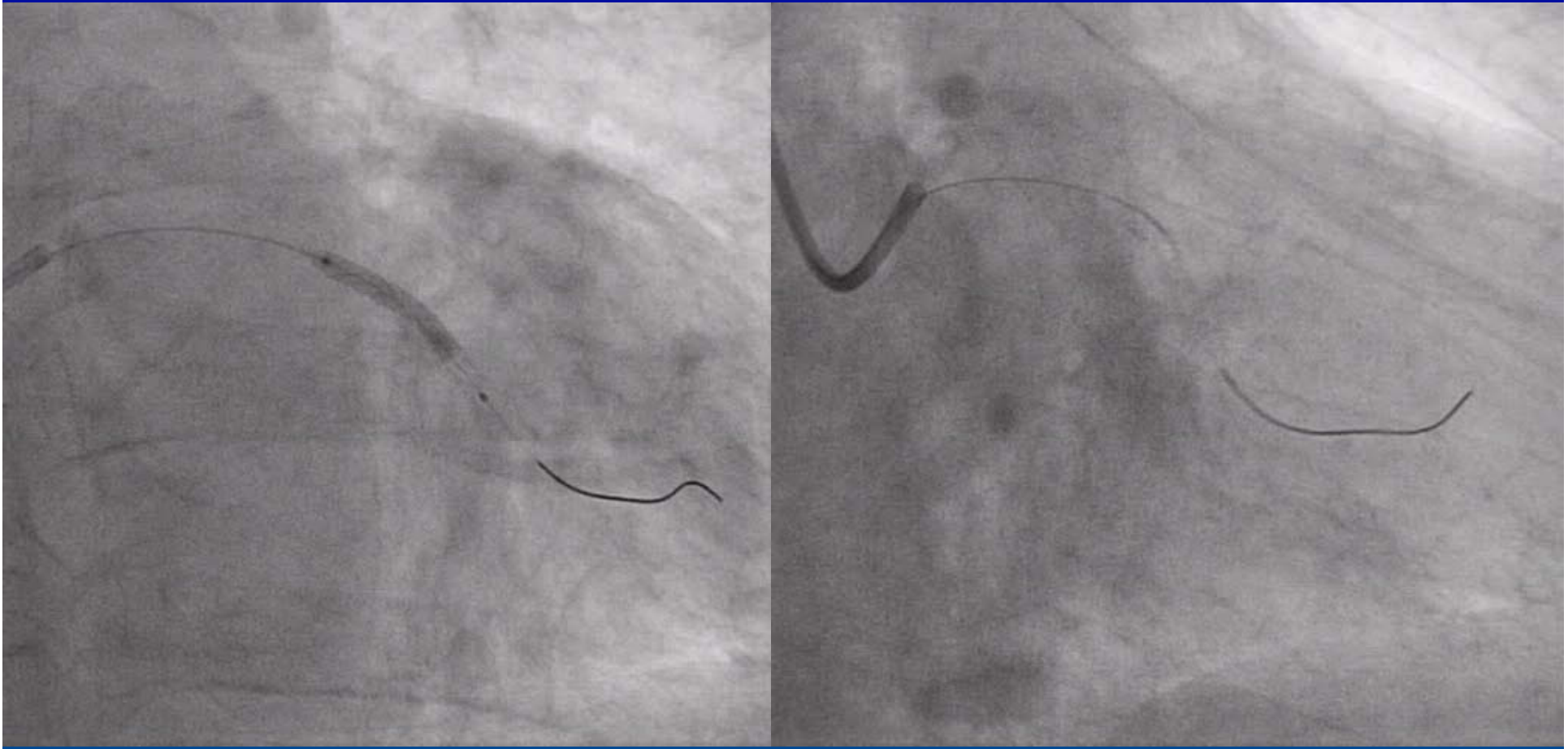
Fielder XT™ supported by PROWLER® microcatheter (Cordis)
Miracle 6g™ guidewire was passed into obtuse marginal (OM)
branch but not into distal-LCX

Predilation



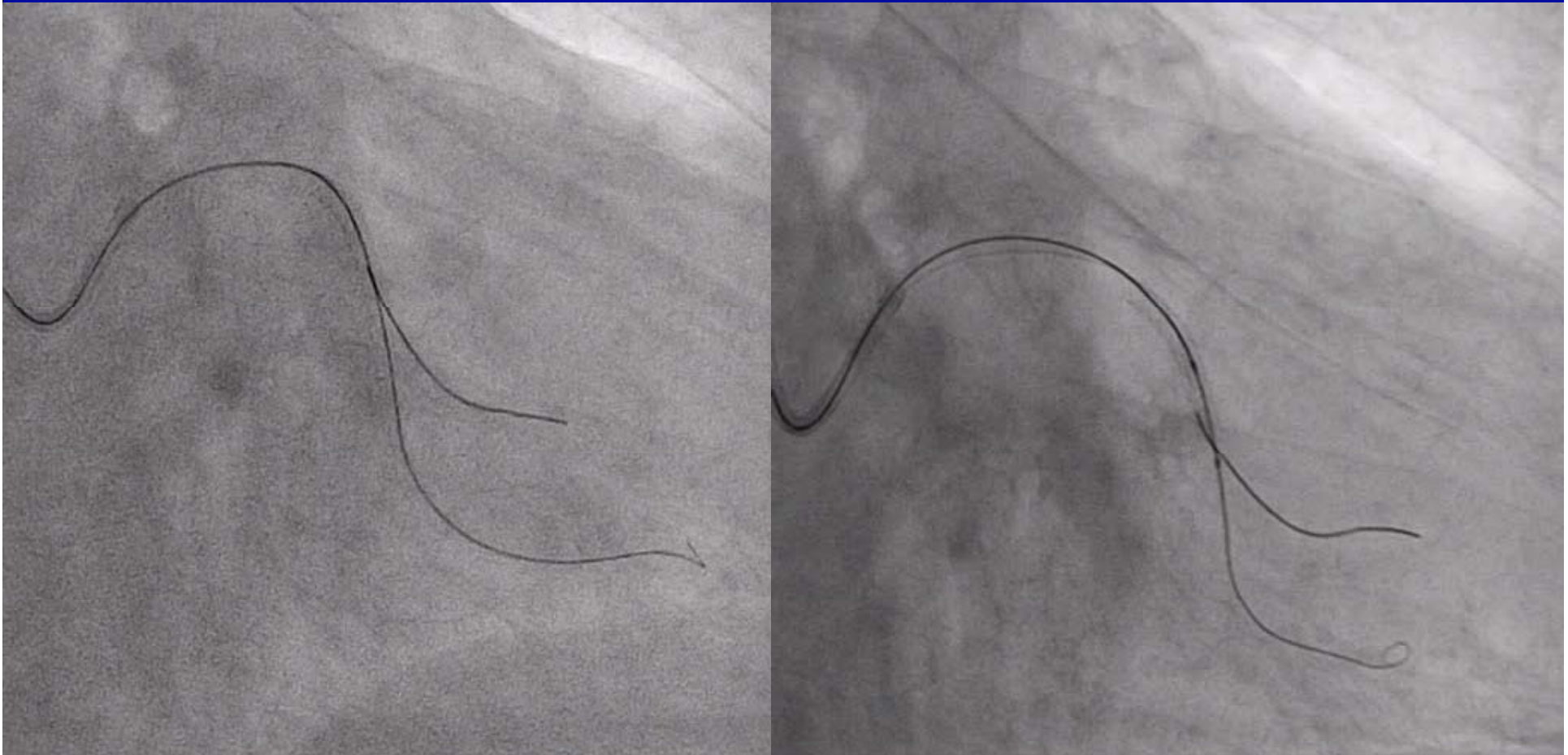
After Miracle wire was changed into Runthrough wire,
Multiple predilation with a 1.5X10 mm ADEMEUS Supercross[®]
and a 2.0X15 mm Sapphire II[®] was done up to burst pressure.

Stenting



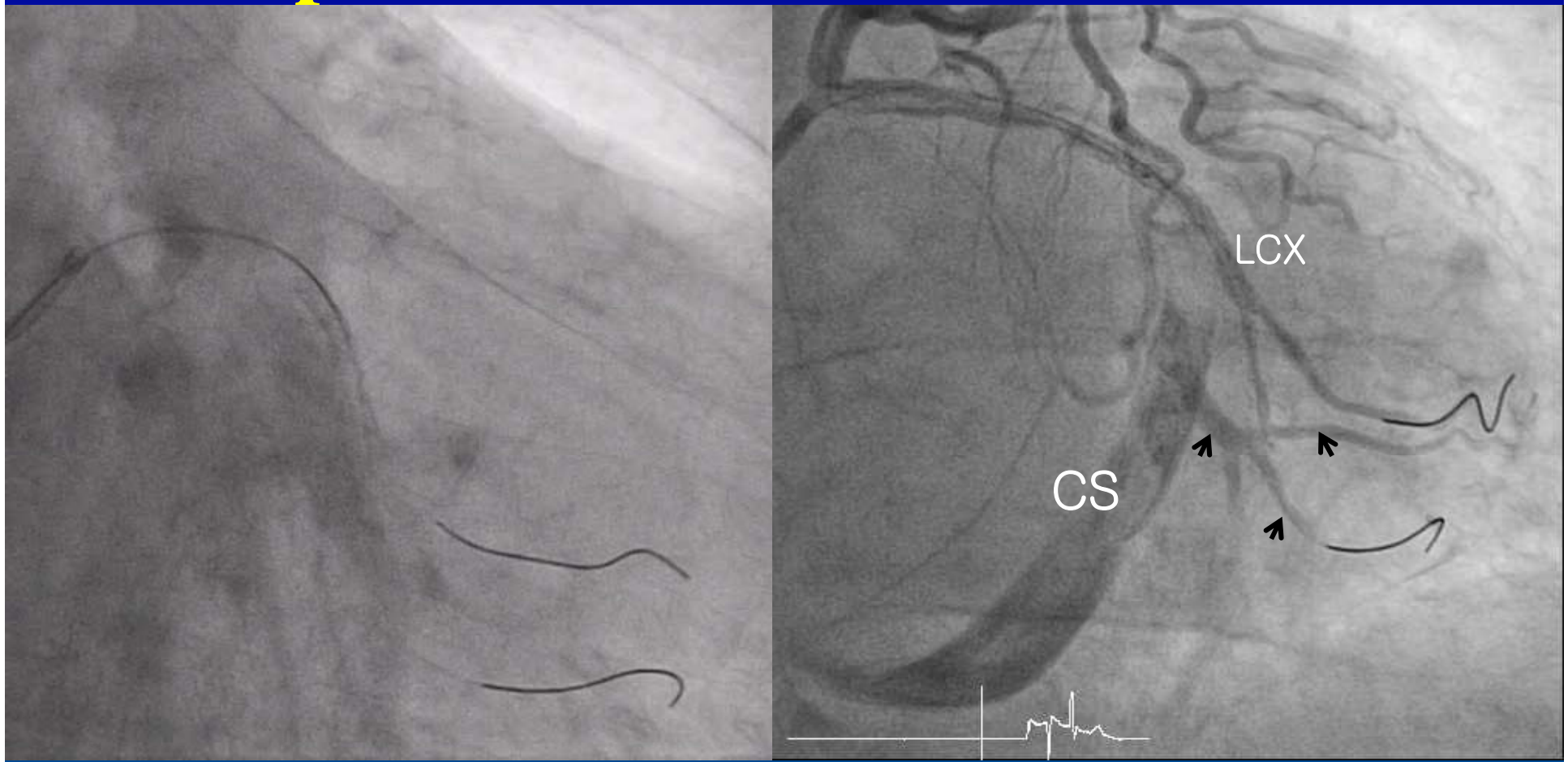
Stent deployment with a 2.75X24 mm NOBORI™ was performed upto 10 atmospheres during 10 second without immediate complication. However, distal LCX branch was still occluded

Wiring & ballooning into LCX



We tried continuously to open occluded distal proper vessel. Attempt to pass across target lesion with FielderXT guidewire was tried. Finally, **we thought FielderXT guidewire successfully passed across into true lumen of distal LCX.** And then, sequential ballooning with a 1.5X10mm Supercross[®] and 2.0X15mm Sapphire[®] was done.

Post-predilation



Cineangiogram showed the formation of an **arteriovenous fistula** arising from the distal LCX artery **draining into coronary sinus** via the **posterior vein of left ventricle (PVLV)** with side branches

Beginning of disaster? or not?

Fortunately,

vital sign was stable and

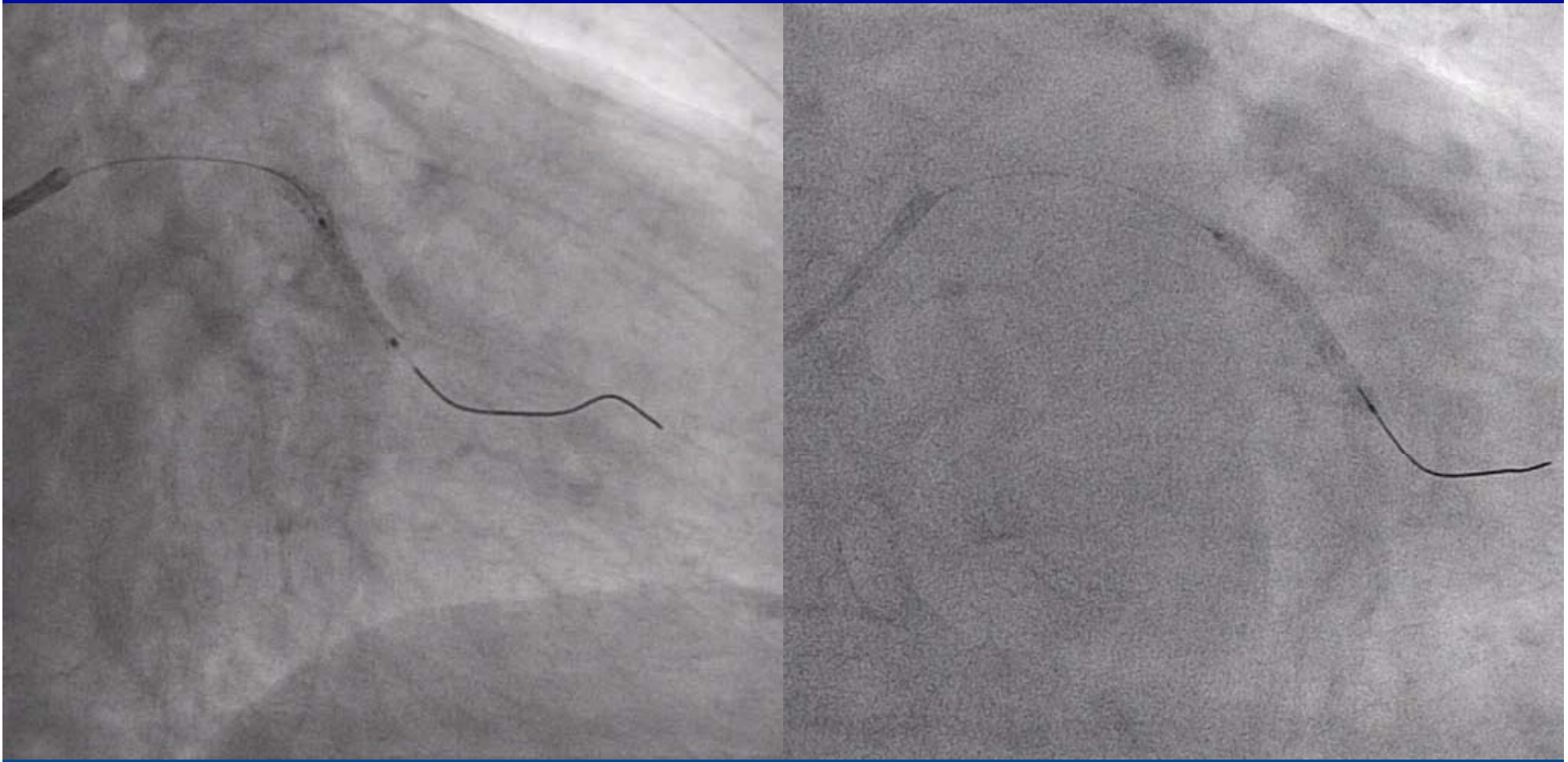
patient didn't complain of chest pain

In this situation, what is the best option?

1. Balloon occlusion and wait?
2. Coiling?
3. Graft stenting?
4. Surgery?
5. Just observation?

* Please tell me your choice!

My option was Graft stent deployment



In order to seal off the fistula, a 3.0X19mm polytetrafluoroethylene (PTFE)-covered stent (Graftmaster, Abbott) was advanced and positioned in bifurcated site of the distal LCX and OM branch.

Final angiography



Subsequently, a 2.75X24mm Nobori stent balloon was positioned inside the covered stent and inflated to 14 atm.

iatrogenic AV fistula

Increased Coronary Perforation in the New Device Era

Incidence, Classification

Stephen G. Ellis,
John A. Bittl, MD, Neal L. Eigler, MD; M
Robert D. Safian, M

Study number: 12900

Ellis type I, II, III, III CS

CS; coronary spilling

Cardiac chamber,
Coronary sinus

Type I	Extraluminal crater without extravasation (Fig 1)
Type II	Pericardial or myocardial blush without contrast jet extravasation
Type III	Extravasation through frank (≥ 1 mm) perforation (Fig 2)
Cavity spilling	Perforation into an anatomic cavity chamber, coronary sinus, etc

Circulation 1994;90:2725

evaluated as a predictor of outcome and as a basis for management. Perforation was observed in 62 of 12 900 procedures reported (0.5%; 95% confidence interval, 0.4% to 0.6%), more commonly with devices intended to remove or ablate tissue

delayed cardiac tamponade for at least 24 hours. (*Circulation*. 1994;90:2725-2730.)

Key Words • angioplasty • revascularization • surgery

Device	Incidence (95% Confidence Interval)	Classification			
		I	II	IIIICS	III
Balloon angioplasty	14/9080 (0.1%; 0.1-0.1%)	3	5	2	4
Directional atherectomy	12/1715 (0.7%; 0.7-0.7%)	3	7	0	2
Excimer laser-I	10/529 (1.9%; 0.8-3.0%)	3	4	0	3
Excimer laser-II	7/371 (1.9%; 0.5-3.3%)	0	7	0	0
Rotablator	10/771 (1.3%; 0.5-2.1%)	3	4	0	3
TEC	9/434 (2.1%; 0.8-3.4%)	1	4	0	4

TABLE 5. In-Hospital Clinical Outcome for Patients With Perforation

Perforation Type	n	Death, %	Emerg CABG, %	QMI, %	Tamponade, %	NQMI, %
I	13	0	15	0	8	0
II	31	0	10	0	13	13
IIIICS	2	0	0	0	0	0
III	16	19	63	15	63	36
Device type						
Balloon angioplasty	14	0	21	0	21	0
Directional atherectomy	12	8	8	0	8	17
Excimer laser-I	10	0	60	0	50	40
Excimer laser-II	7	0	0	0	0	0
Rotablator	10	10	30	20	20	20
TEC	9	11	22	0	44	11

Iatrogenic coronary AV fistula (1)

- Extremely rare complication of PCI
- Almostly, communications between the coronary arteries and the **cardiac chambers** such as the right ventricle, and less commonly, the left ventricle

Iatrogenic coronary AV fistula (2)

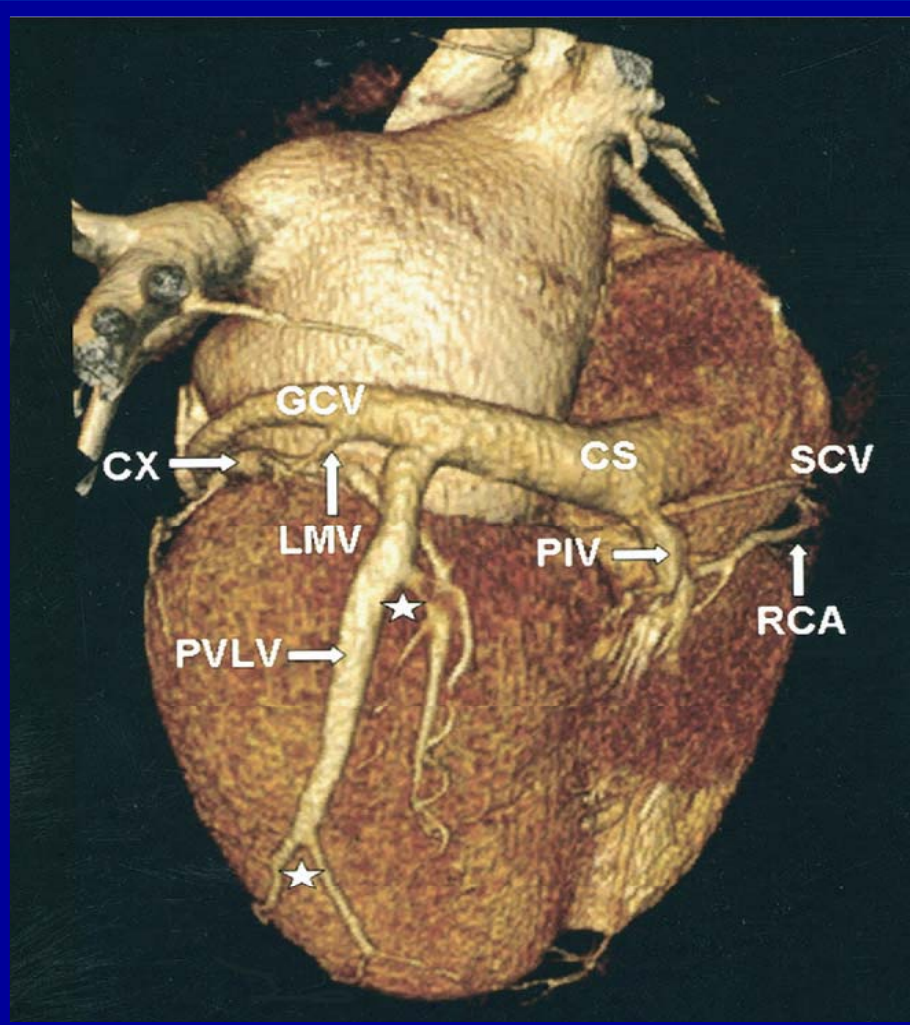
- During 2000–2010,
 - ; There are a few published series of iatrogenic coronary AV fistula to cardiac vein that developed following PCI; several case series have been reported.
 - Coil embolization, Covered stent
 - observation => spontaneous resolution

J Invasive Cardiol 2007;19(7):e188–e191.

J Interv Cardiol. 2008;21(5):410–3

J Interv Cardiol. 2009 Oct;22(5):460–5

Cardiac vein anatomy



CS: Coronary sinus

GCV: great cardiac vein

PVLV: posterior vein of
left ventricle

JACC 2006;48:1832-8

Summary from the literatures

- Upto date, the intraprocedural management of a iatrogenic coronary AV fistula resulting from PCI is not established due to very rare incidence.
- Case by case..

Conclusion

In our case,

- AV fistula size was big
- There were large amount of the shunt flow
- Already balloon dilation was performed following guidewire penetration.

→ My rationale for graft stenting

- 1) Chance of spontaneous closure will not be easy.
- 2) Worried about future hemodynamic burden
“At least no harm” to patient