Balloon

Dr Lam ho

Consultant , Cath lab director
Hon. clinical associate professor

屯門醫院
Tuen Mun Hospital

Objective

- Type of Balloon
- Function
- Complication

Type of Balloon

- **Semi Compliant Balloon**
- **Non Compliant Balloon**

- **Special Balloons:**
  - **Scoring Balloon**
    - Cutting Balloon
    - Score flex
    - Angiosculpt
    - NSE
  - **OPN Balloon**
  - **Trapping Balloon**
  - **Shock wave Balloon**
  - **OTW Balloon**

Compliant vs NC – Pressure

- **Semi Compliant Balloon**
- **Non Compliant Balloon**

- **Special Balloons:**
  - **Scoring Balloon**
    - Cutting Balloon
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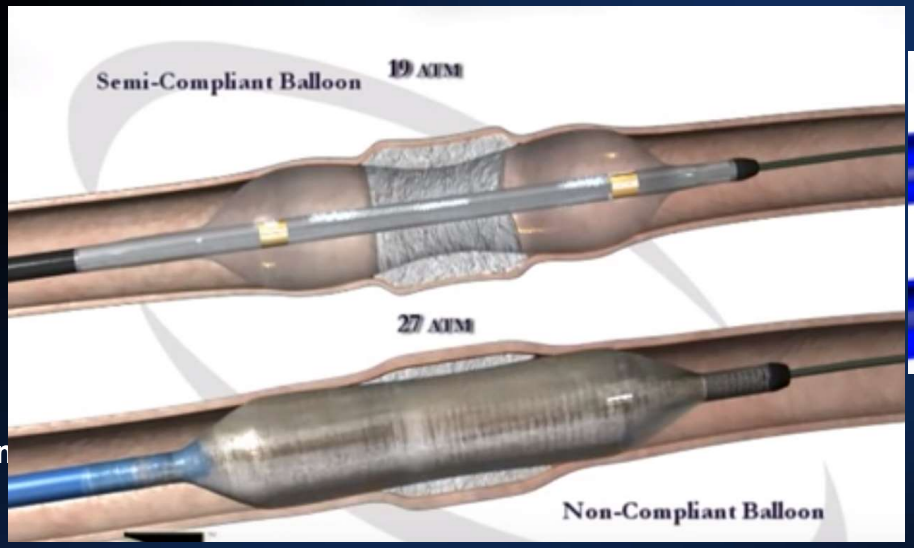
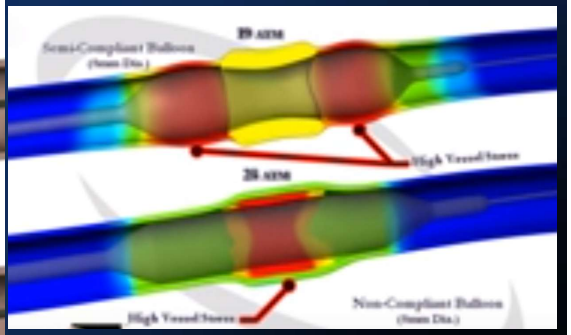
  - **OPN Balloon**
  - **Trapping Balloon**
  - **Shock wave Balloon**
  - **OTW Balloon**





With NC, then it is NC!

Compliant vs NC – Deliverability

- **Semi Compliant Balloon**
- **Non Compliant Balloon**

- **Special Balloons:**
  - **Scoring Balloon**
    - Cutting Balloon
    - Scoreflex
    - Angioscupt
    - NSE
  - **OPN Balloon**
  - **Trapping Balloon**
  - **Shock wave Balloon**
  - **OTW Balloon**

In general, semi compliant is better than NC.

Compliant vs NC – Deliverability

- Semi Compliant Balloon
- Non Compliant Balloon

single marker is better.

Compliant vs NC – Deliverability

- **Semi Compliant Balloon**
- **Non Compliant Balloon**

- **Special Balloons:**
  - **Scoring Balloon**
    - Cutting Balloon
    - Scoreflex
    - Angiosculpt
    - NSE
  - **OPN Balloon**
  - **Trapping Balloon**
  - **Shock wave Balloon**
  - **OTW Balloon**

What is the most important factor for deliverability ?

Functions of balloon

- Dilate
  - Predilate
  - Post – dilate
- Anchor
- Centralize Wire

Functions of balloon: Predilate

- **Lesion preparation**
  - **What is the appropriate balloon size ?**
- **Small vs Big**

Clinical and Procedural Benefits of Direct Stenting

- **All-comers meta-analysis across 24 randomized controlled trials, n = 6803[1]**
  - Only data from RCT specifically evaluating direct (DS) vs. conventional stenting (CS) included
  - Primary endpoint: 6-month composite death or MI; secondary endpoint: 6-month MI and TVR
  - ***Conclusion: In select coronary lesions, DS reduces composite death or MI 22% vs. CS***

	Direct (n=3,412)	Conventional (n=3,391)	*p-value*
Composite Death or MI	3.95 %	5.10%	p=0.02
MI	3.16 %	4.04 %	p=0.04
TVR	6.50 %	6.96 %	p=0.42

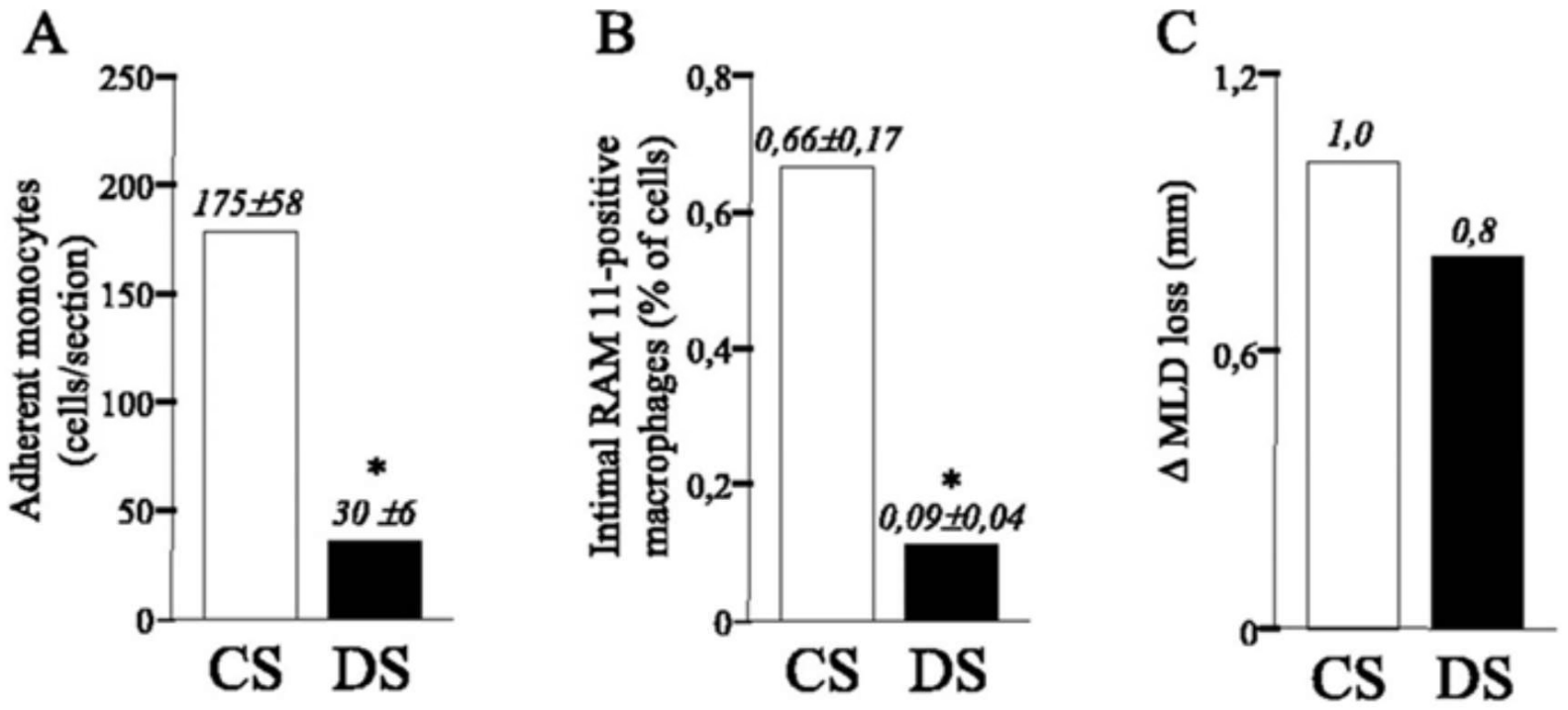
- **Acute Vs Elective**

- **Acute Myocardial Infarction (TIMI and DISCO 3 studies)[3-4]**
  - ***Conclusion: DS associated with lower rates of death, MI, CHF, improved myocardial perfusion***

3 Ly, Gibson et al., Am J Cardiol 2005; 95: 383-386.
4 Cuellas, Elbal et al., Rev Esp Cardiol 2006; 59(3): 17-24.

Microvascular Impact of Direct Stenting

Comparison between direct stenting (DS) and conventional stenting (CS) with respect to: (A) number of adherent monocytes 3 days after the procedure; (B) percentage of intimal macrophages, at 14 days after the procedure; (C) minimal lumen diameter (MLD) loss.



Emanuele Barbato et al. Eur Heart J 2003;24:394-403

European Heart Journal

Functions of balloon: Predilate

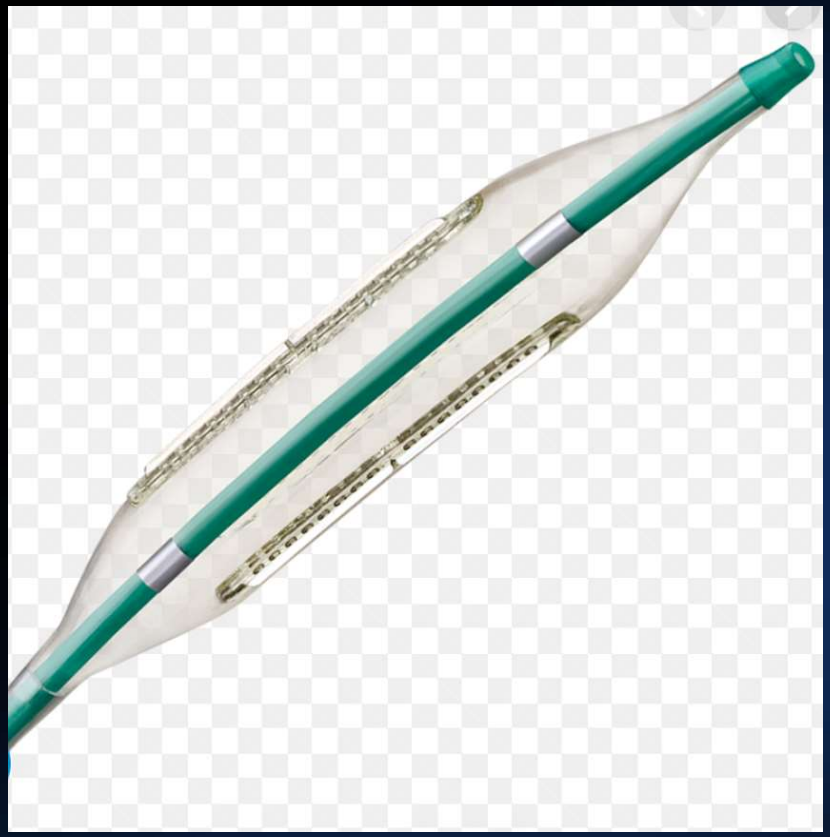
- Lesion preparation
  - What is the appropriate balloon type?

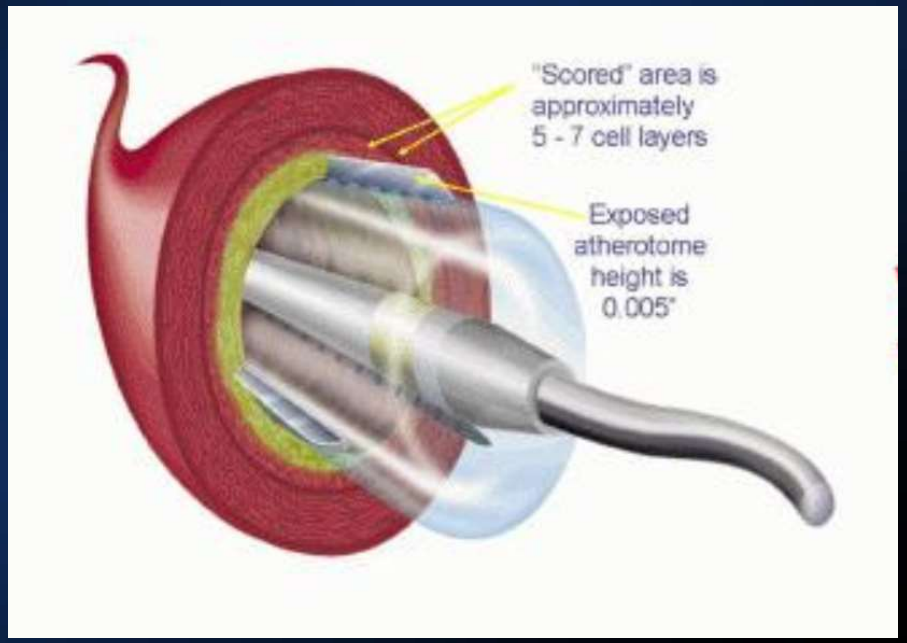
- Semi vs NC vs Special balloons

  – Cutting Balloon
  – Score flex
  – Angiosculpt
  – NSE

Shock Wave Balloon

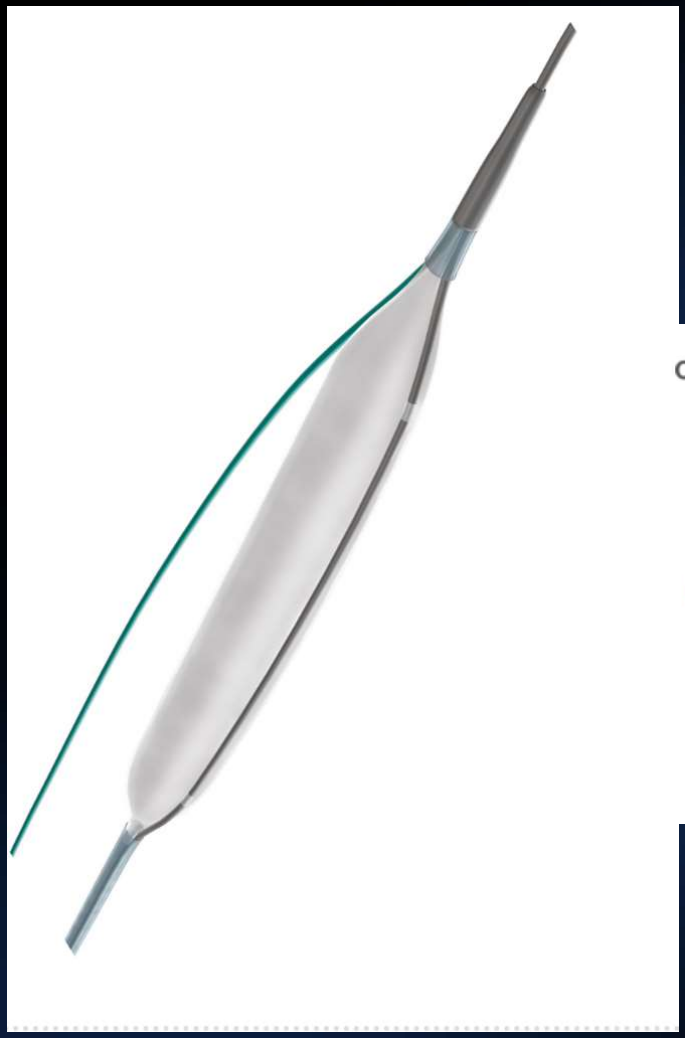
Cutting Balloon

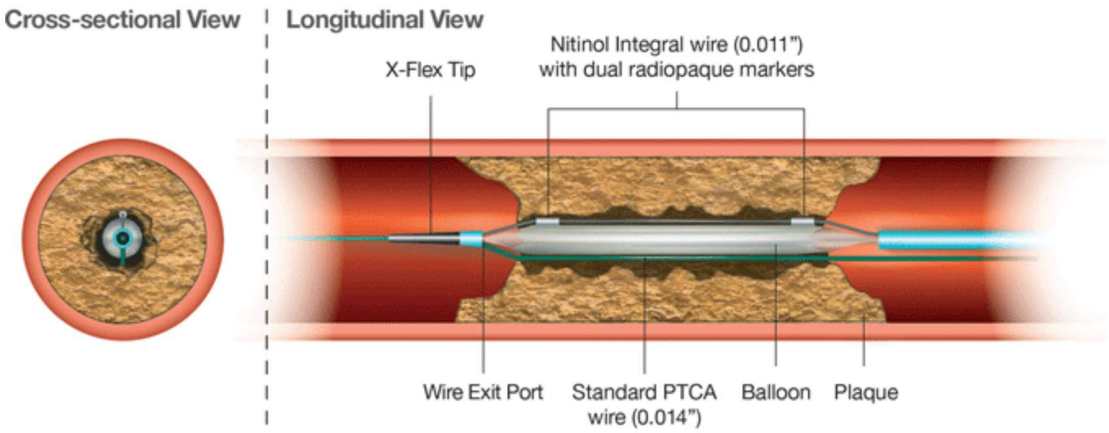




Angiosculpt

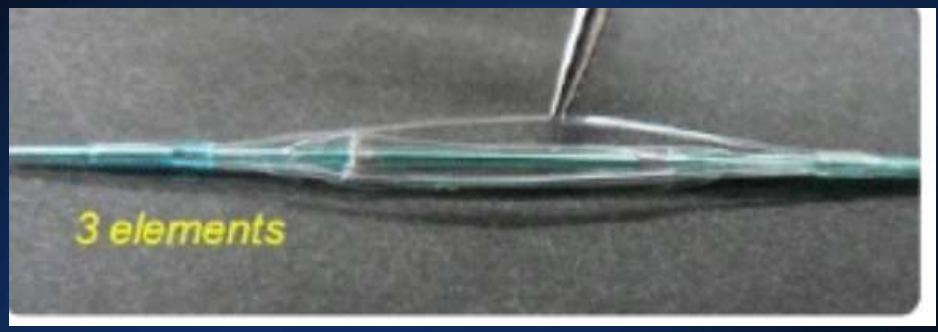
Scoreflex




Cross-sectional View
Longitudinal View
Nitinol Integral wire (0.011")
with dual radiopaque markers
X-Flex Tip
Wire Exit Port
Standard PTCA
wire (0.014")
Balloon
Plaque

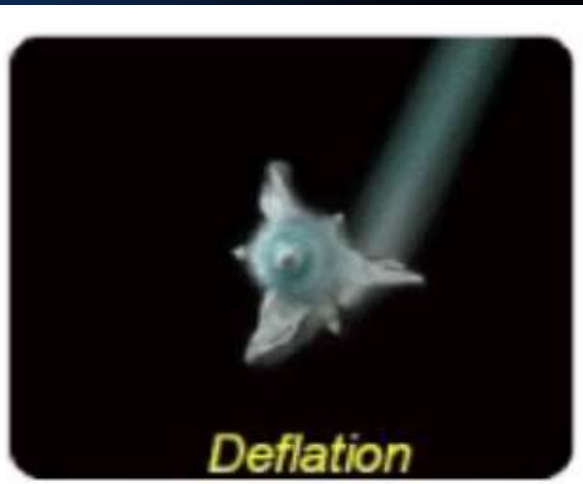
NSE balloon


NSE ALPHA™
LACROSSE® Coronary Dilatation Catheter

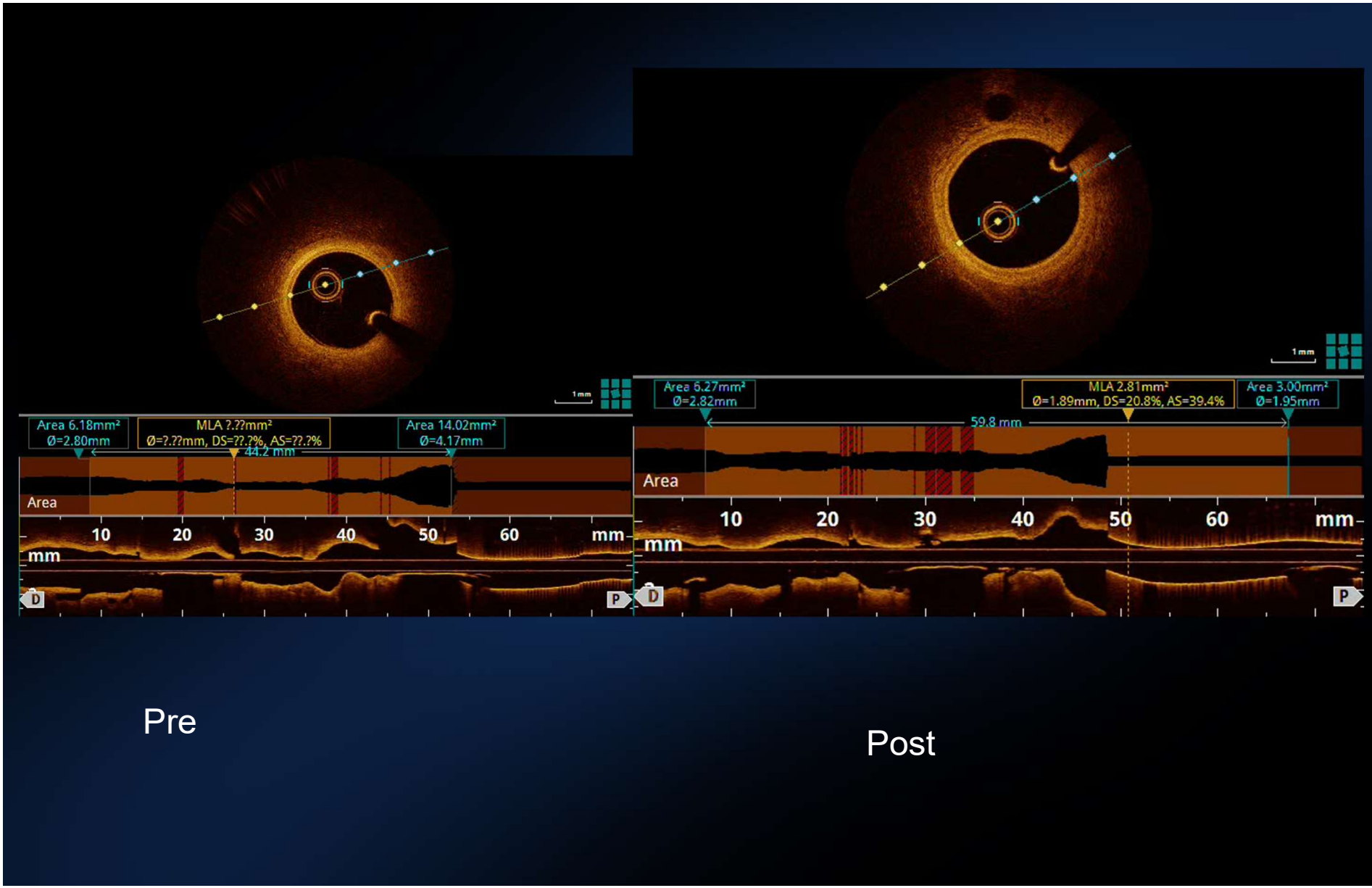

3 elements


Pre-Inflation


120°
Inflation


Deflation

Shock Wave Balloon



Pre

Post

Functions of balloon: Post - dilate

- **Stent optimization – use NC Balloon**

Compliance Data			
Pressure			Diameter
atm	(kPa)		(mm)
14	(1419)	NP	3.00
15	(1520)		3.01
16	(1621)		3.03
17	(1723)		3.04
18	(1824)		3.06
19	(1925)		3.07
20	(2027)	RBP	3.09

IP			BALLOON Ø
kPa	(atm)		mm
608	6		2.77
709	7		2.80
811	8		2.84
912	9		2.87
1013	10		2.91
1115	11		2.94
1216	12	NP	2.97
1317	13		2.99
1419	14		3.01
1520	15		3.03
1621	16		3.05
1723	17		3.07
1824	18		3.09
1925	19		3.11
2027	20	RBP	3.13
2128	21		3.15
2229	22		3.17
2330	23	RBP	3.20
2432	24		3.22
2533	25		3.25

ATM	kPa	
2	203	2.52 mm
3	304	2.58 mm
4	405	2.63 mm
5	507	2.68 mm
6	608	2.73 mm
7	709	2.78 mm
8	811	2.83 mm
9	912	2.87 mm
10	1013	2.91 mm
11	1115	2.94 mm
12 (NOM)	1216	2.97 mm
13	1317	3.00 mm
14	1419	3.02 mm
15	1520	3.04 mm
16	1620	3.07 mm
17	1723	3.09 mm
18 (RBP)	1824	3.11 mm
19	1925	3.14 mm
20	2027	3.16 mm
21	2128	3.18 mm
22	2229	3.21 mm

P		Ø
(atm)	(kPa)	(mm)
6	608	2.82
8	811	2.89
10	1013	2.95
12	1216	3.00
14	1419	3.04
16	1621	3.08
18	1824	3.11
20	2026	3.15
21	2128	3.17
22	2229	3.19
23	2330	3.21
24	2432	3.23
25	2533	3.25

NC Pantera LEO

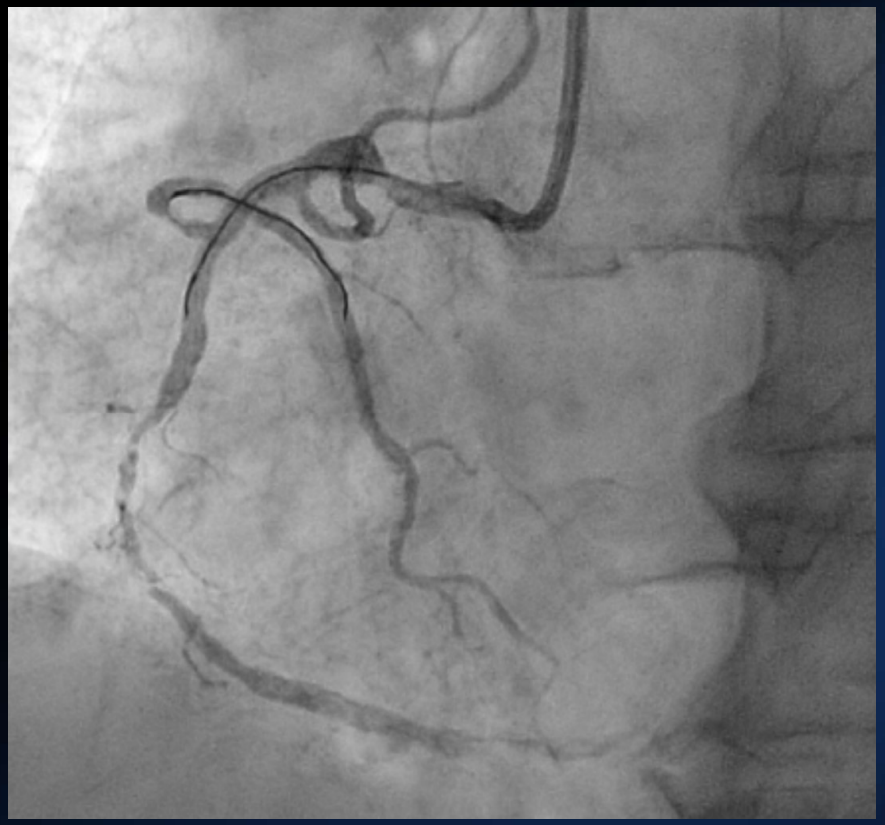
NC Euphora

NC Radien

NC Trek

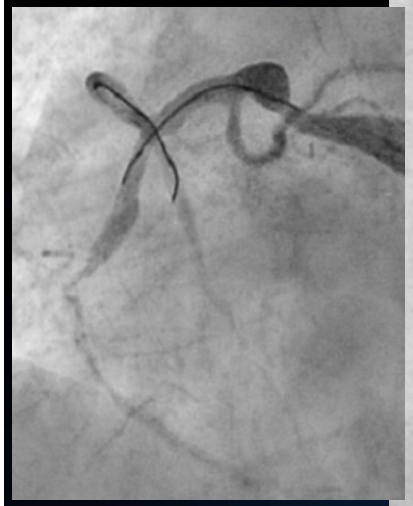
Accuforce NC

Functions of balloon: non- dilatable

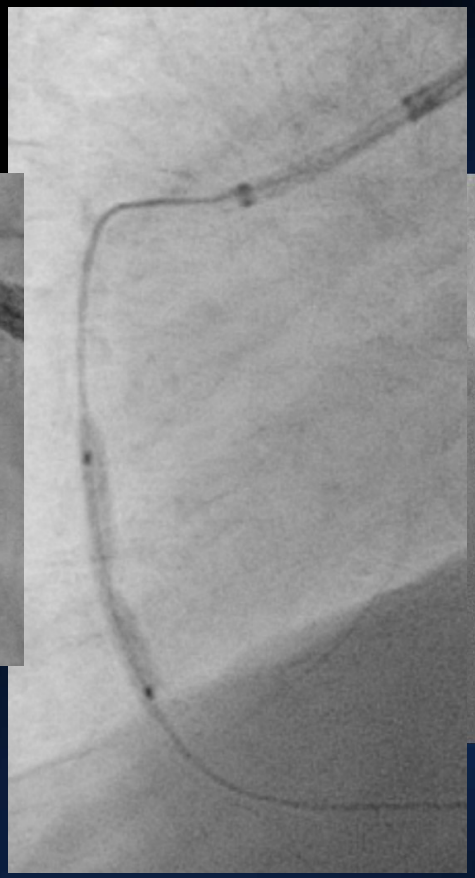


Challenging wiring
Need Mizuki Flex to cross the bend

What will you do ?



Tortuousity

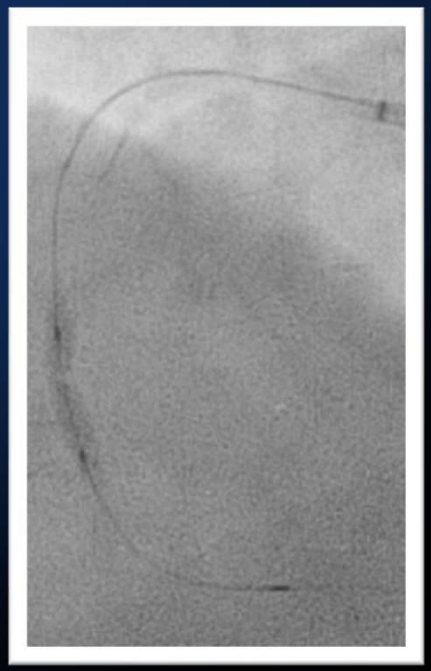


Eccentricity

Minor dissection ++Ve

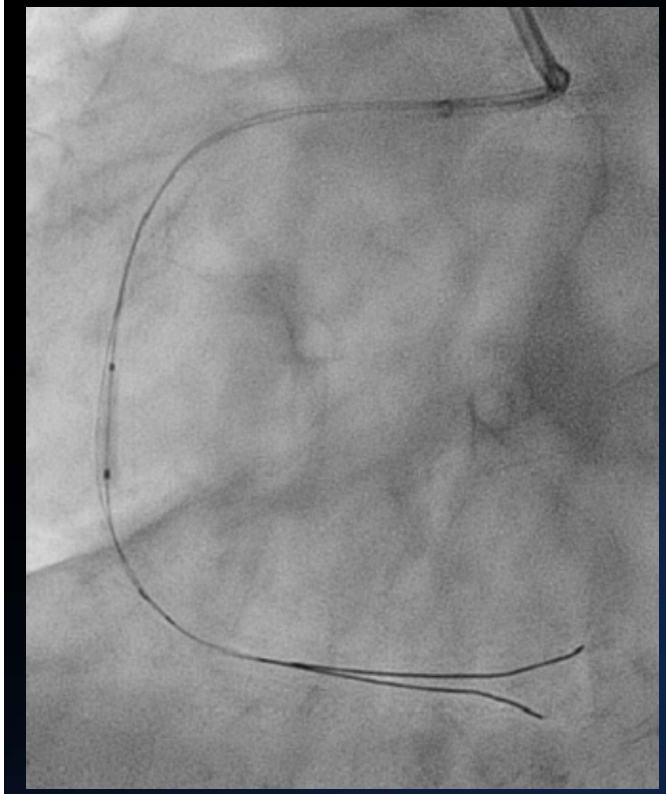
Mobility

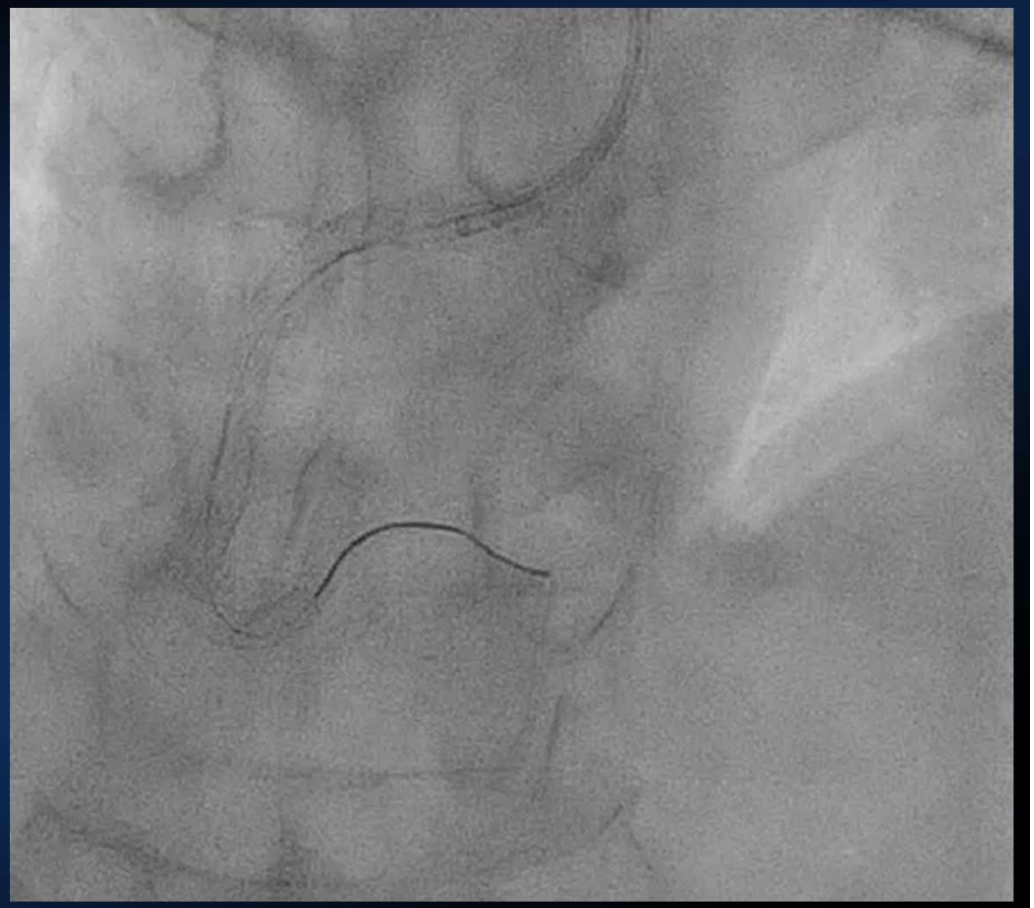
1.25 blur



Still non dilatable

OPN 40 ATM plus cutting wire





Onyx

Functions of balloon: non- dilatable

OPN NC **Ø3.0 x 10**

PTCA Balloon Catheter

REF 300-010-004 LOT 189629 2022-09-21

SUPER HIGH PRESSURE

Ø Balloon: 3.0 mm

↔ Balloon: 10 mm

MIN GC: 5 F (0.056", 1.42 mm)

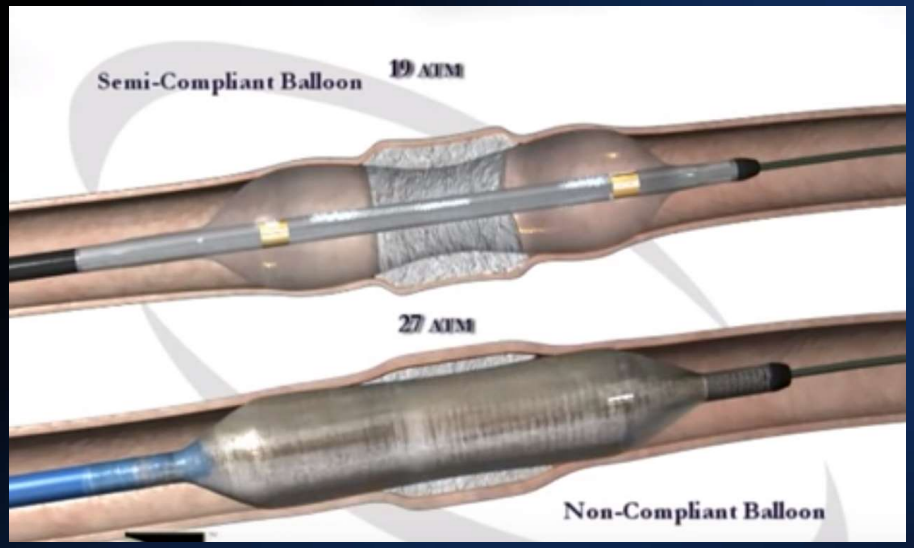
REC GW: 0.014", 0.36 mm

BALLOON COMPLIANCE

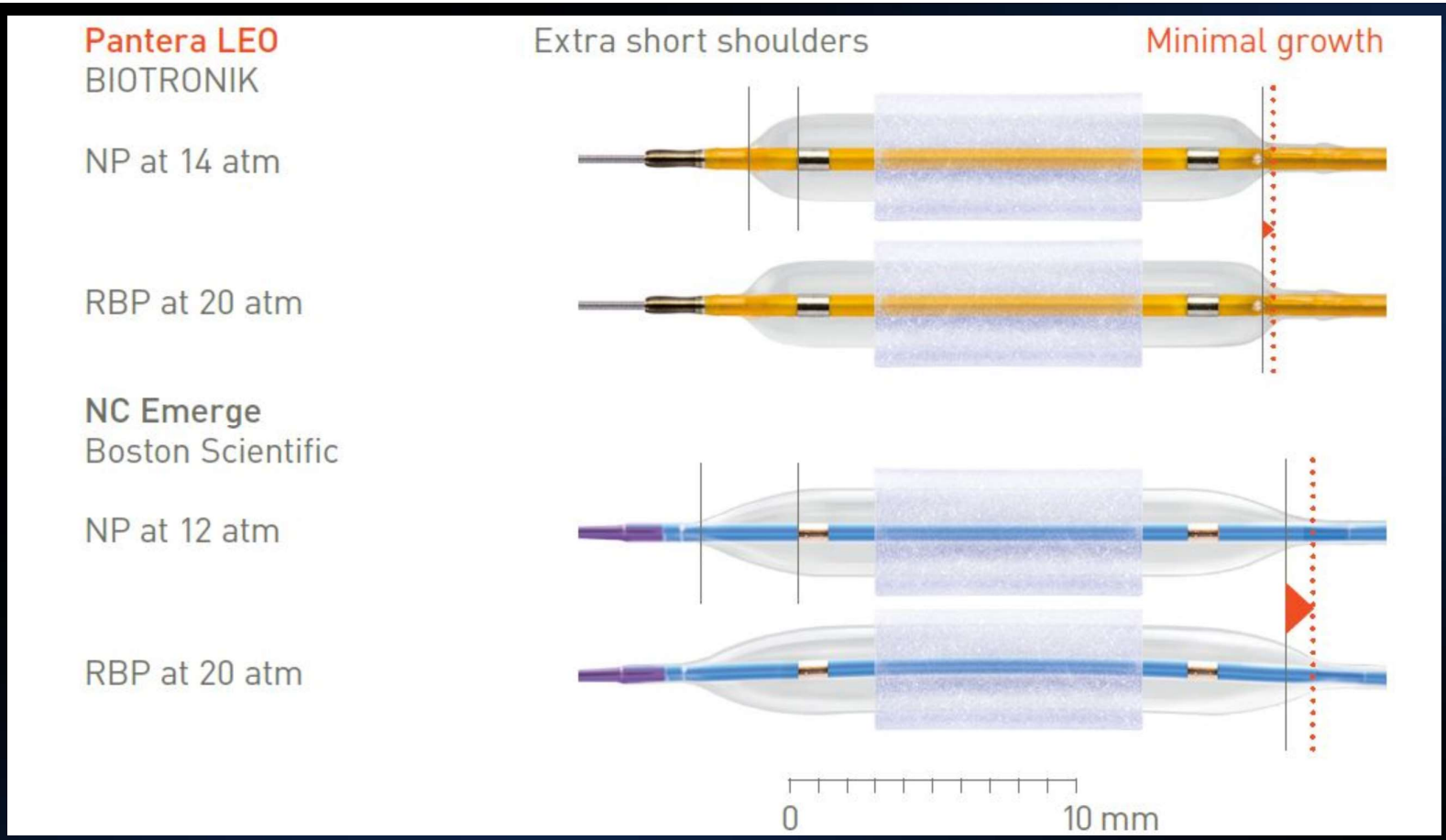
[Bar]	[MPa]	Ø [mm]
10	**1.0**	**3.00**
20	2.0	3.14
30	3.0	3.29
35	**3.5**	**3.36**

Functions of balloon: non- dilatable

- Dog bone effect



Be careful of shouldering



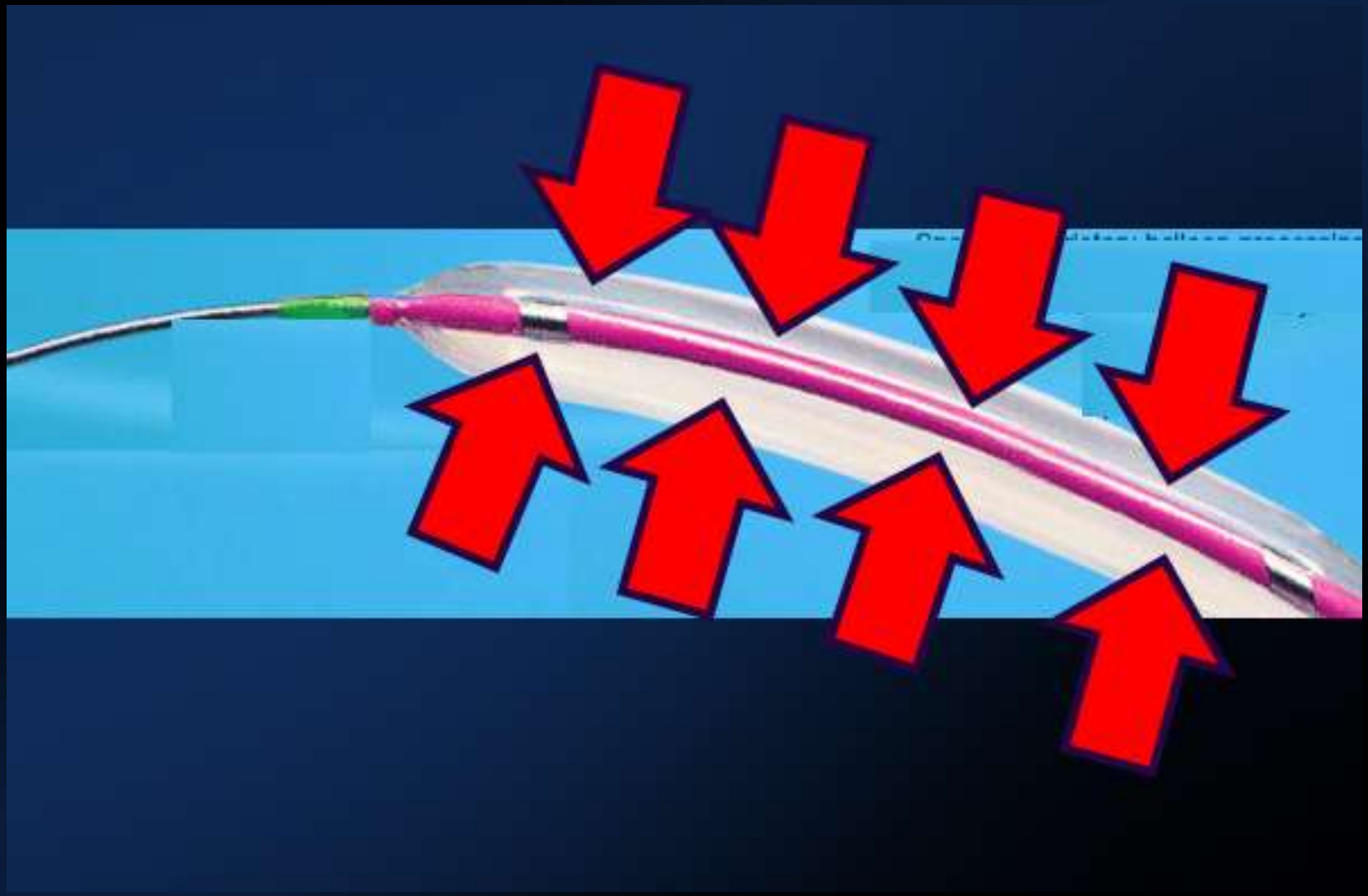
Short shouldering balloon :

Accurforce, Pantera LEO, NC Euphora

Post kissing POT position

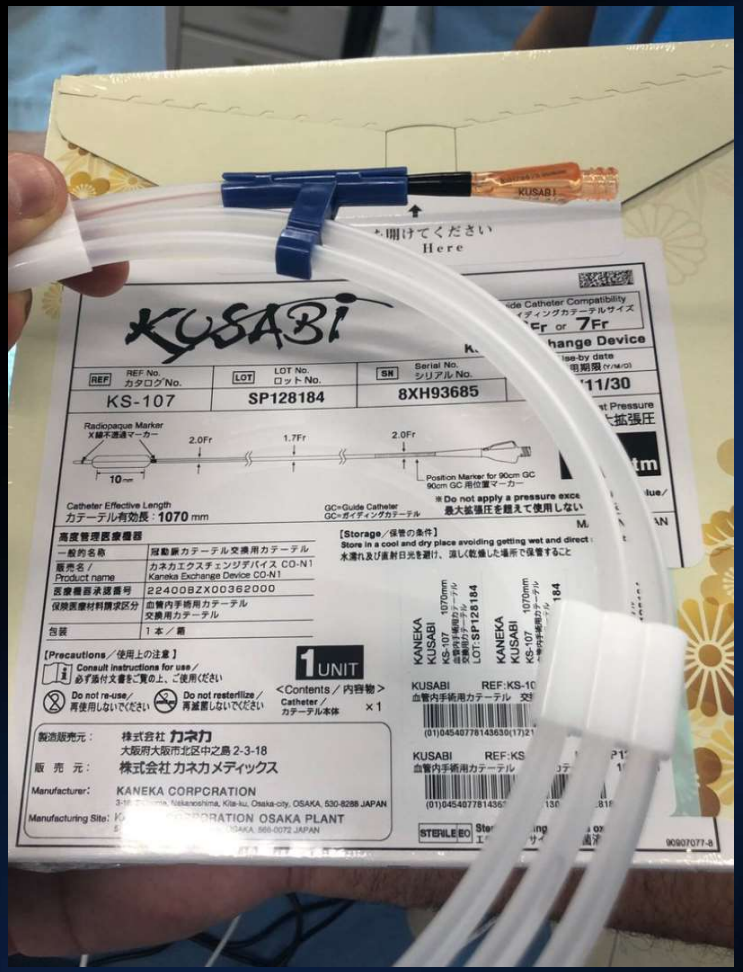
POT Balloon shoulder
should not touch carina

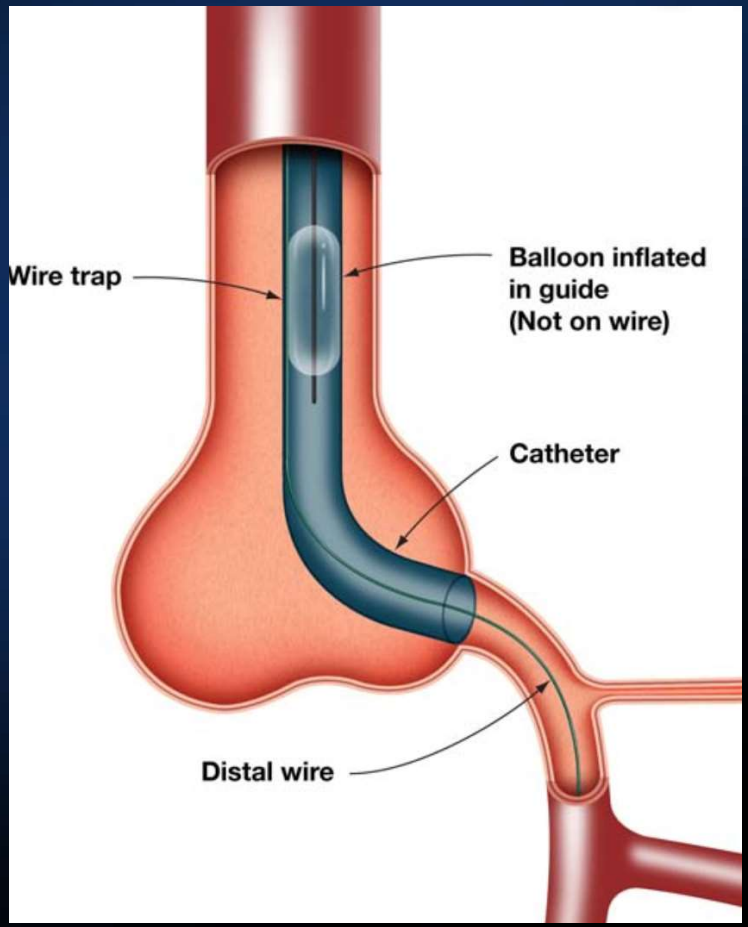
Be careful of “balloon wire fusion”



Functions of balloon : Anchor

- Anchor : wire trapping for removal or pushing



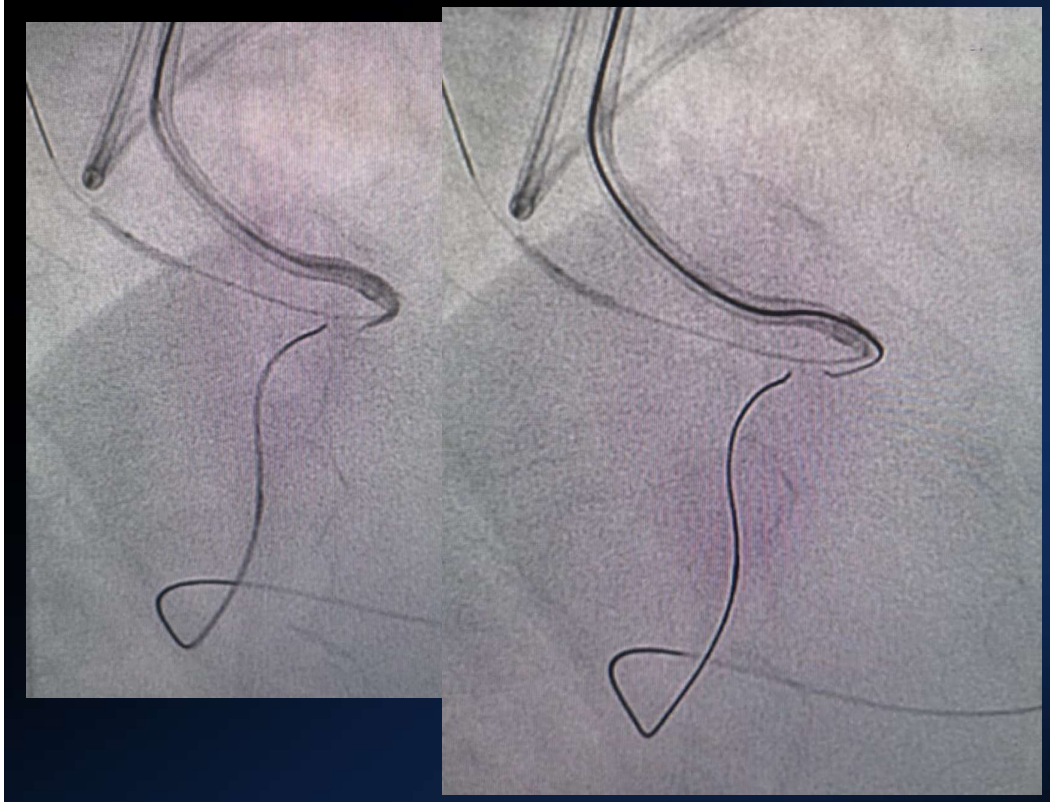


Functions of balloon : Anchor

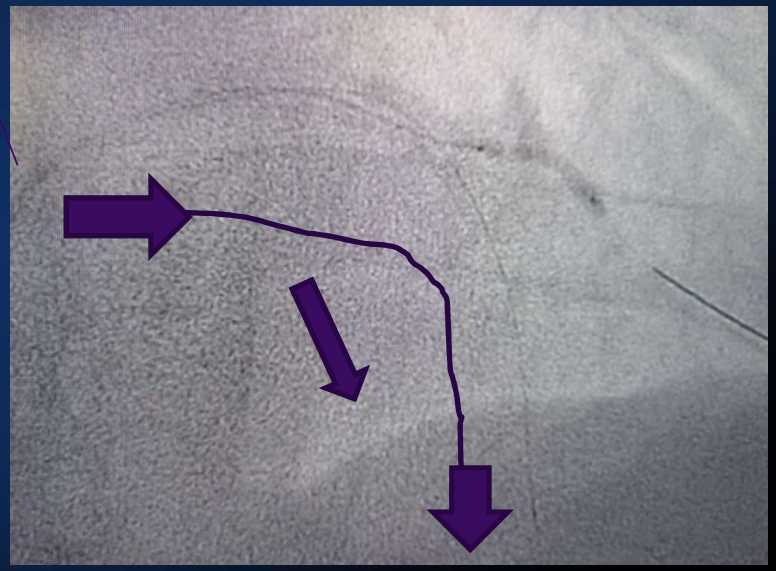
- Anchor : microcatheter trapping in retrograde

Functions of balloon : Anchor

- Anchor : increase support for puncture or deliver



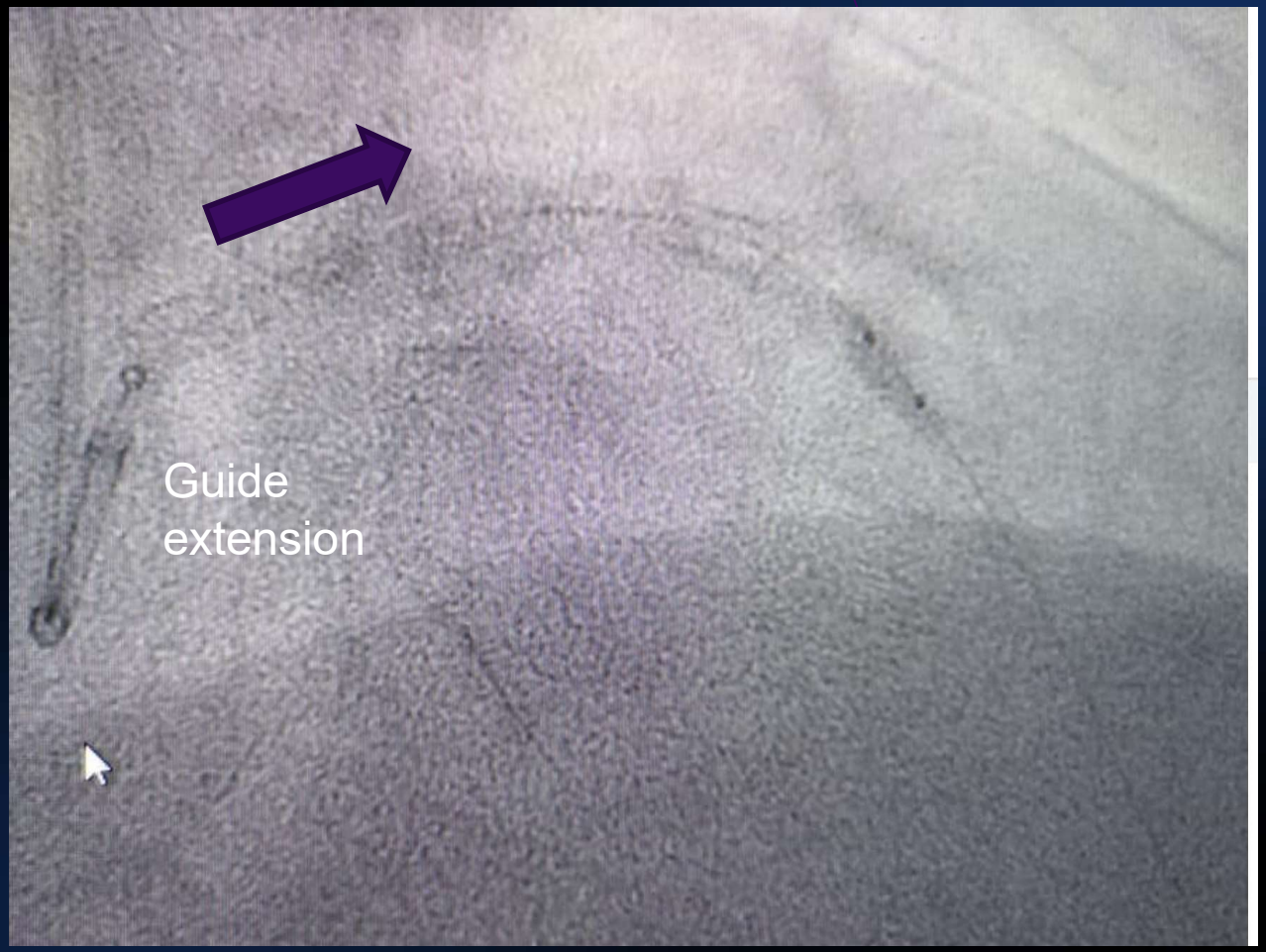
puncture



deliver

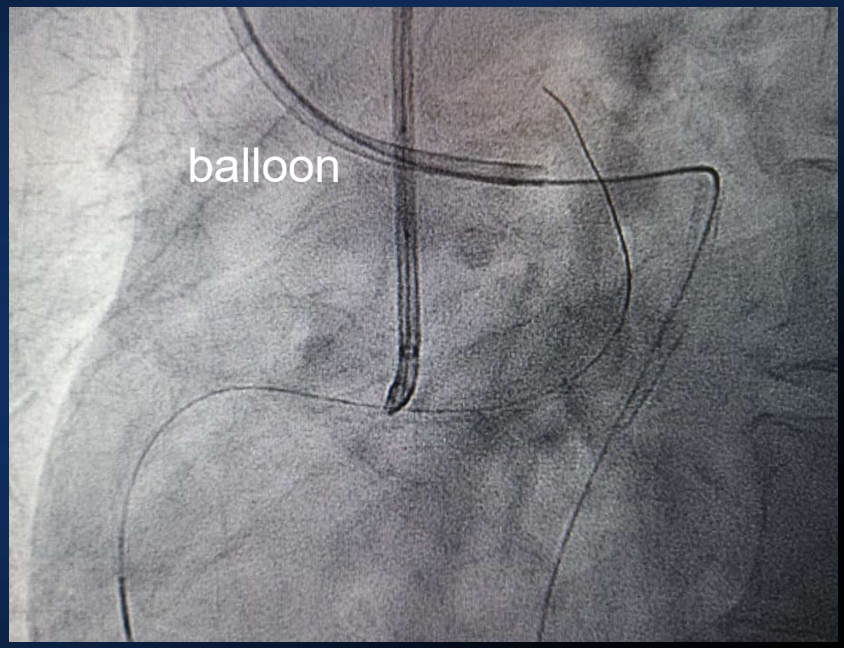
Functions of balloon : Anchor

- Anchor : increase support for puncture or deliver

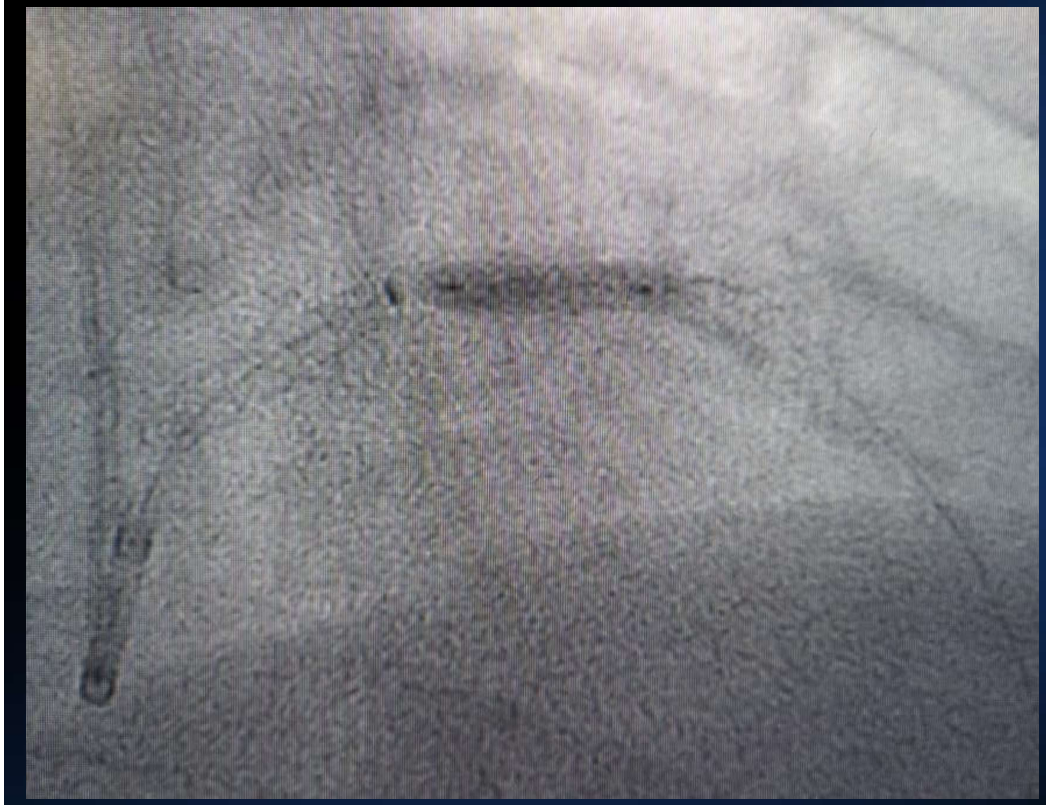


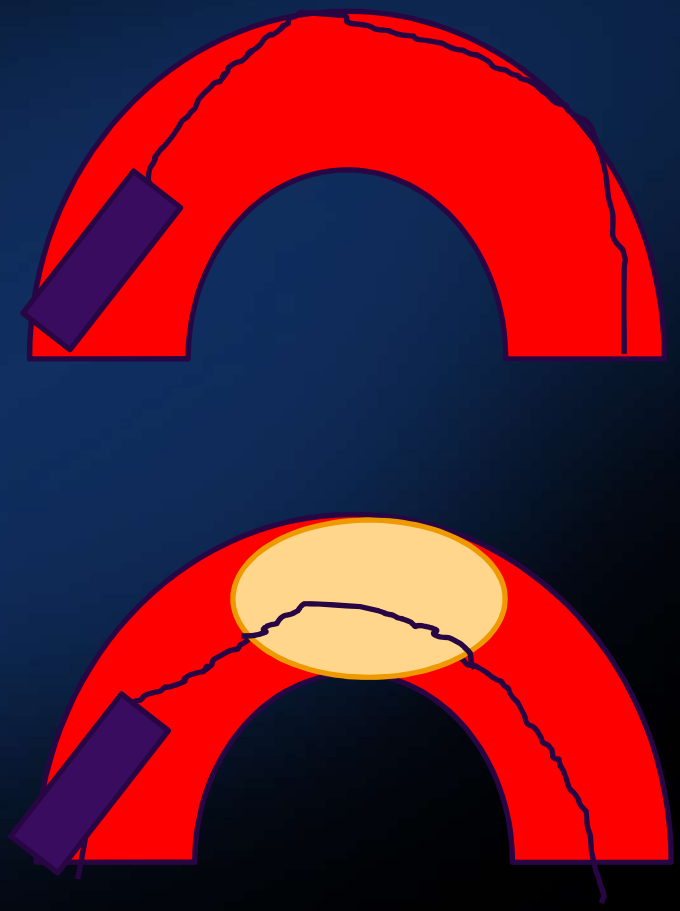
Functions of balloon : Anchor

- Anchor : home made flexible snare



Functions of balloon : Centralize wire





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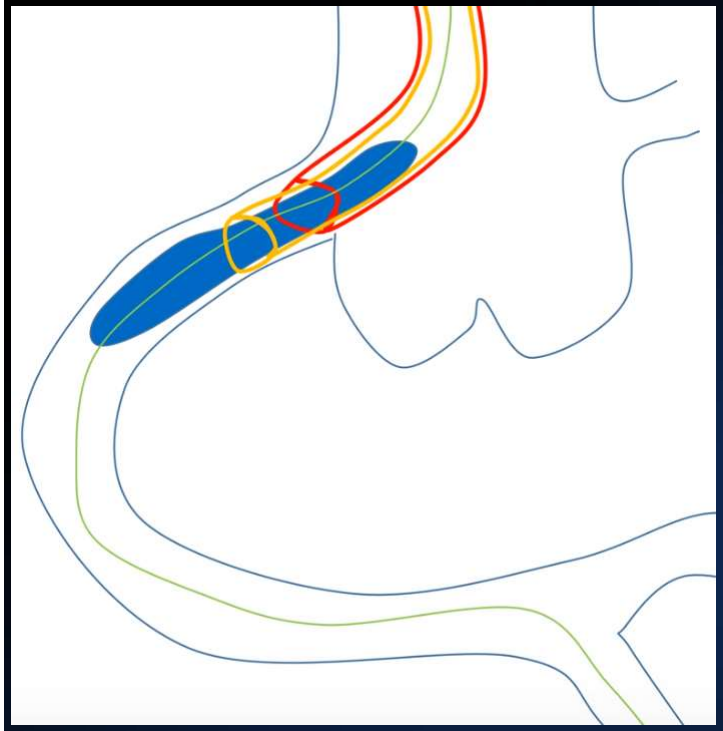
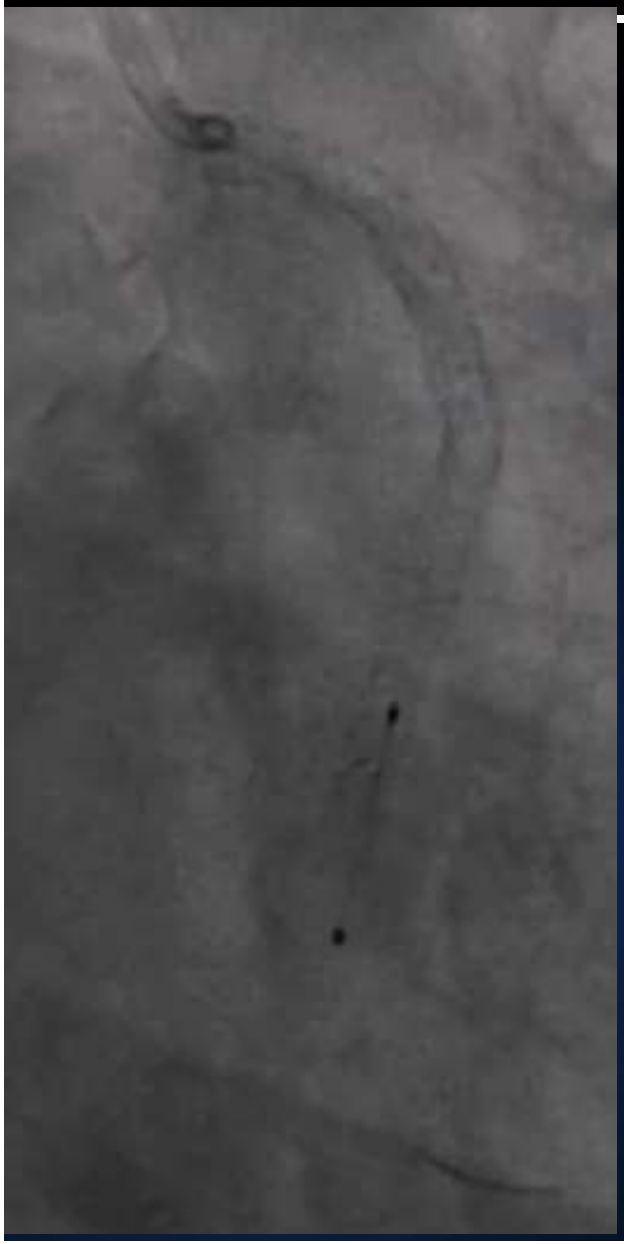
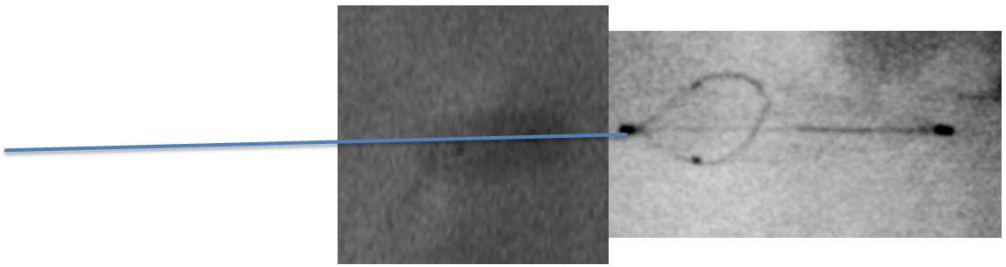


Functions of balloon : Centralize wire



Step 2 inflate the 3.5 NC balloon close to the trapped filter wire



Step 1 force

Step 2 force

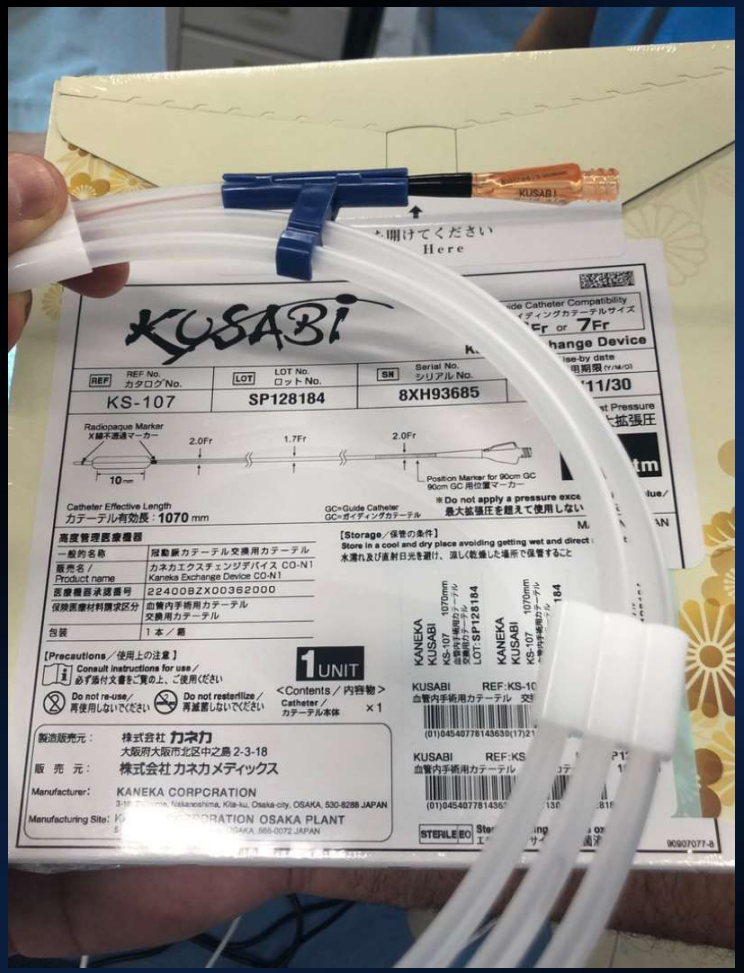
Inflate the 3.5 NC balloon will centralize the wire of filter wire

Step 3 using the 3.5 NC as anchor ballon to push the filter wire down

By this sequence of force, the filter wire was unlocked.

Functions of balloon : Anchor

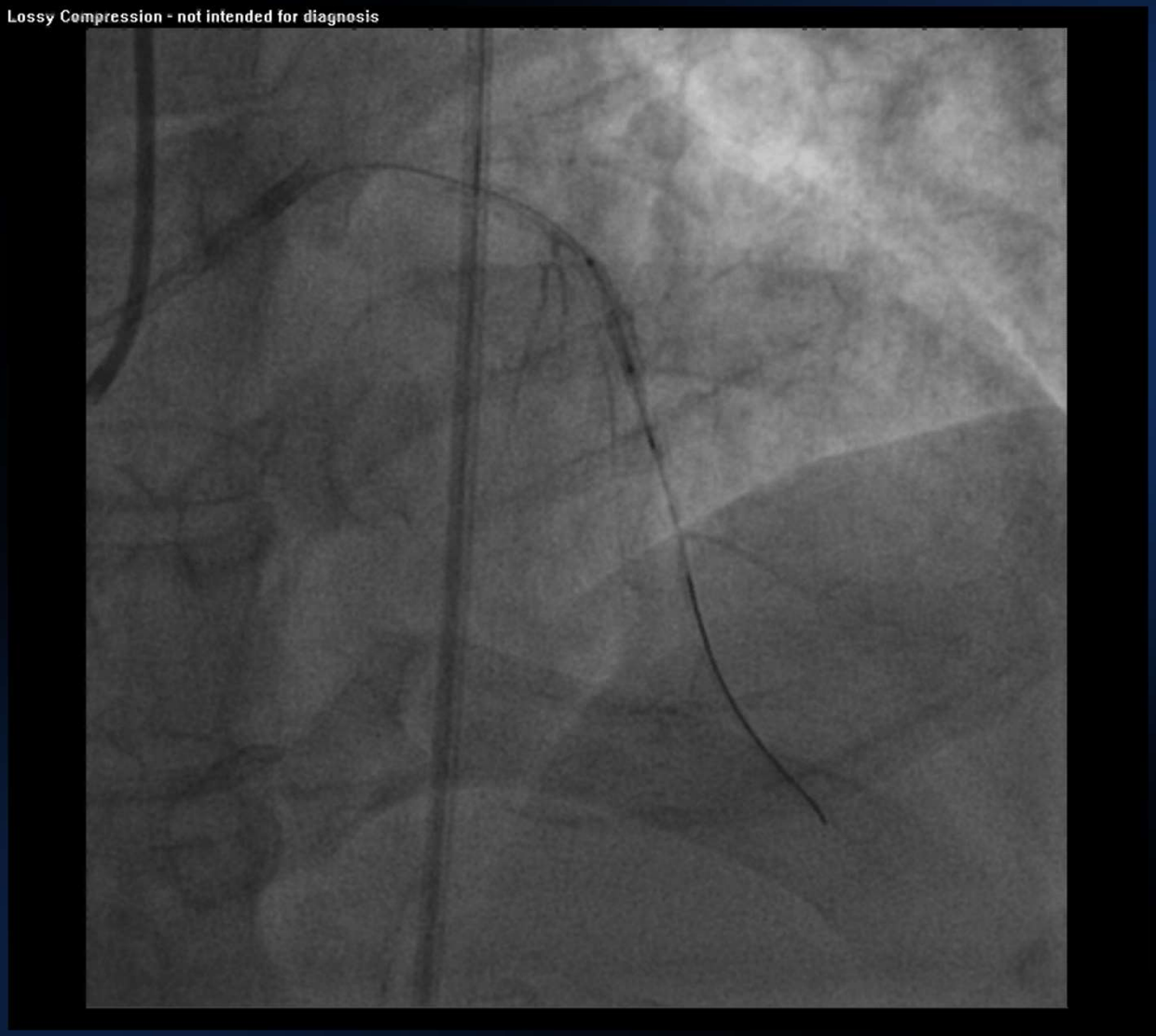
- Anchor : trapping balloon Kusabi or any



- Type of Balloon
- Function

Complication

Balloon Rupture



Shaft rupture

New type NC balloon

2.5 x 15 NC balloon @20 ATM

Pop Sound

Indeflator Pressure drop

Can’t rise up again
Can’t negative the balloon

What happen?

Take home message

- Type of Balloon
- Function
- Complications