

# How to Seal Distal Perforations Using Coils and Other Devices

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# Disclosure

- No potential COI with regard to this presentation

# 70+ Chinese male

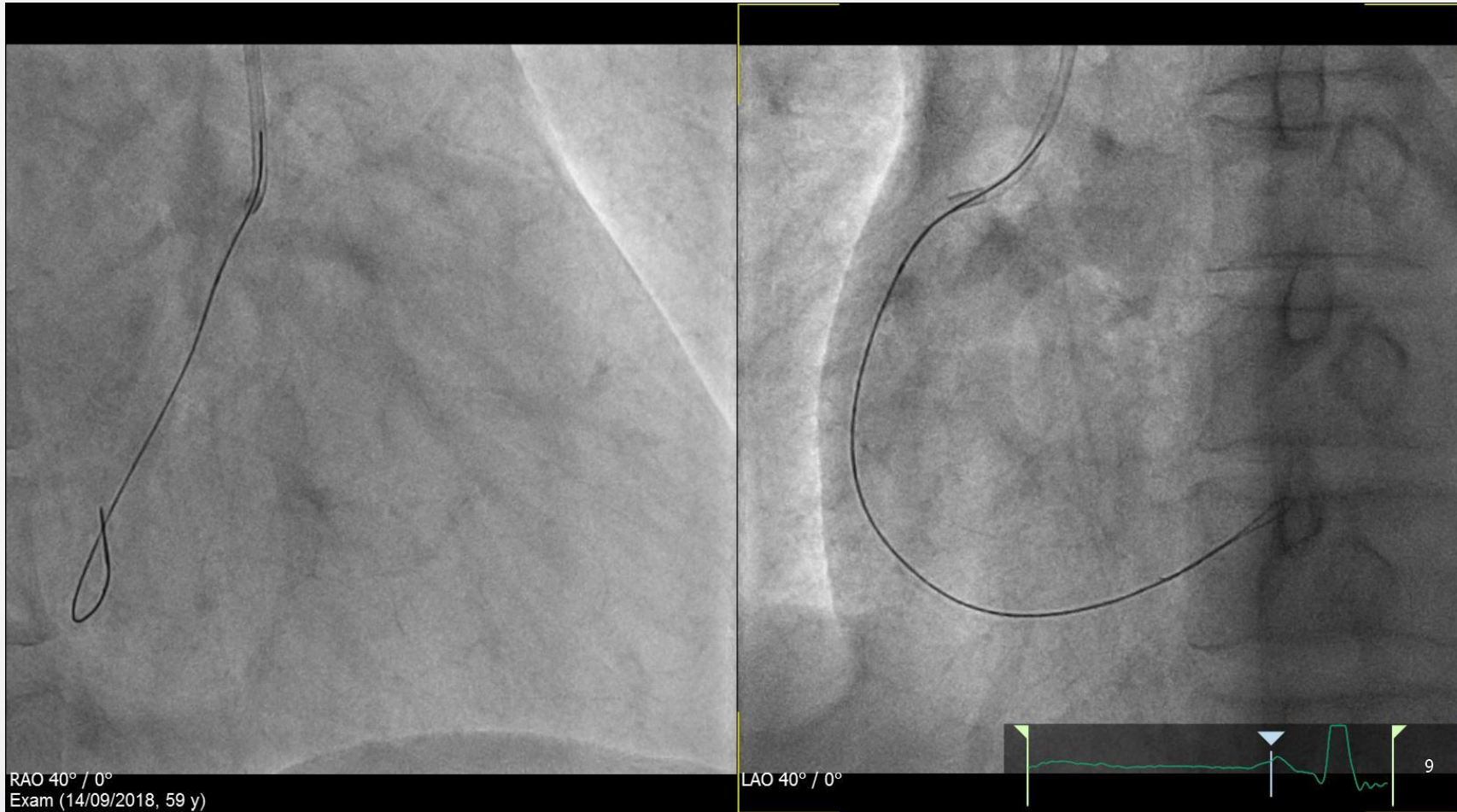
*Elective RCA PCI*



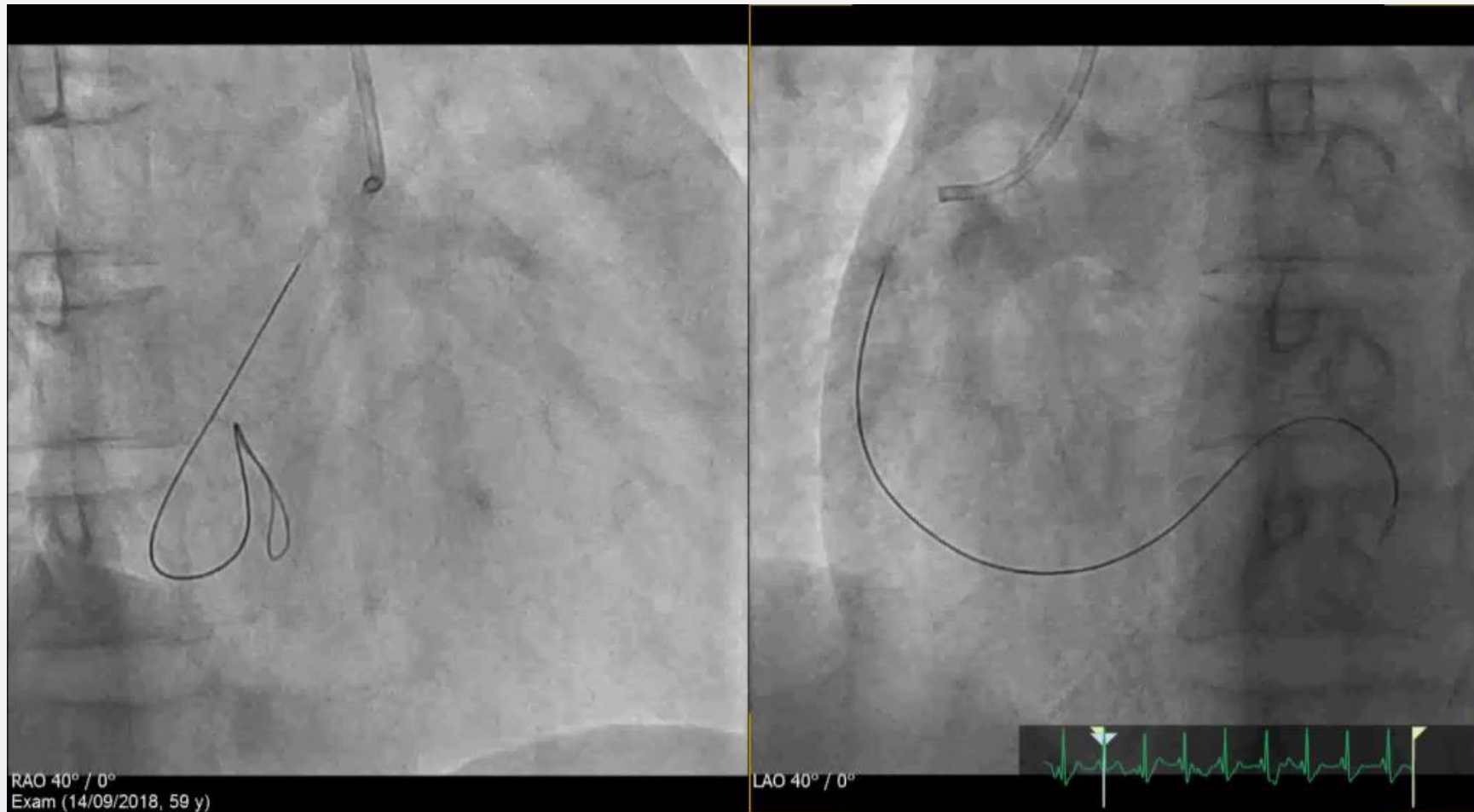


# Wire cross



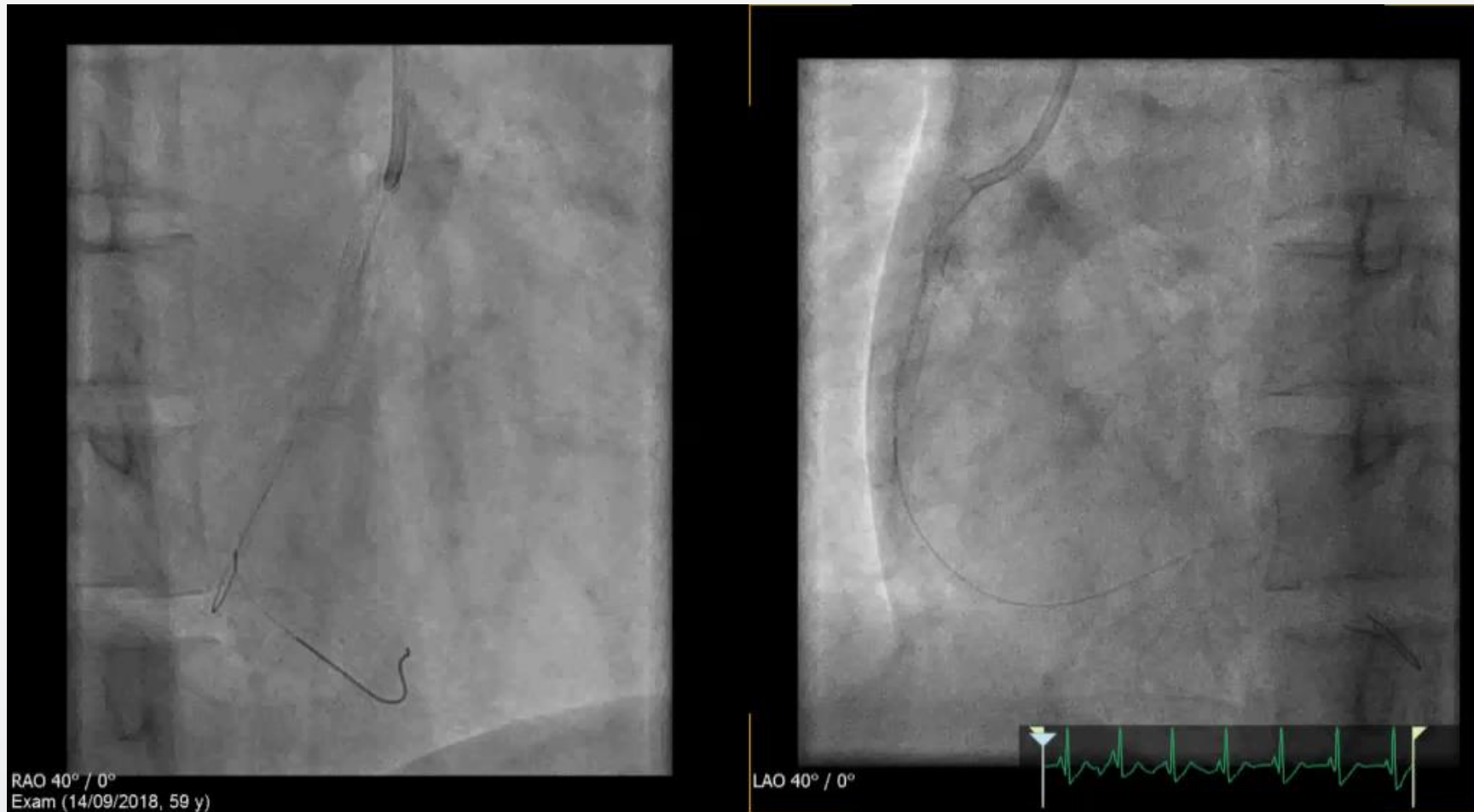


# After 1.0mm POBA 'leopard crawl'





# After stenting





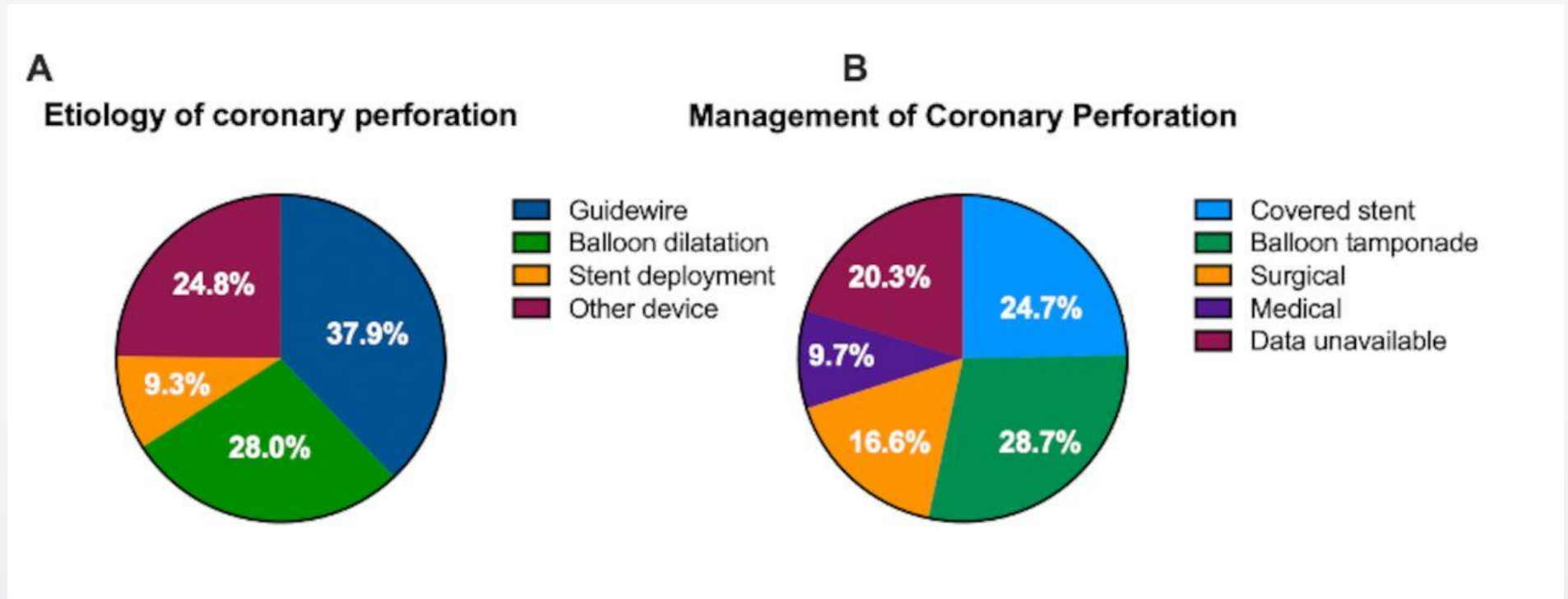
# 'Final'



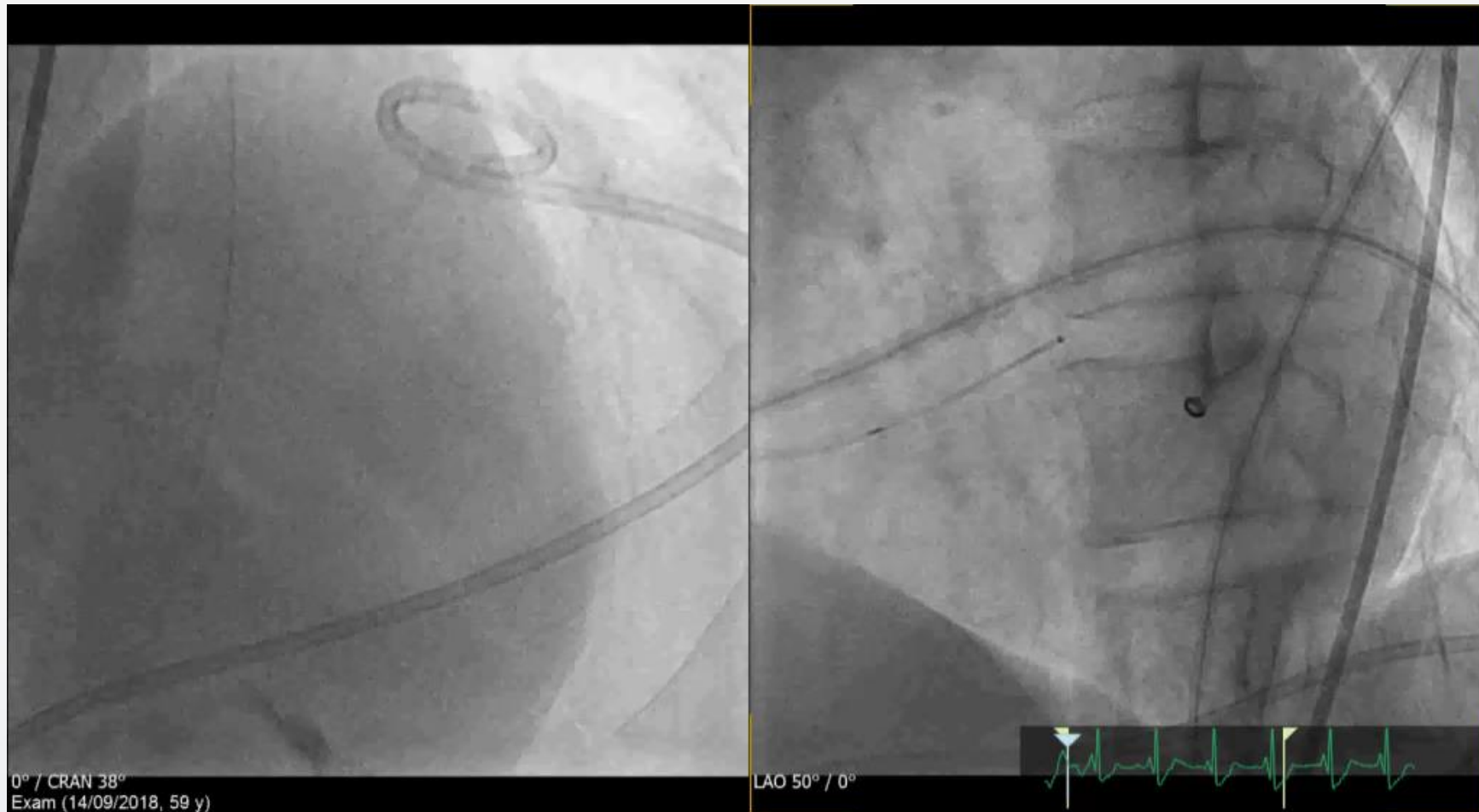
# Aetiology of coronary perforations

67 studies with a total of 5 568 191 PCIs included over a 38-year period (1982–2020).

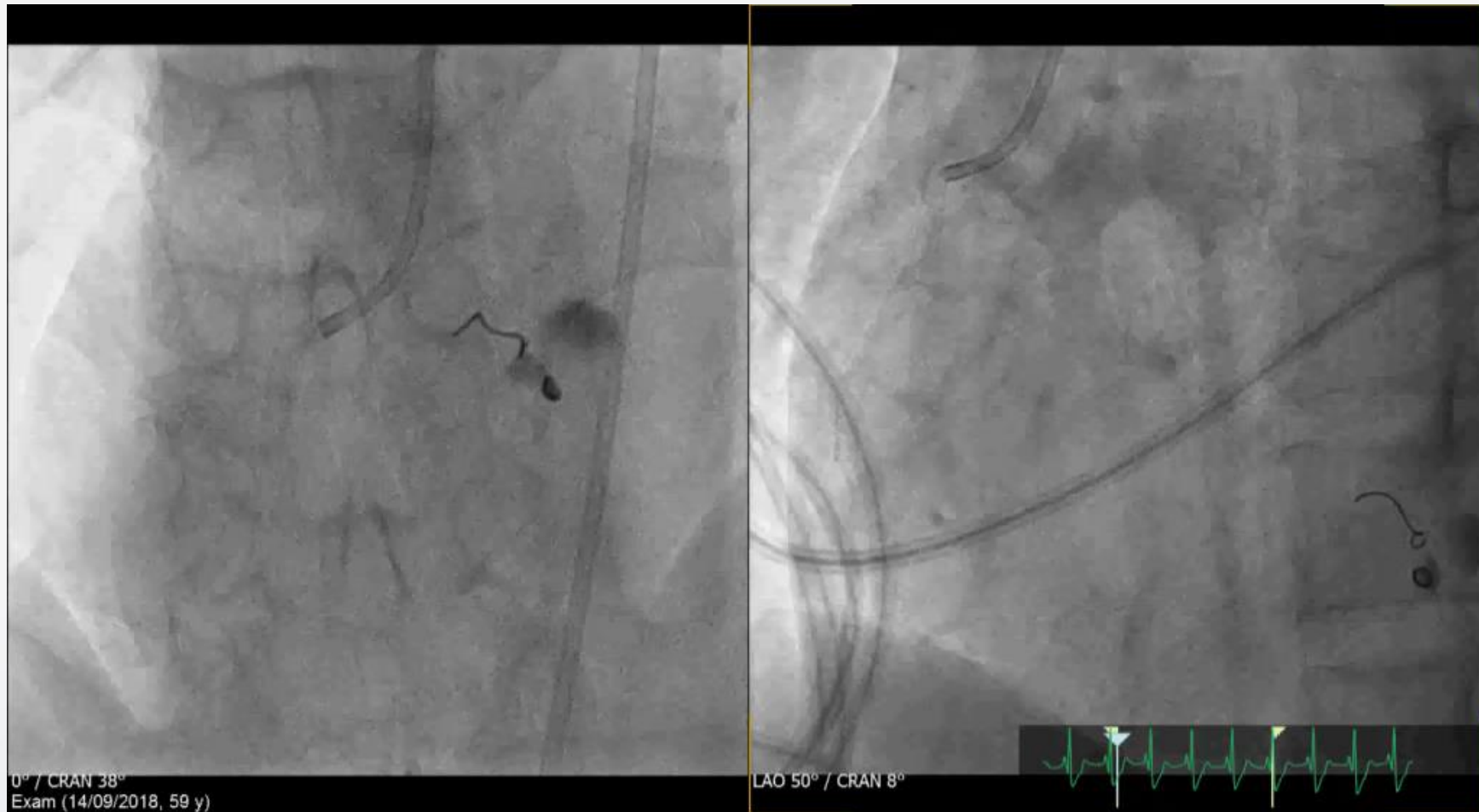
The overall pooled incidence of perforation was 0.39% (95% CI 0.34% to 0.45%) and remained similar throughout the study period.



# Pericardiocentesis and coiling

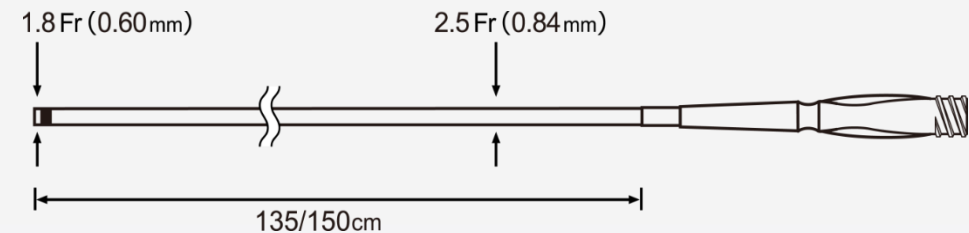


# Final



# Key Steps

- Determine the site of perforation
  - contrast injection from guide catheter
  - distal contrast injection
- Balloon inflation to stop bleeding
- If unsuccessful → deliver microcatheter near to the site of perforation
  - balloon trapping technique, or use 2<sup>nd</sup> wire
- Deliver the material
  - site of deployment
  - technique
- Make sure bleeding has stopped
  - \*\* heparinised blood takes longer to clot
  - consider balloon inflation in the meantime
  - check every 5 min → up to 25-30 min
  - +/- additional coil / treatment



# What can be used to seal the distal perf?

- Coils
- Blood clots
- Fat
- Gelfoam
- Thrombin
- Microspheres

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# Coils

- Construction almost similar to stainless steel guidewire, with a memory / shape
- Synthetic nylon/Dacron fibers → attract platelets → thrombogenic
- **Classification**
  - **Type of deployment** – pushable; detachable
  - **Different sizes** – micro coil ( $\leq 0.018$ "); macro coils (0.035")
  - **Shapes**



# Commonly used coils in distal coronary perforations

- **Cook** – Nester / MicroNester Pushable coils



Microcatheter compatibility	Coil embolus diameters	Extended coil embolus length
<b>0.018"</b>	2 mm	2 cm
<b>0.018"</b>	2 mm	5 cm
<b>0.018"</b>	3 mm	3 cm

# Commonly used coils in distal coronary perforations

- **Boston Scientific** – Pushable Coil

Microcatheter compatibility	Coil embolus diameters	Extended coil embolus length
0.018"	2 mm	≤ 3 cm
0.018"	3 mm	≤ 3 cm

**VortX™ - 18**  
**PUSHABLE COIL 5PK**

**Fibred Platinum Coil**  
 Espiral de platino con fibras, Coil fibreux en platine, Platinfaserspirale, Spirale di platino con fibre, Platina spiraal met vezels, ファイバー付プラチナ・コイル, Fiberplatin spiral, Ινώδες σπειράμα από πλατίνα, Espiral de Platina em Fibra, Trádig platinaspiral, Rostszálas platinaspirál, Vlákniťatá platinová spirála, Spirala z włókien platynowych, Fibret platinaspiral, Fiberli Platin Koil

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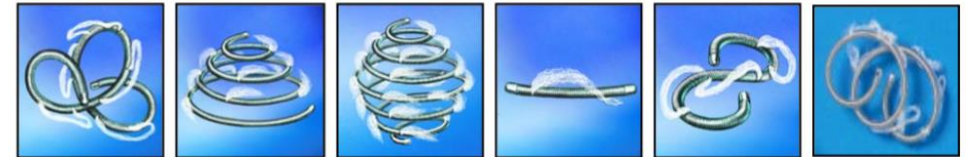
- Peripheral Use Only
- Includes (1) Introducer
- Includes Coil
- (1) Plunger
- 0.53mm (0.021in) Microcatheter Inner Diameter

## Boston Scientific Pushable Coil Portfolio

Versatile and Cost-Effective



**Six Shapes (L to R):** Complex Helical, VortX™, VortX Diamond, Straight, Figure 8, Multi-Loop (2D Helical)



Coil Length	Coil Diameter									
	2 mm	3 mm	4 mm	5 mm	6 mm	7 mm	8 mm	9 mm	10 mm	11 mm
0-3cm										
4-6cm										
7-9cm										

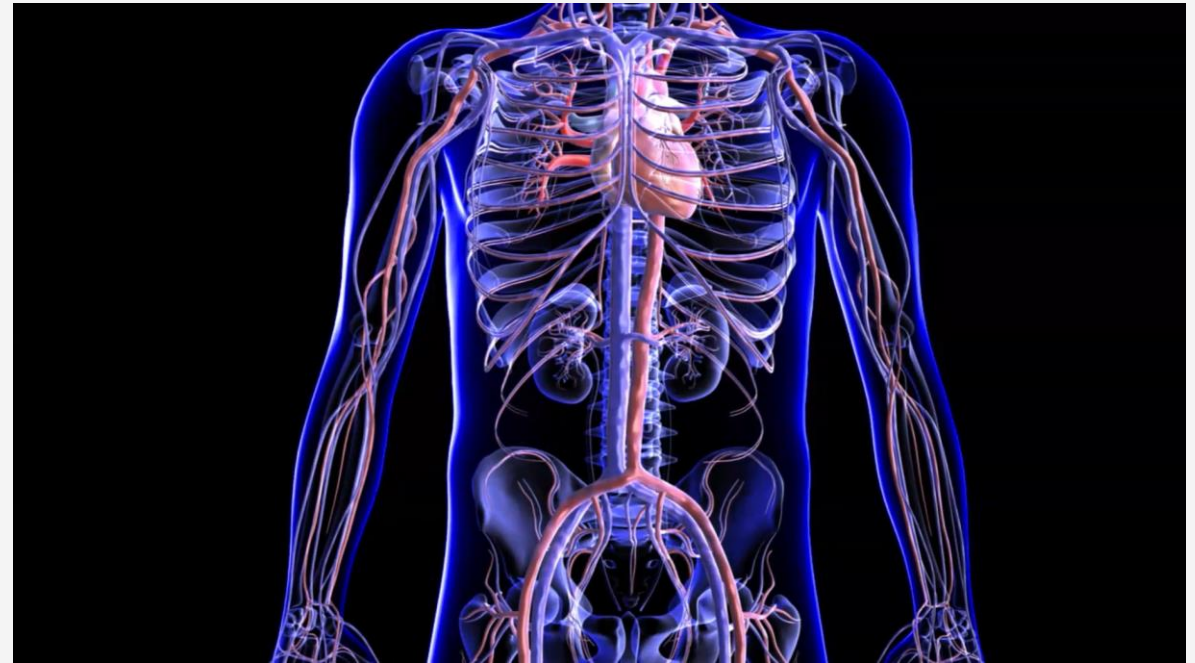
Legend: Blue square = 0.018" Pushable Coils, Yellow square = 0.035" Pushable Coils

# Microcatheters (compatible with 0.018" coil)

Company	Microcatheter	Distal tip ID (inch)	Catheter OD (distal /proximal)	Maximal GW	'Coronary' Coil embolization
Terumo	Progreat 2.2 Fr	0.021"	2.2 Fr / 2.9 Fr	0.018"	✓
	Progreat 2.0 Fr	0.019"	2.0 Fr / 2.7 Fr	0.016"	✓
Terumo	FineCross	0.018"	1.8 Fr / 2.6 Fr	0.014"	✓
Asahi	Caravel	0.016"	1.4 Fr / 2.6 Fr	0.014"	⚠
	Corsair Pro XS	0.015"	1.3 Fr / 2.9 Fr	0.014"	✗
	Corsair Pro	0.015"	1.3 Fr / 2.8 Fr	0.014"	✗
Kaneka	Mizuki (Standard)	0.018"	1.8 Fr / 2.5 Fr	0.014"	✓
	Mizuki (FX type)	0.017"	1.7 Fr / 2.5 Fr	0.014"	⚠
Telefax	Turnpike / Turnpike LP	0.015"		0.014"	✗
Orbus Neich	Teleport Control	0.0175"		0.014"	⚠
	Teleport	0.0170"		0.014"	⚠



- **Medtronic / EV3**
- Detachable Coil

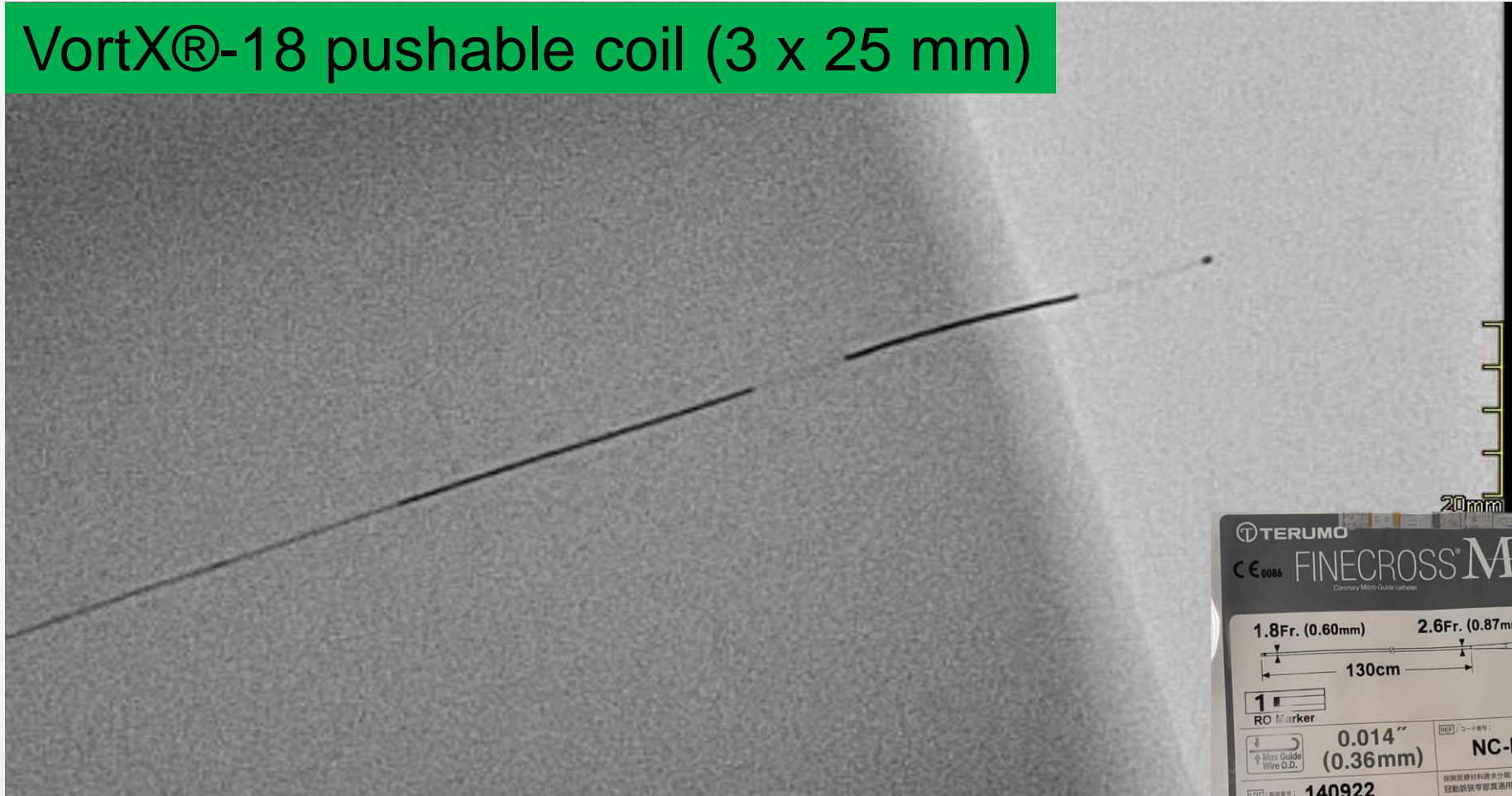


Order number	Description	Diameter (mm)	Length (cm)	Shape	Min. Micro Catheter Compatibility (in)
NV-2-4-Helix	Concerto™ nylon helical	2	4	Helix	0.0165
NV-2-6-Helix	Concerto™ nylon helical	2	6	Helix	0.0165

(2 mm, 3 mm, 4 mm) -----> ID 0.0165"

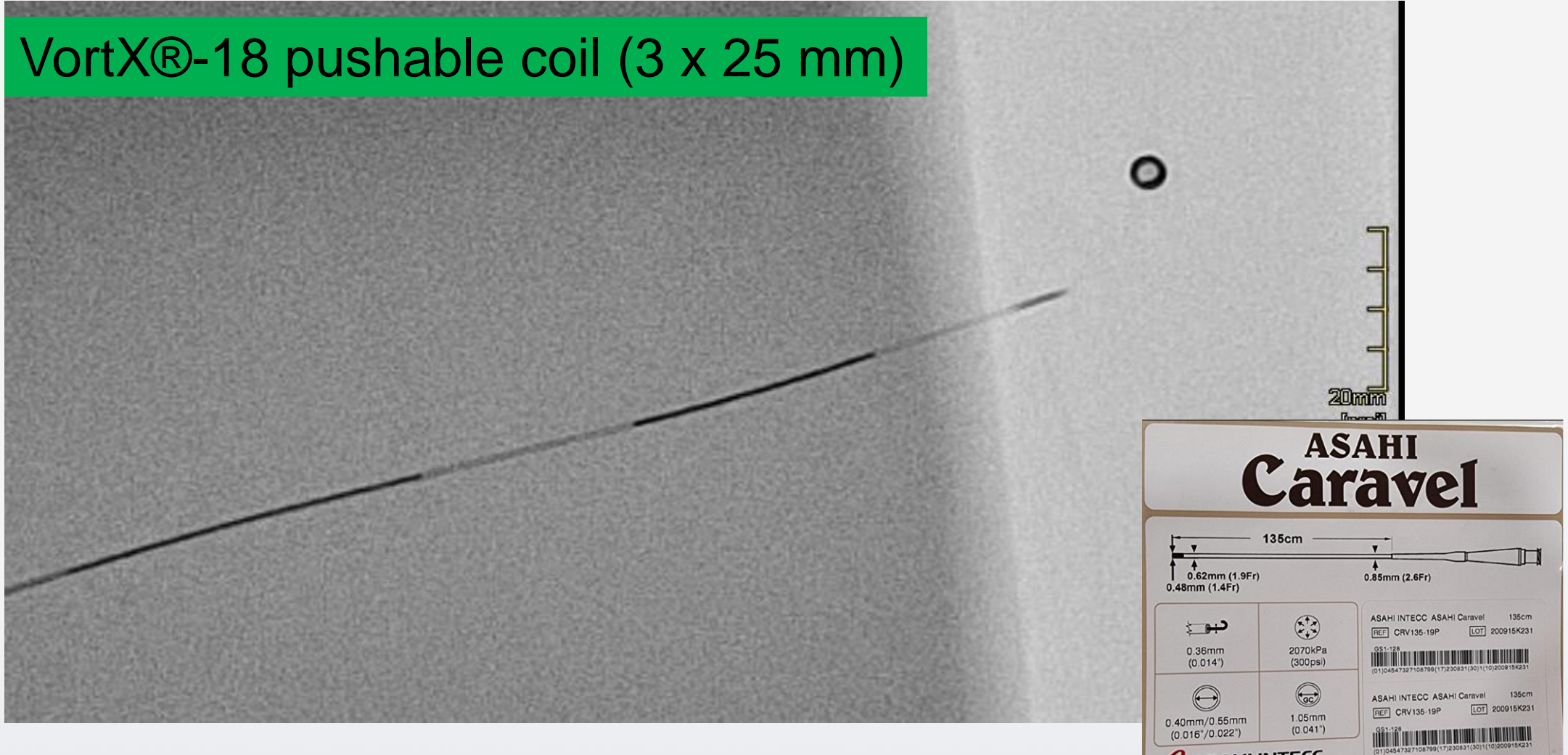
# Finecross MG<sup>®</sup> (tip I.D = 0.018")

VortX<sup>®</sup>-18 pushable coil (3 x 25 mm)



# Caravel® (tip I.D = 0.016")

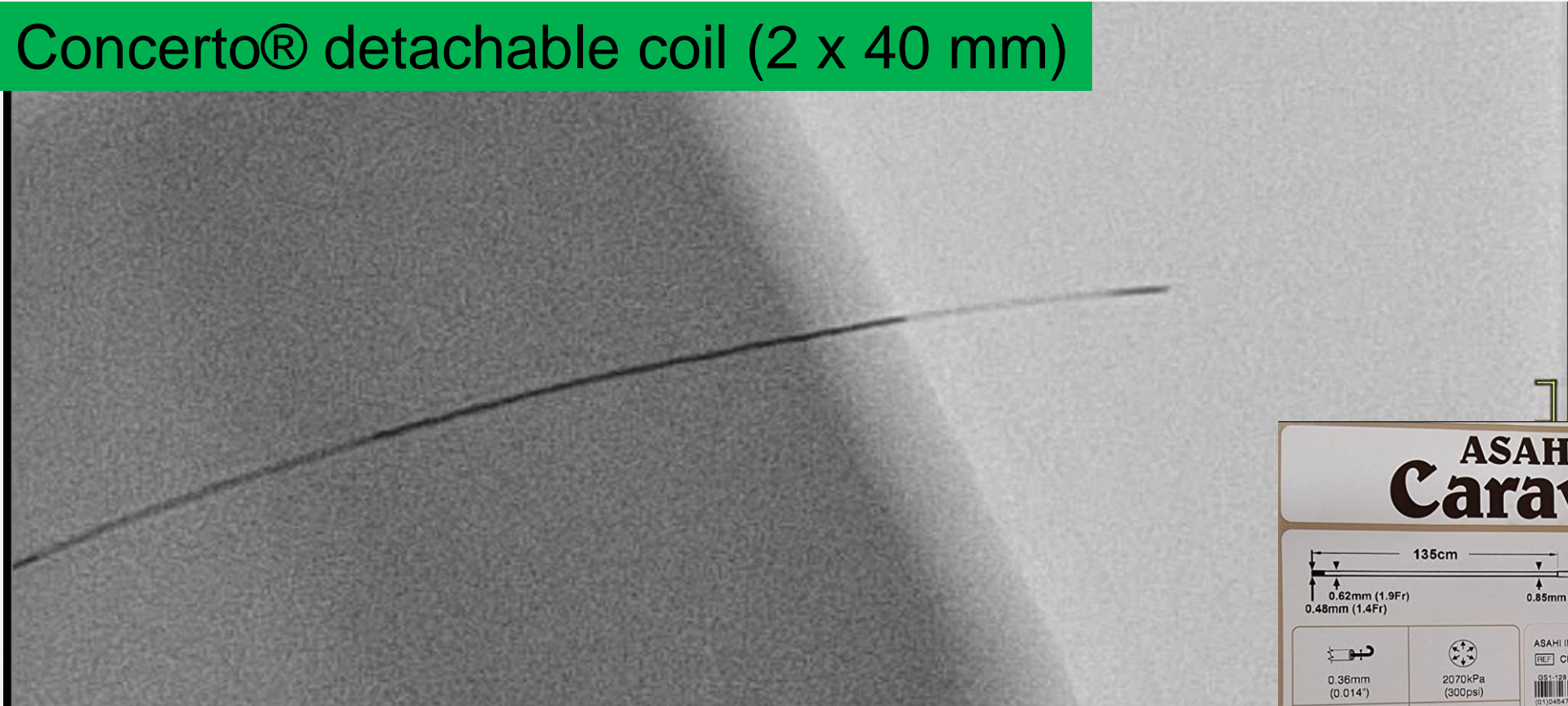
VortX®-18 pushable coil (3 x 25 mm)





# Caravel® (tip I.D = 0.016")

Concerto® detachable coil (2 x 40 mm)



**ASAHI Caravel**

135cm

0.62mm (1.9Fr)  
0.48mm (1.4Fr)

0.85mm (2.6Fr)

 0.36mm (0.014")	 2070kPa (300psi)	ASAHI INTECC ASahi Caravel 135cm REF CRV135-19P LOT 200915K231 GS1-128 (01)04547327108799(17)230831(30)1(10)200915K231
 0.40mm/0.55mm (0.016"/0.022")	 1.05mm (0.041")	ASAHI INTECC ASahi Caravel 135cm REF CRV135-19P LOT 200915K231 GS1-128 (01)04547327108799(17)230831(30)1(10)200915K231

ASAHI INTECC

# Technique of delivering pushable coil .....near distal end of microcatheter



# What can be used to seal the distal perf?

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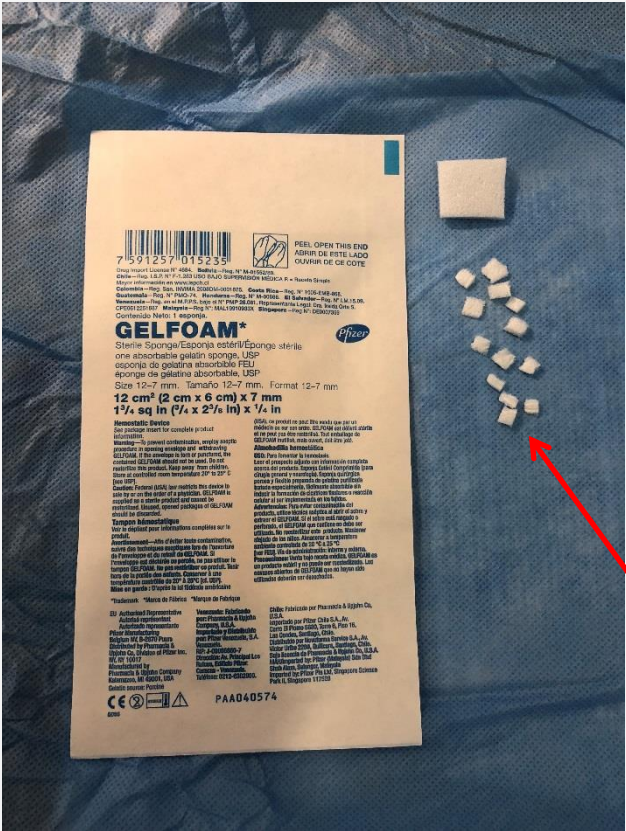
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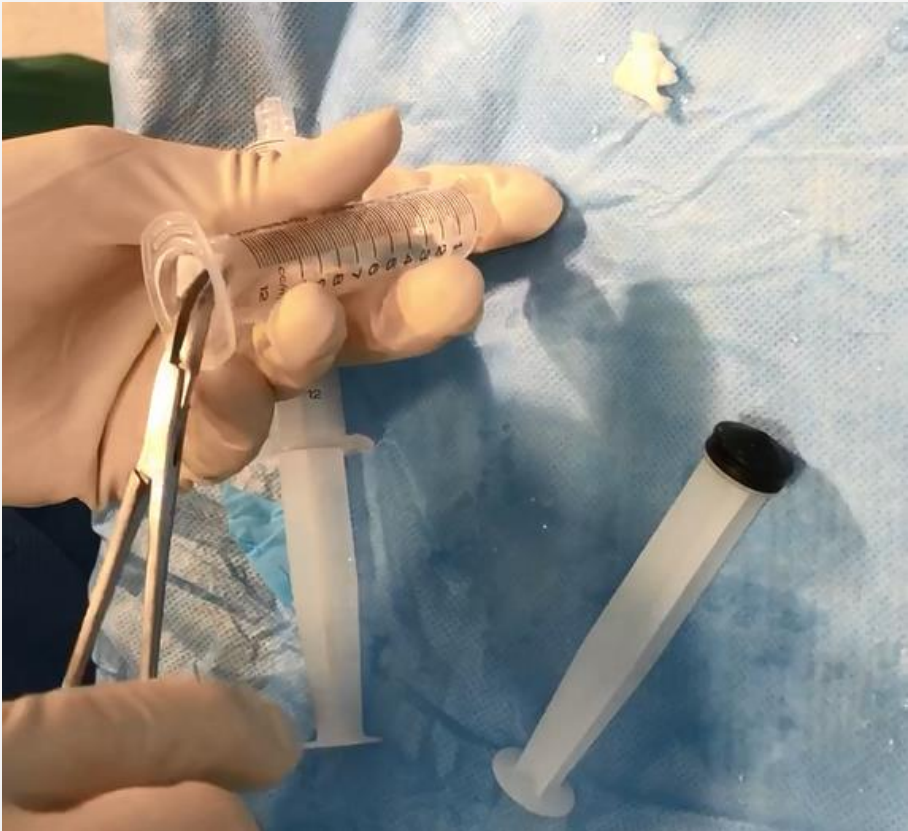


# Gelfoam embolisation

## Preparing the Gelfoam



Cutting of Gelfoam into smaller pieces

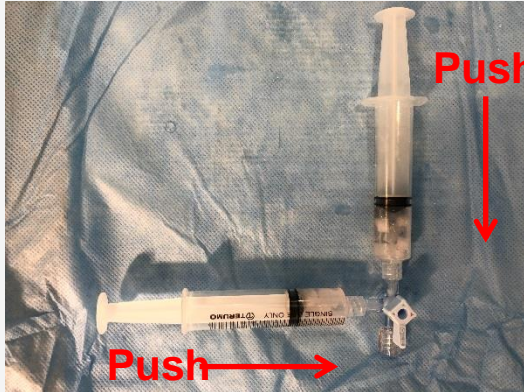


Placing of Gelfoam in 10ml syringe

# Mixing of Gelfoam



**Step 1:** Connect one 10ml syringe with saline/diluted contrast to the syringe with Gelfoam using a 3-way connector



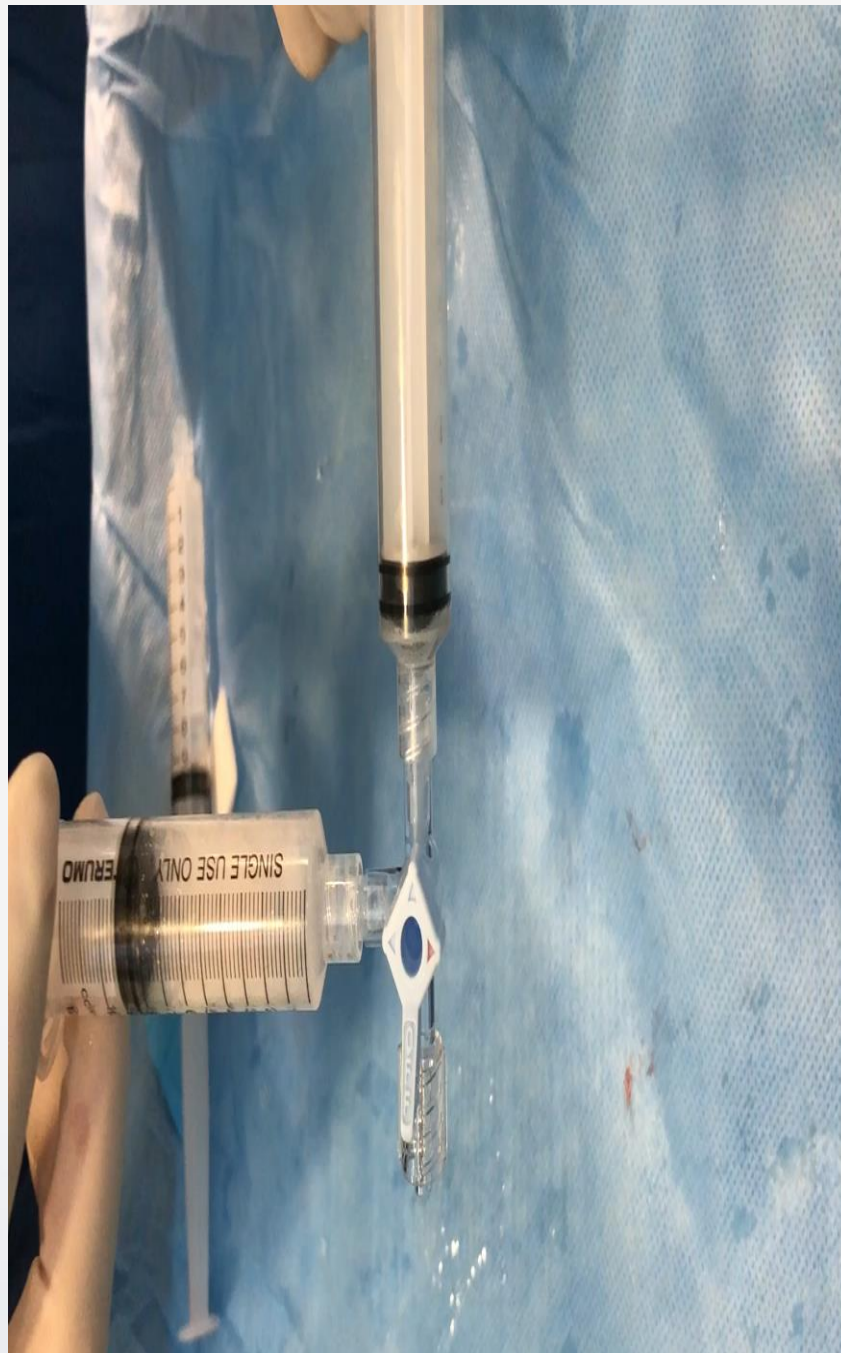
**Step 2:** Mix both syringes (see arrows)



“Mixed” Gelfoam with saline/diluted contrast

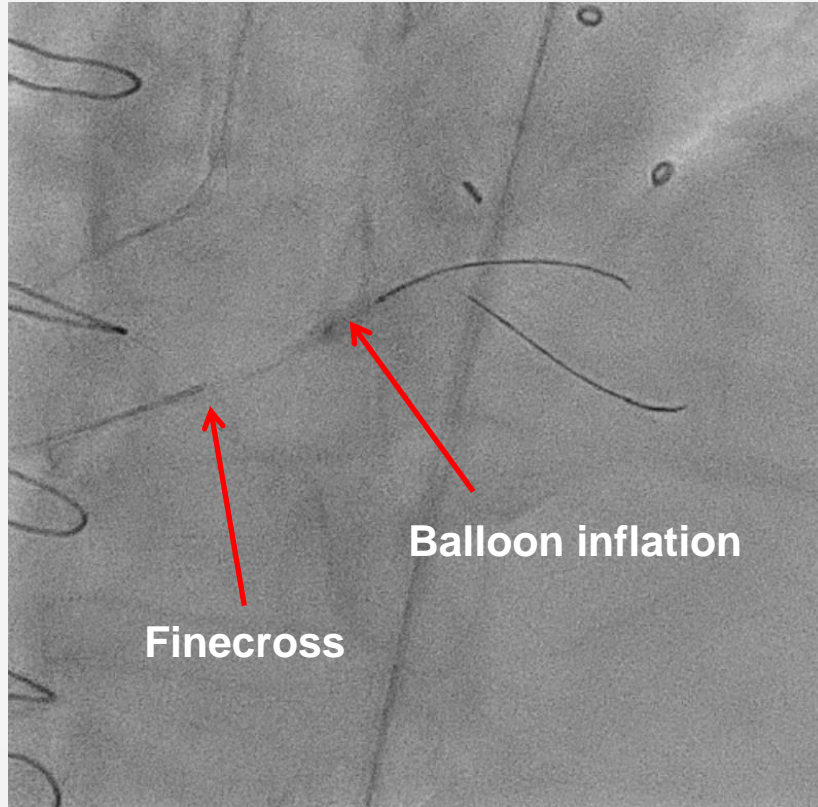


# Mixing of Gelfoam

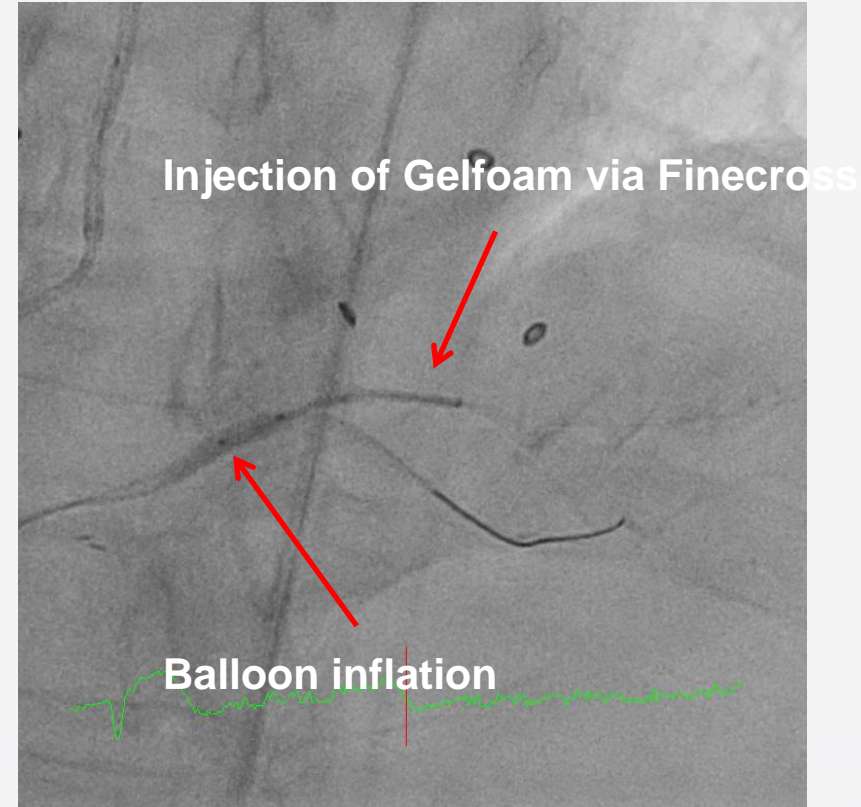




# Gelfoam Distal embolisation



Introduction of finecross microcatheter on 2<sup>nd</sup> wire while maintaining distal balloon inflation



Injection of Gelfoam (small volume ~1ml) with ongoing balloon inflation to prevent proximal spillage

# Conclusion

- You must be aware of risk of distal guidewire-induced coronary perforation
  - anatomy & case complexity
  - guidewire selection and handling
  - visualization field
- Need to know what is available in the cath lab, and how to use devices
  - Size and shapes of coils, how to prepare gelfoam or fat or blood clots
  - Microcatheter compatibility
  - Deployment technique
- Work in a team!
- Ask for HELP