

# CAT devant une perforation coronaire per-angioplastie

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## Déclaration de Relations Professionnelles *Disclosure Statement of Financial Interest*

*J'ai actuellement, ou j'ai eu au cours des deux dernières années, une affiliation ou des intérêts financiers ou intérêts de tout ordre avec une société commerciale ou je reçois une rémunération ou des redevances ou des octrois de recherche d'une société commerciale :*

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### Affiliation/Financial Relationship

- consulting

### Company

- Abbott
- Boston Sci
- Stentys
- Cordis
- Medtronic
- Hexacath
- Biotronik
- Saint Jude Medical
- Terumo

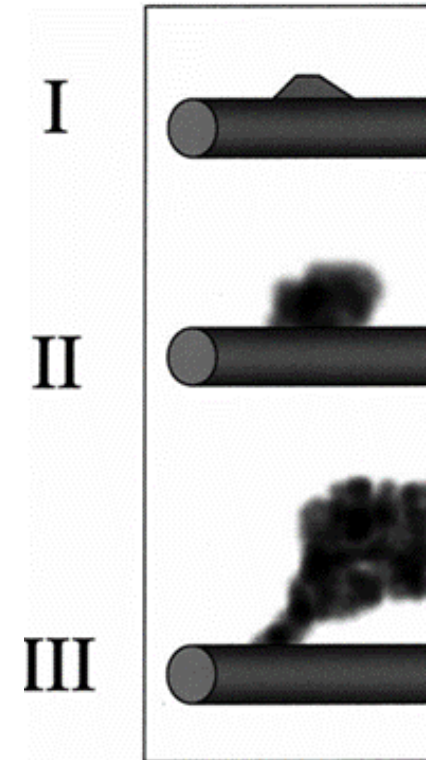
“Good judgement comes from experience  
... and experience comes from bad judgement”

*Lillehei*

# Taux actuel des complications d'angioplastie (*NY State registry*)

COMPLICATION	% RATE (n=23.339 procedures)
Death one month post PCI	0.6
Death in the catheter laboratory	0.047
Stroke	0.29
Cardiac perforation <b>V</b>	0.29
Any myocardial infarction	0.74
Emergent surgery	0.15
Stent thrombosis (ST) at one month	0.53
Presumed stent thrombosis	0.82
Renal failure	0.28
Haemodialysis	0.17
Vascular complication and bleeding	0.79
<b>ANY COMPLICATION</b>	<b>3.36</b>

- Grade I: Extraluminal crater without extravasation
- Grade II: Pericardial or myocardial blush without contrast extravasation
- Grade III: Extravasation through frank (>1mm) perforation or cavity spilling into an anatomic cavity chamber



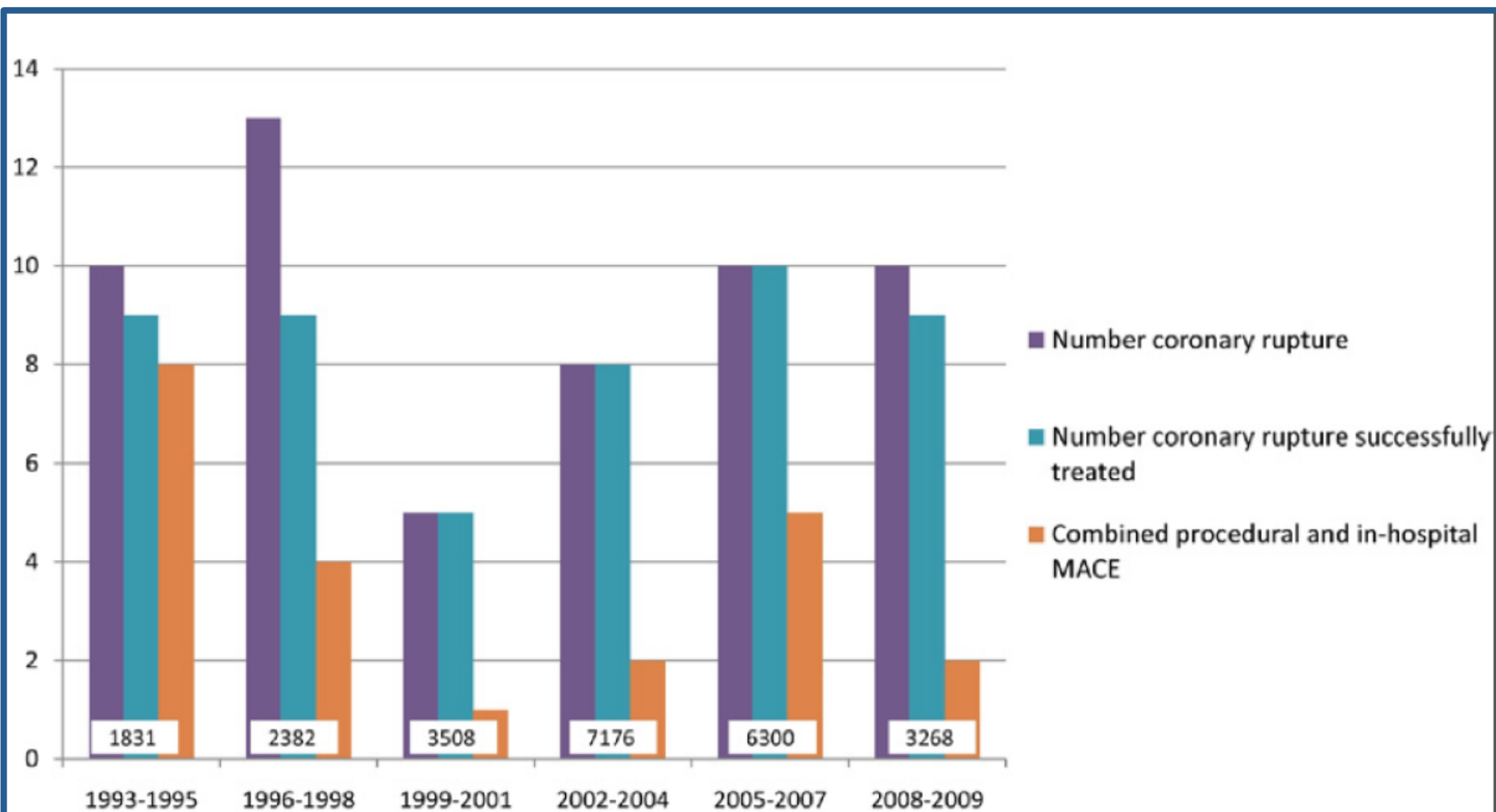
# Traiter les perforations de type III rapidement avec les bons outils

Author	Perforation type (n)	Tamponade*	MI	Emergency CABG	Death
Ellis, et al.	I (13)	8%	0%	15%	0%
	II (31)	13%	13%	10%	0%
	III (16)	63%	51%	63%	19%
	III CS (2)	0%	0%	0%	0%
Ajuni, et al.	I/II (17)	6%	29%	24%	6%
	III (10)	20%	30%	60%	20%
Gruberg, et al.	I/II/III (88)	31%	35%	29%	10%
Dipple, et al.	I (0)	-	-	-	-
	II (19)	5%	-	0%	0%
	III (14)	43%	-	50%	21%
	III CS (2)	0%	-	0%	0%



# Facteurs prédictifs de mortalité intra-hospitalière

Univariate analysis	Chi square	P value
Perforation Grade	14.5	< 0.001
Chronic Renal Insufficiency (CRI)	7.36	0.007
Tamponade	7.35	0.007
Emergent CABG	6.48	0.01
Chronic Total Occlusion (CTO)	3.17	0.07
Age	0.84	0.36
Atheroablative device use	1.13	0.29
Multivariate analysis		
Perforation Grade	8.54	0.004
Chronic Renal Insufficiency (CRI)	4.23	0.04



*Al-Lamee R et al. Incidence, Predictors, Management, Immediate and Long-Term Outcomes Following Grade III Coronary Perforation. JACC: Cardiovascular interventions, vol. 4, no. 1, 2011: 87-95*



# Perforation :

## *facteurs de risque « techniques »*

Guides stiff et hydrophiliques

Surdimensionnement des ballons et des stents (>1.2)

Haute pression d'inflation

Rupture de ballon (à haut niveau de pression)

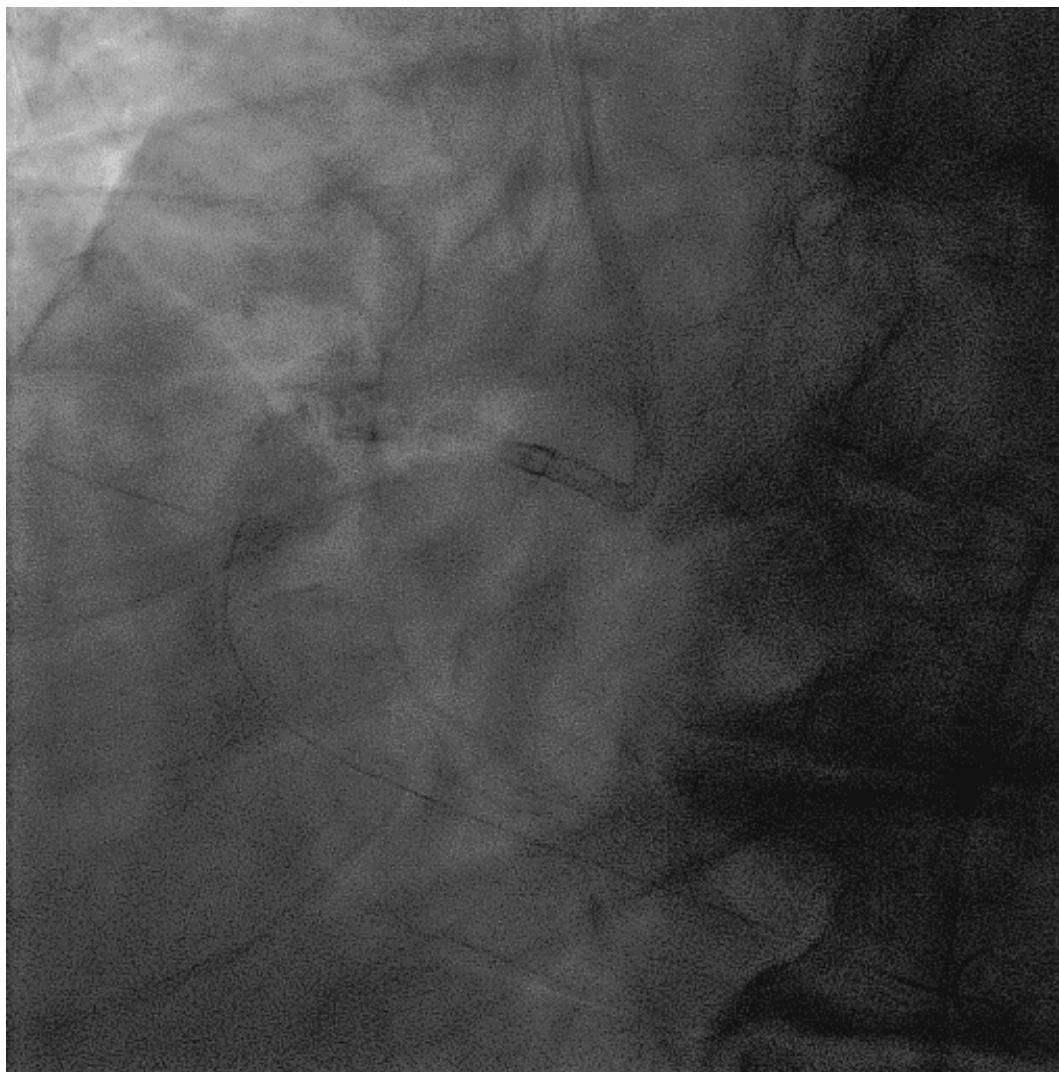
Post-dilatation agressive

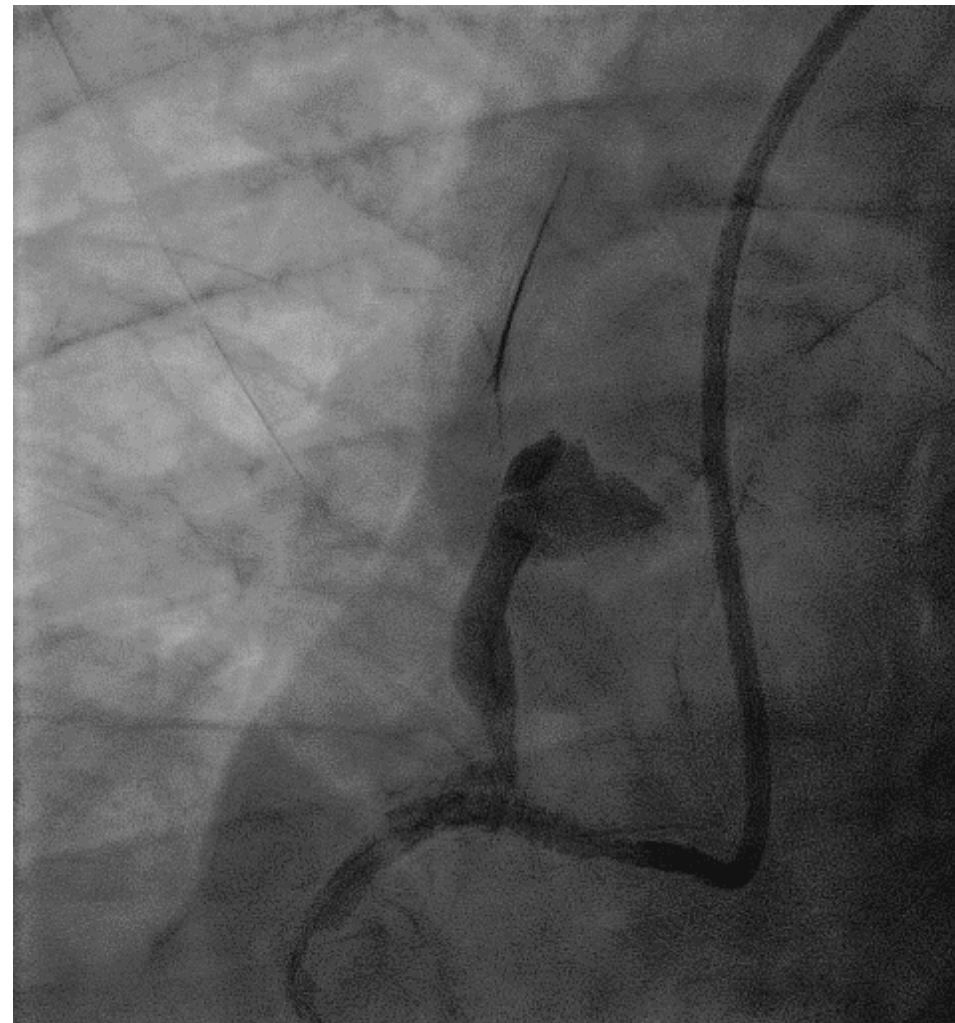
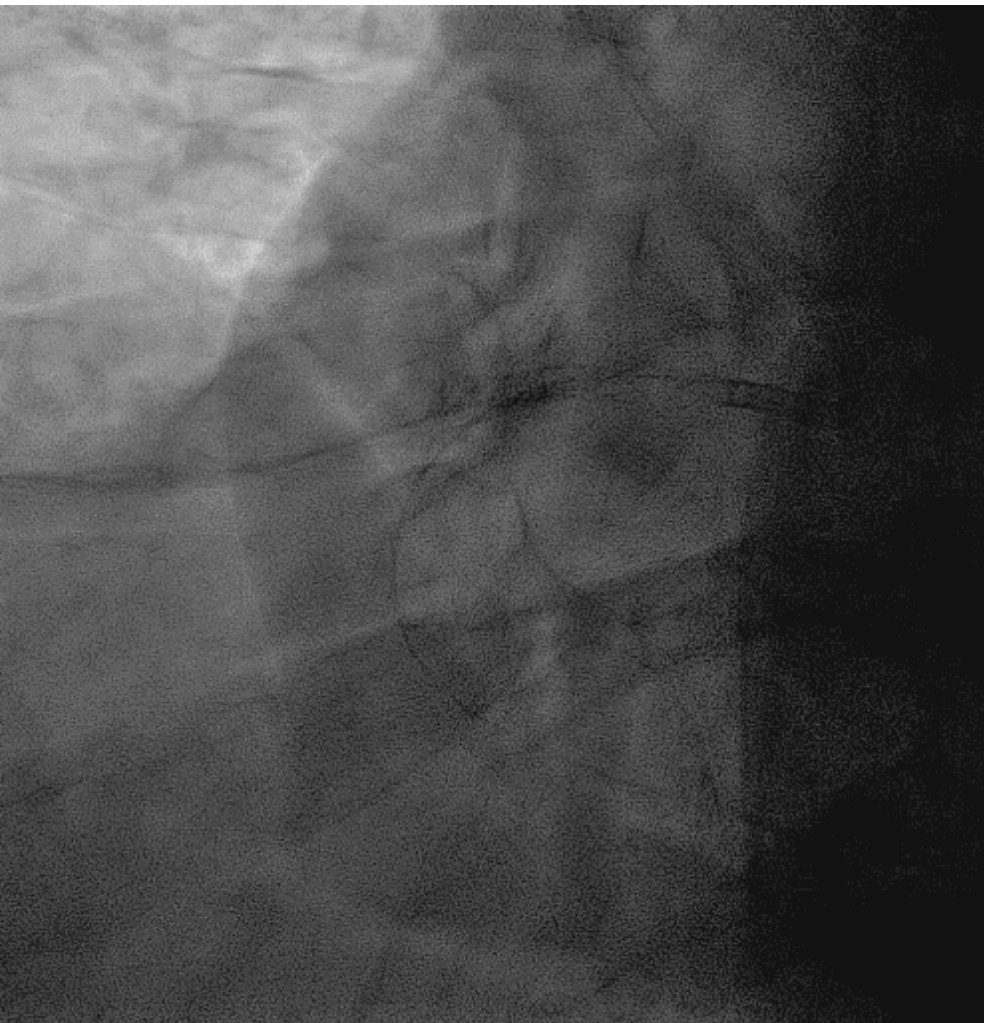
Athérectomie (Rotablator, Laser)

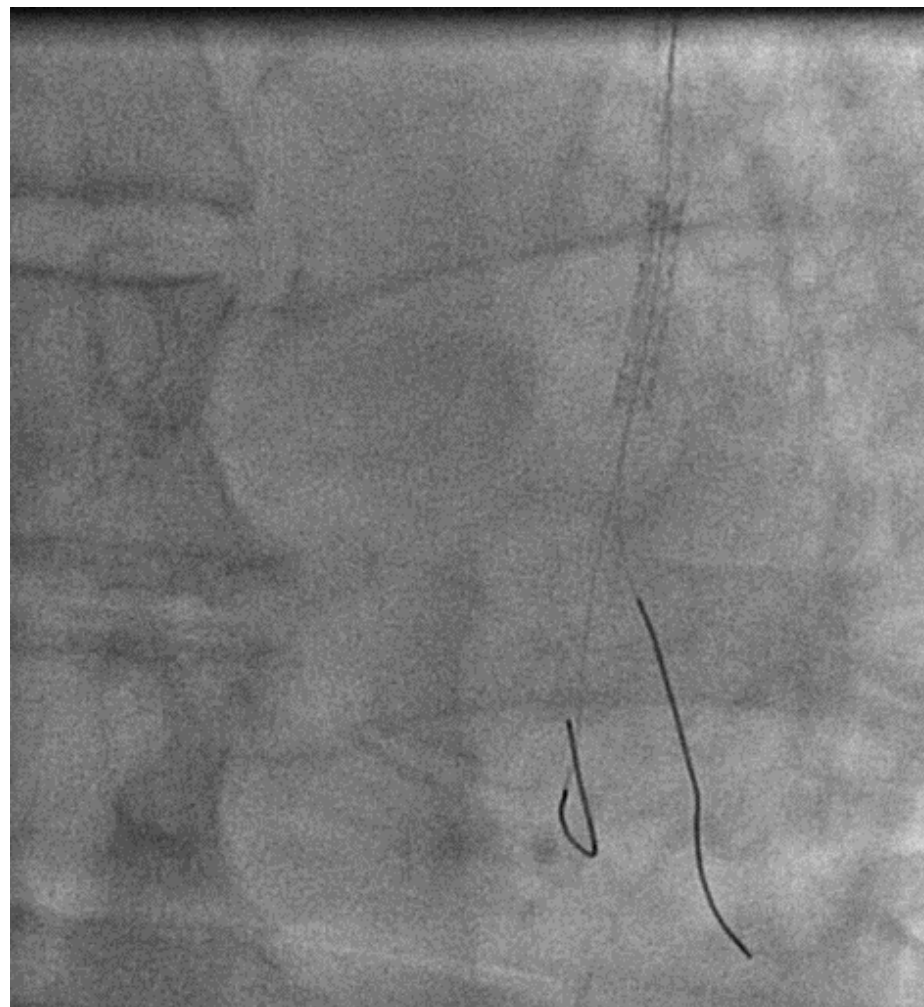
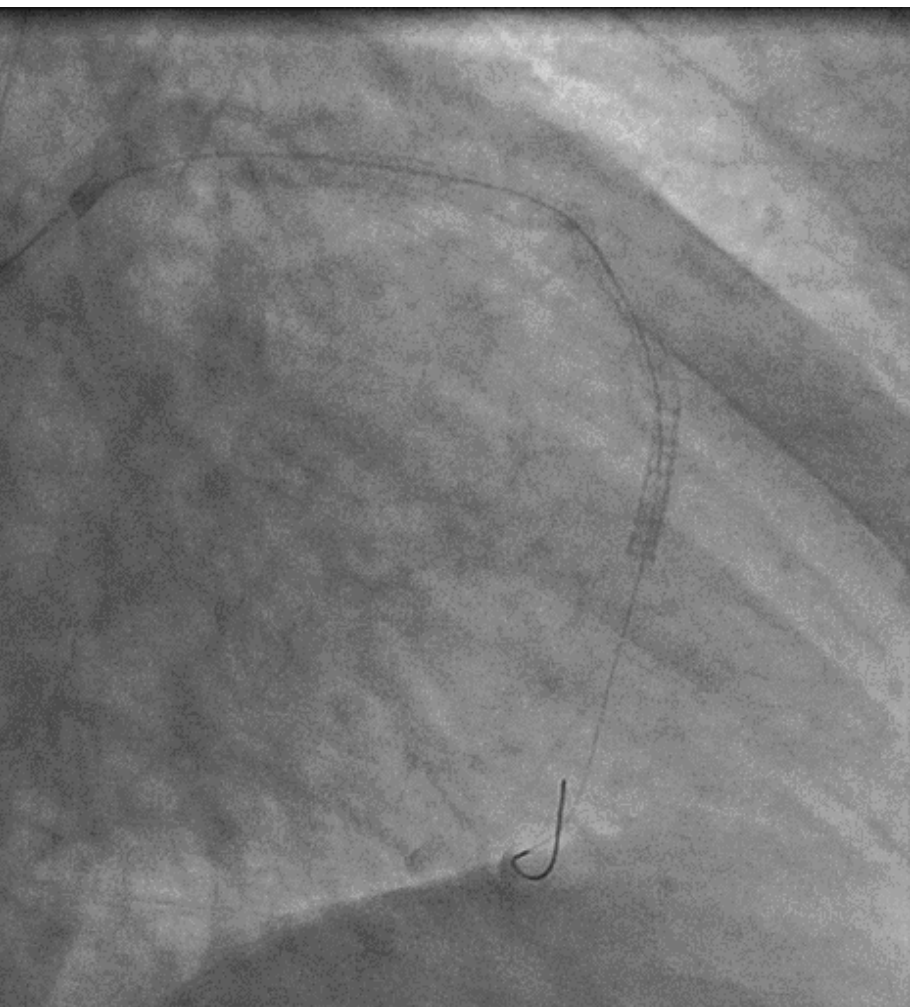
# Perforation :

## *facteurs de risque « anatomiques »*

- Calcifications
- Lésion excentrée
- Sinuosités avec angulation sévère
- Petites artères
- Lésions distales
- CTO

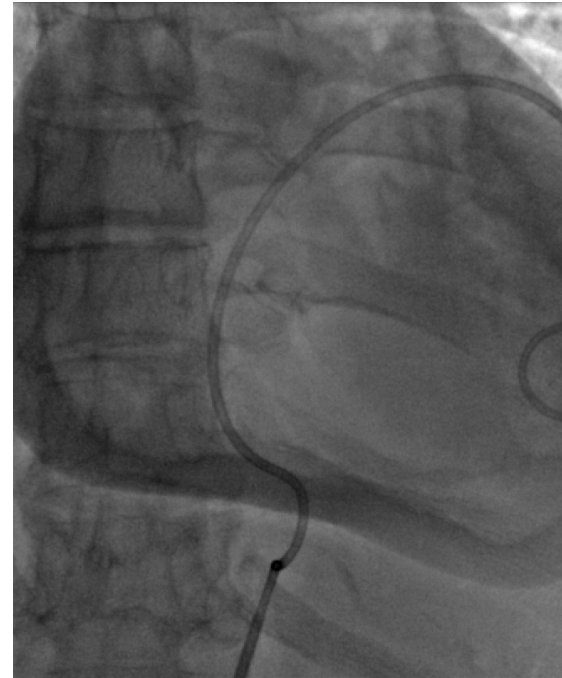


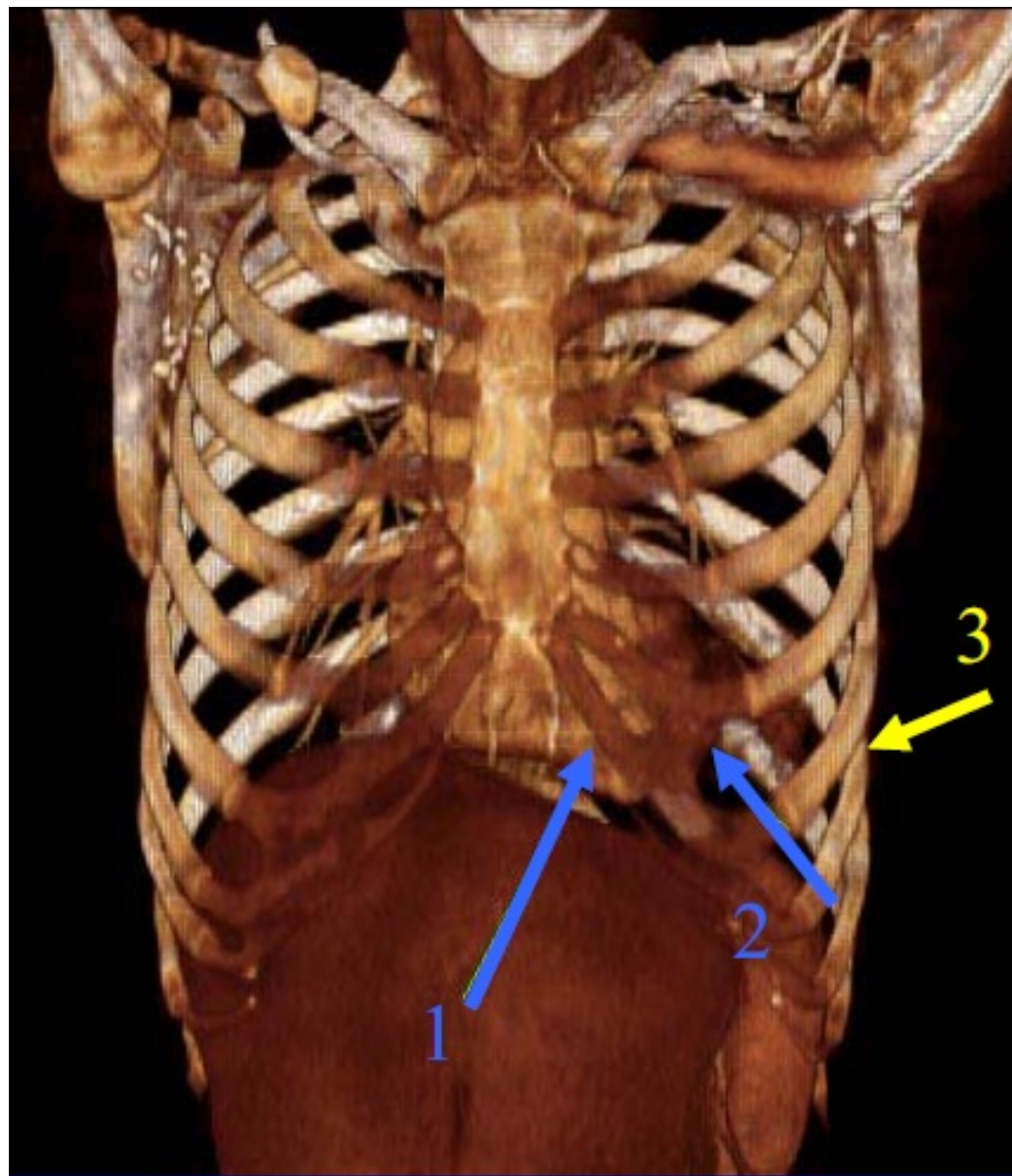


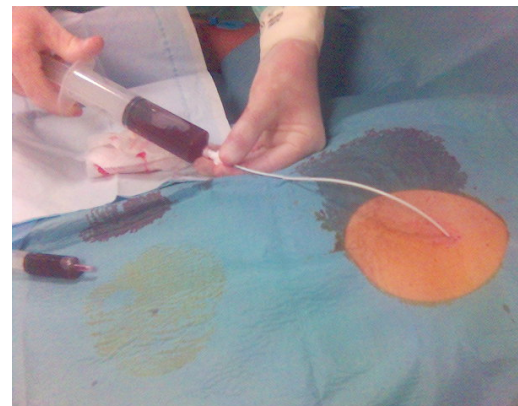
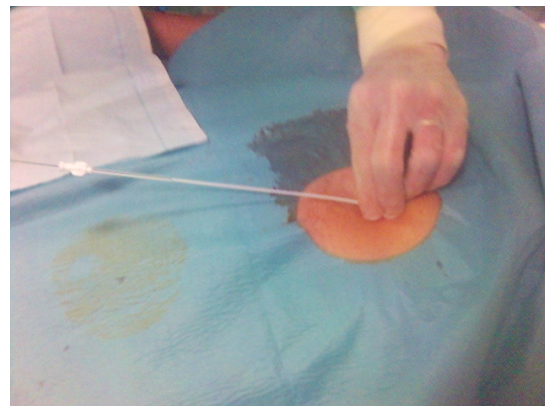
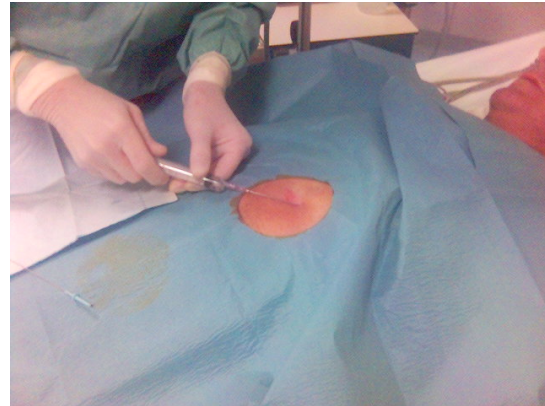


# Conduite pratique

- Contenir le saignement par l'inflation du ballonnet
- Appeler l'échographiste
- Antagoniser l'héparine (et commander des plaquettes en cas d'antigp2b3a..)
- Préparer le matériel pour le drainage péricardique
- Mise en marche du cell-saver si disponible
- Remplir le patient
- Stent couvert ou coils en attente
- Prévenir le chirurgien....







Courtesy of [echorea.org](http://echorea.org)

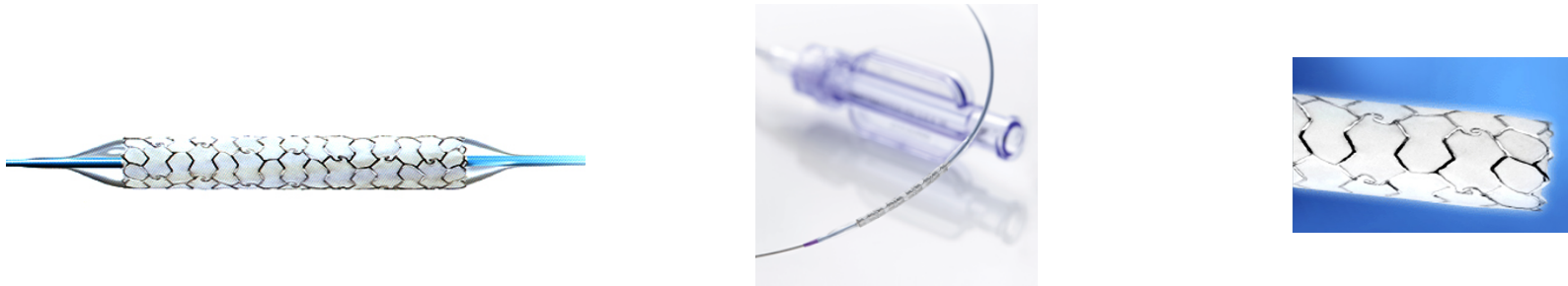


## 2 TYPES DE TRAITEMENT CURATIF

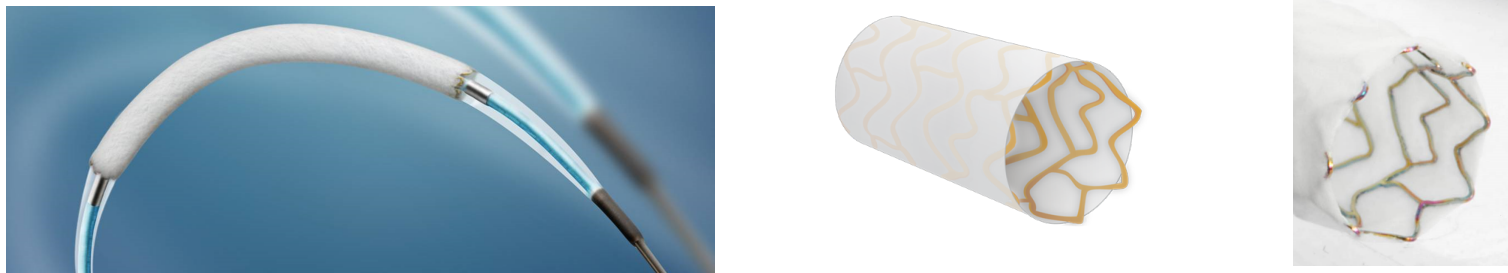
- **Obturation de la perforation** ou de l'artère perforée par un stent couvert (mais plus d'accès aux branches adjacentes...)
- **Exclusion du canal collecteur** par embolisation de matériels (coils+++, caillots, mousse hémostatique en kit, thrombine..) avec pour conséquence une nécrose myocardique (perforation distale non accessible)

# Stent couvert

**Abbot Grafmaster Rx** : membrane de PTFE sandwichée entre 2 stents

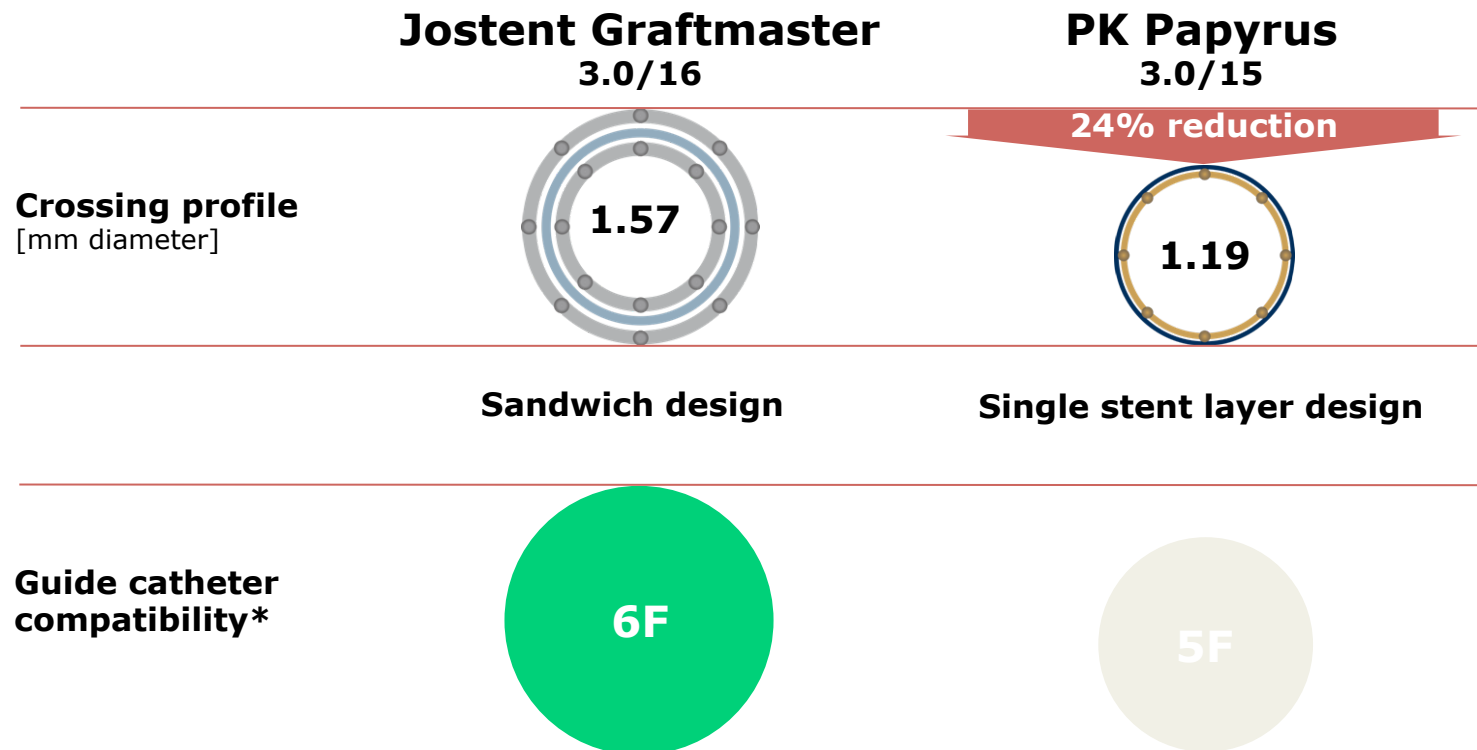


**Biotronik PK Papyrus Rx** : 1 seule couche sur un stent Pro-Kinetic

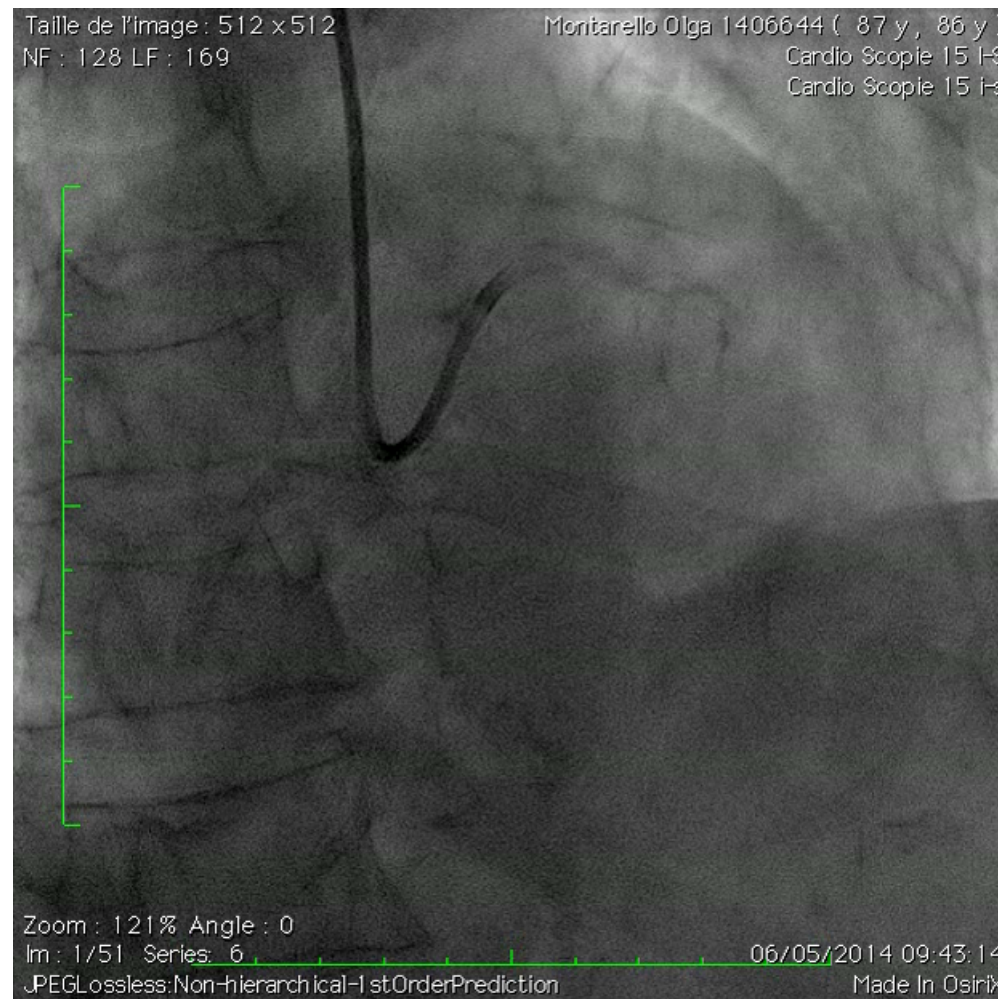
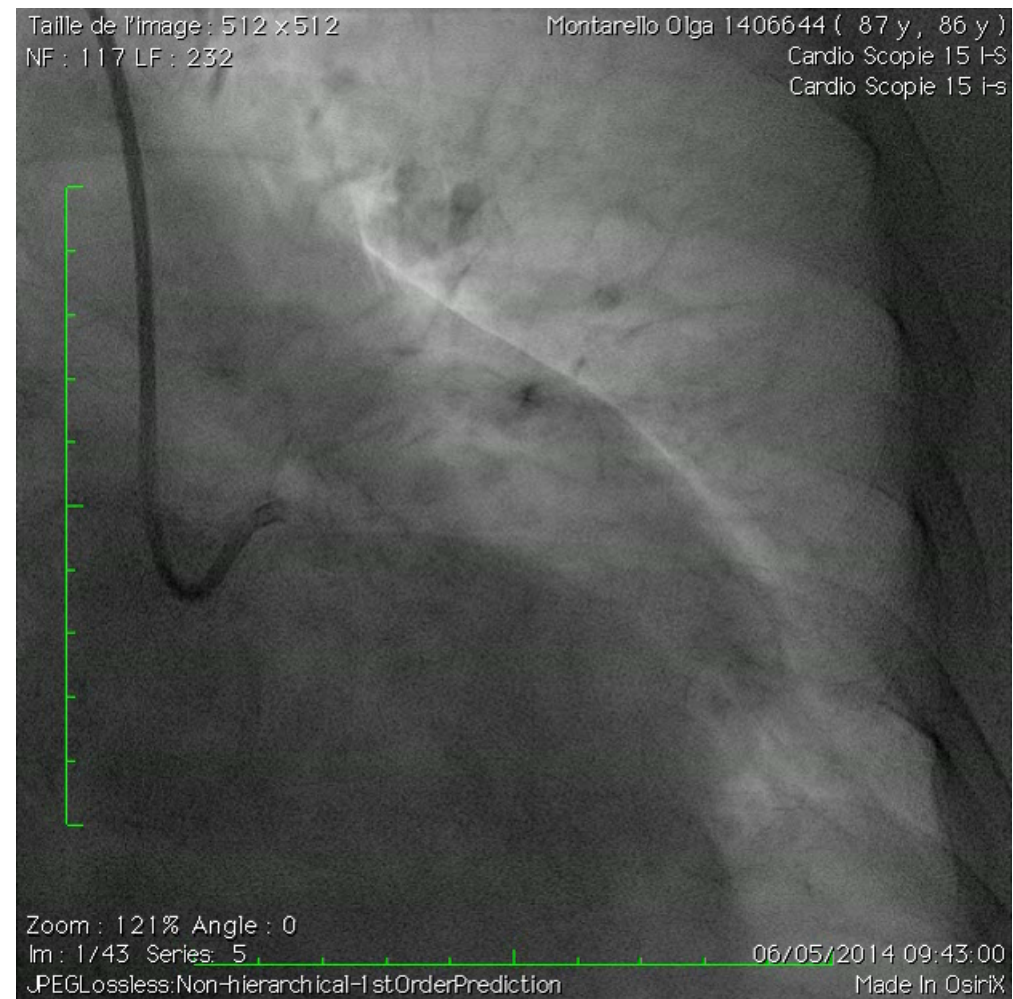


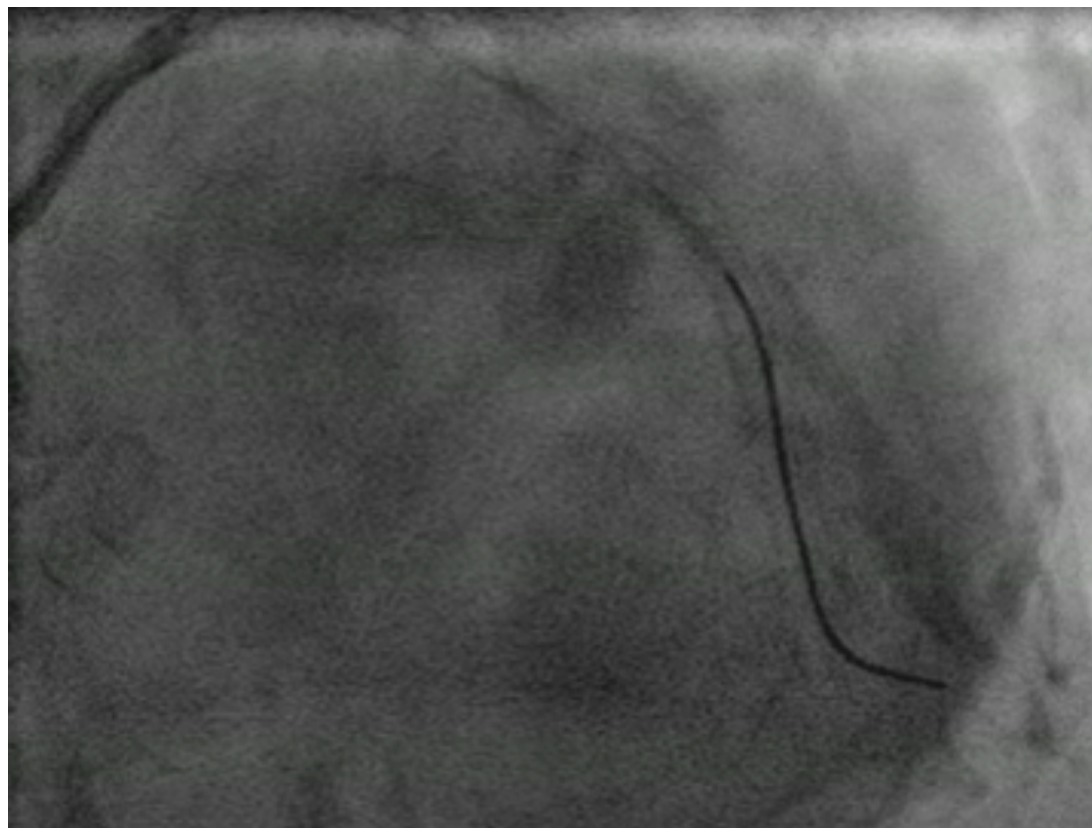
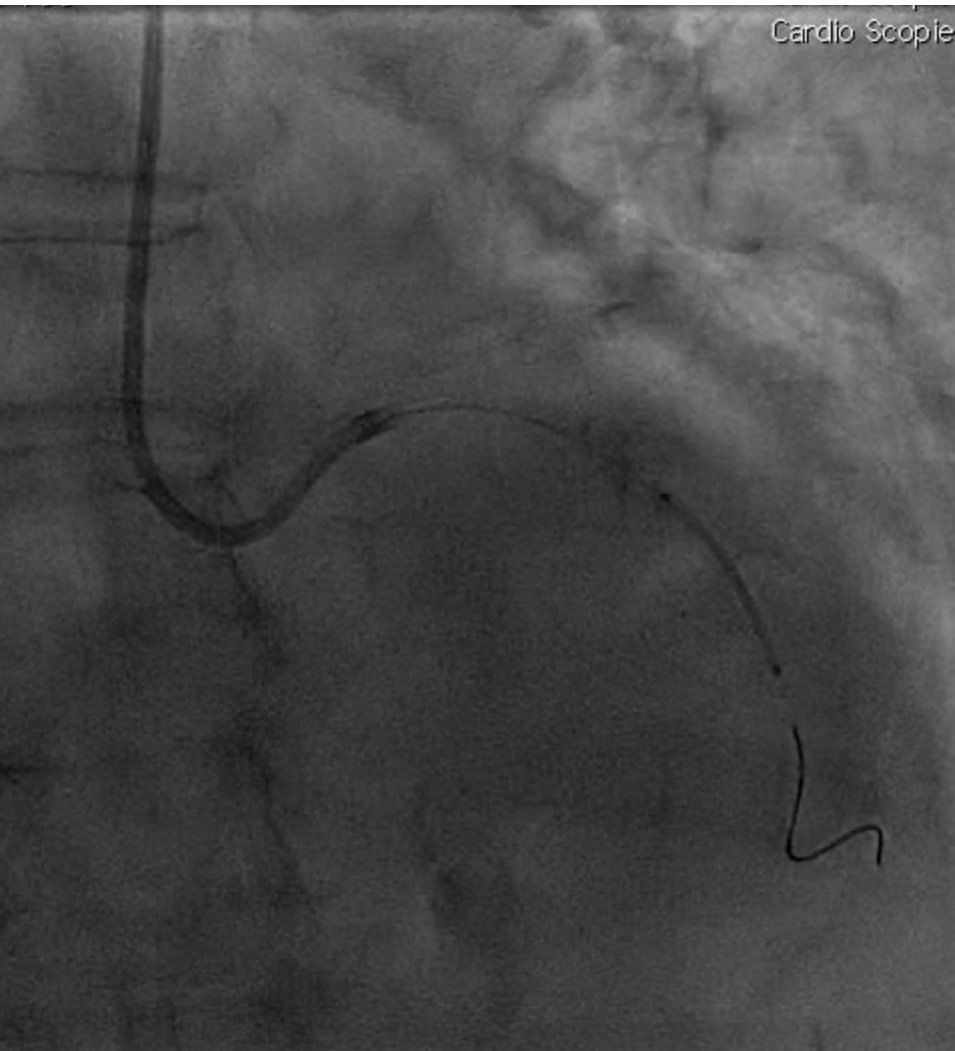
**Maquet Advanta V12 Rx** : 5&6 mm dispo pour KTG 6F

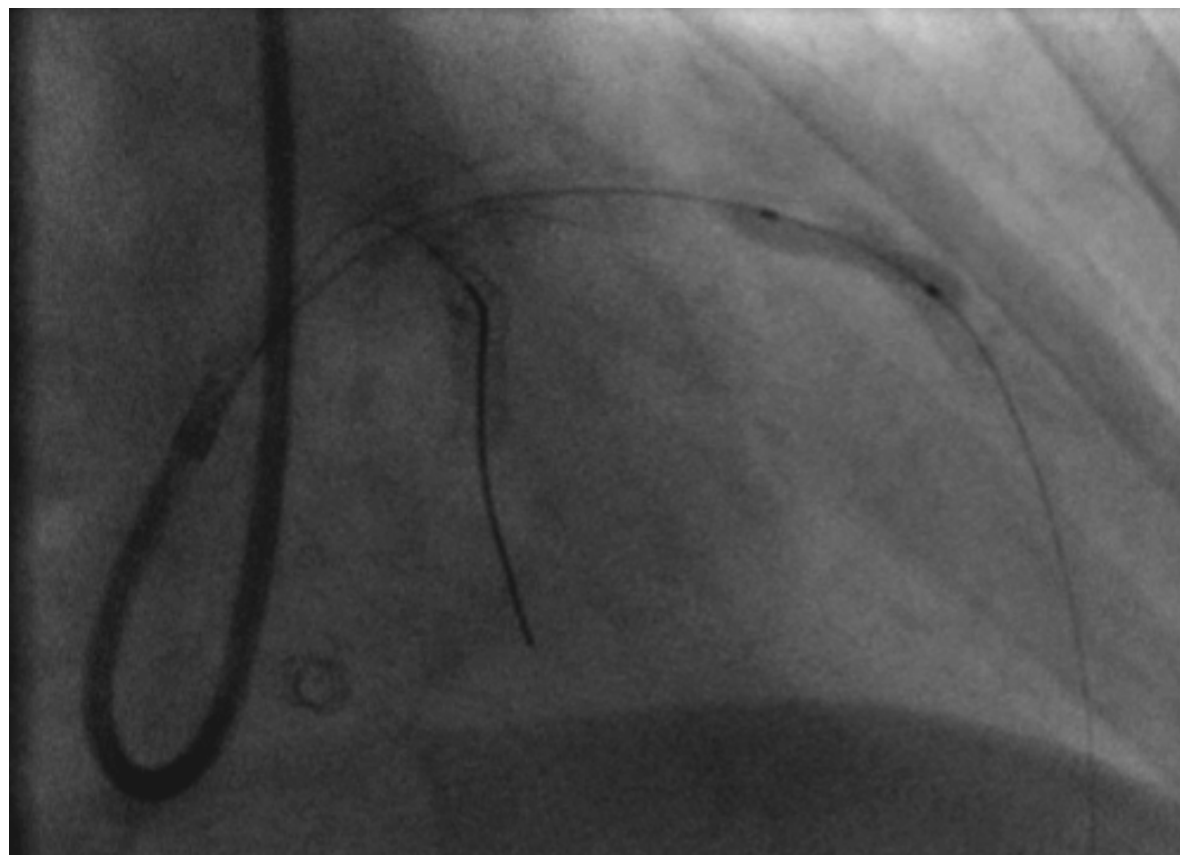
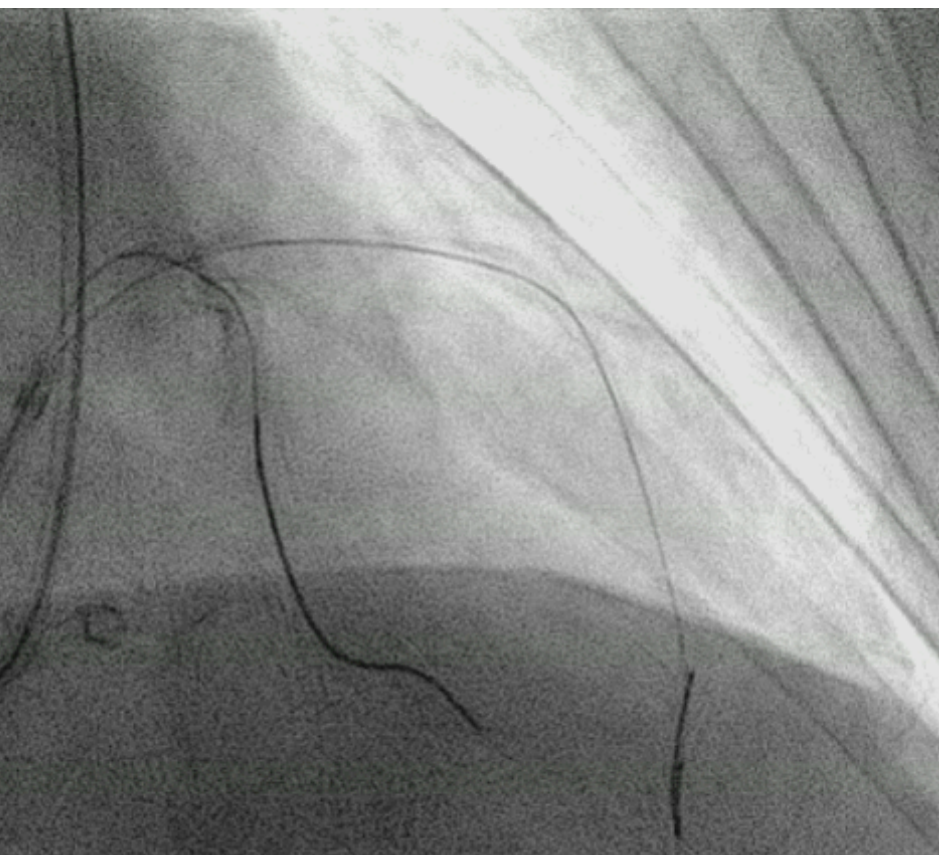


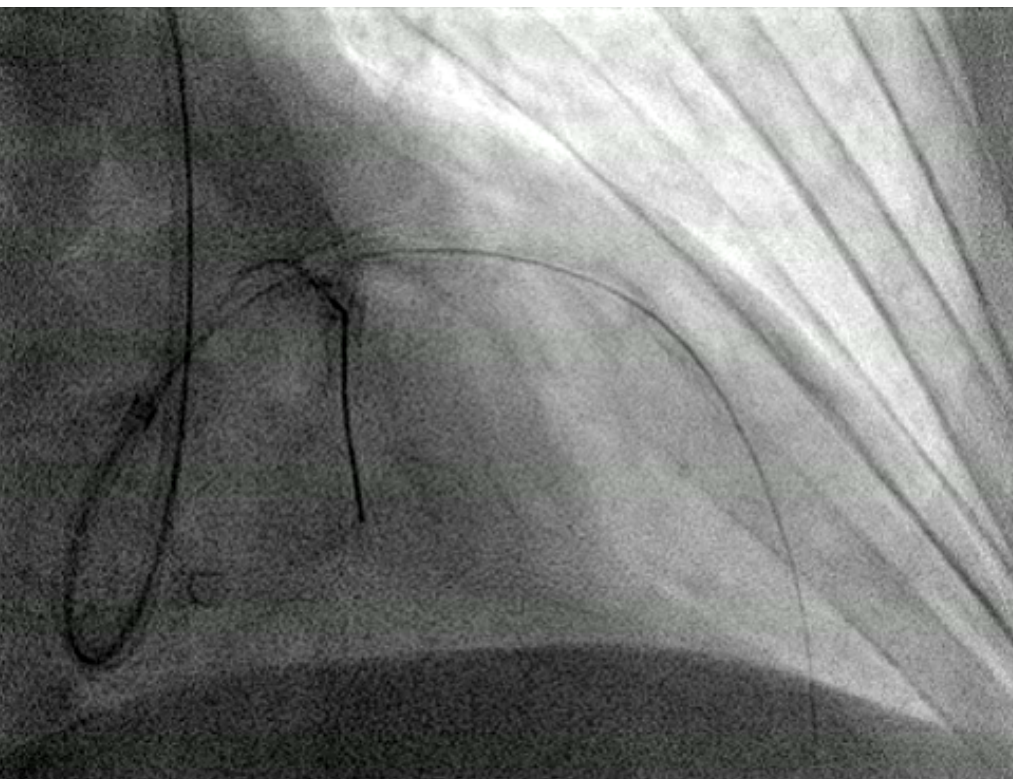


**24% reduction**

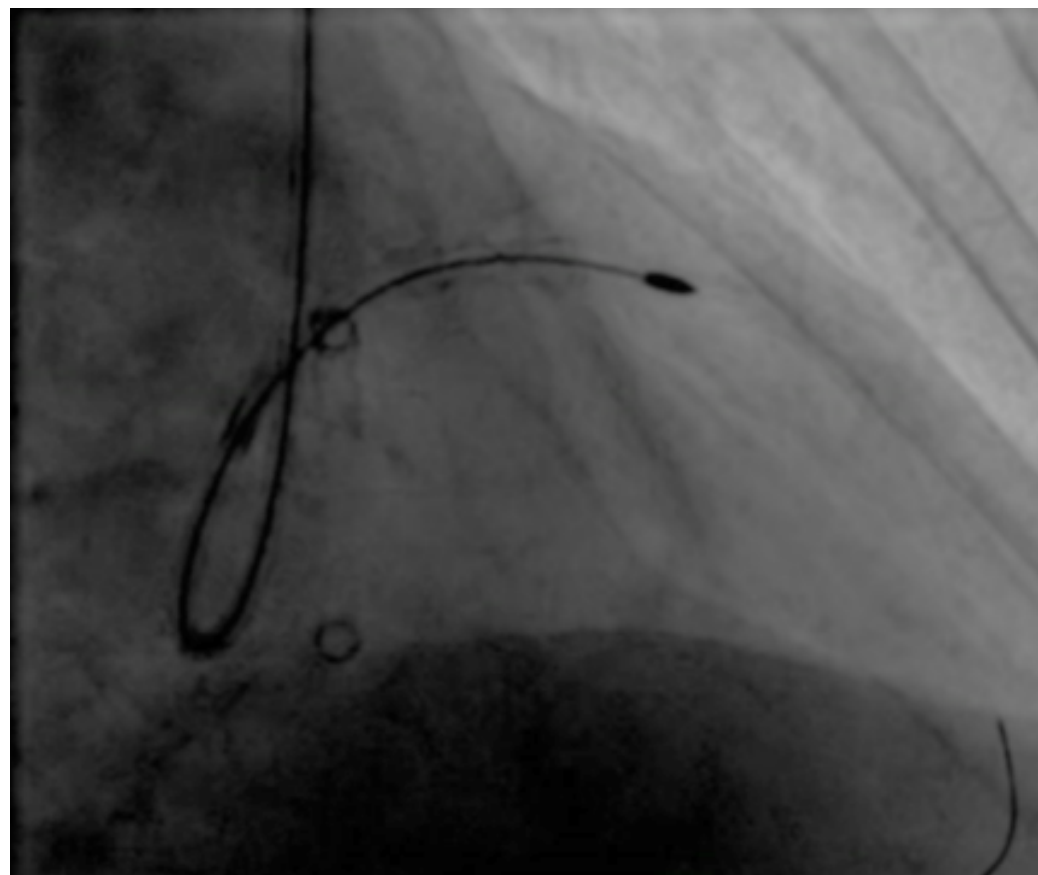
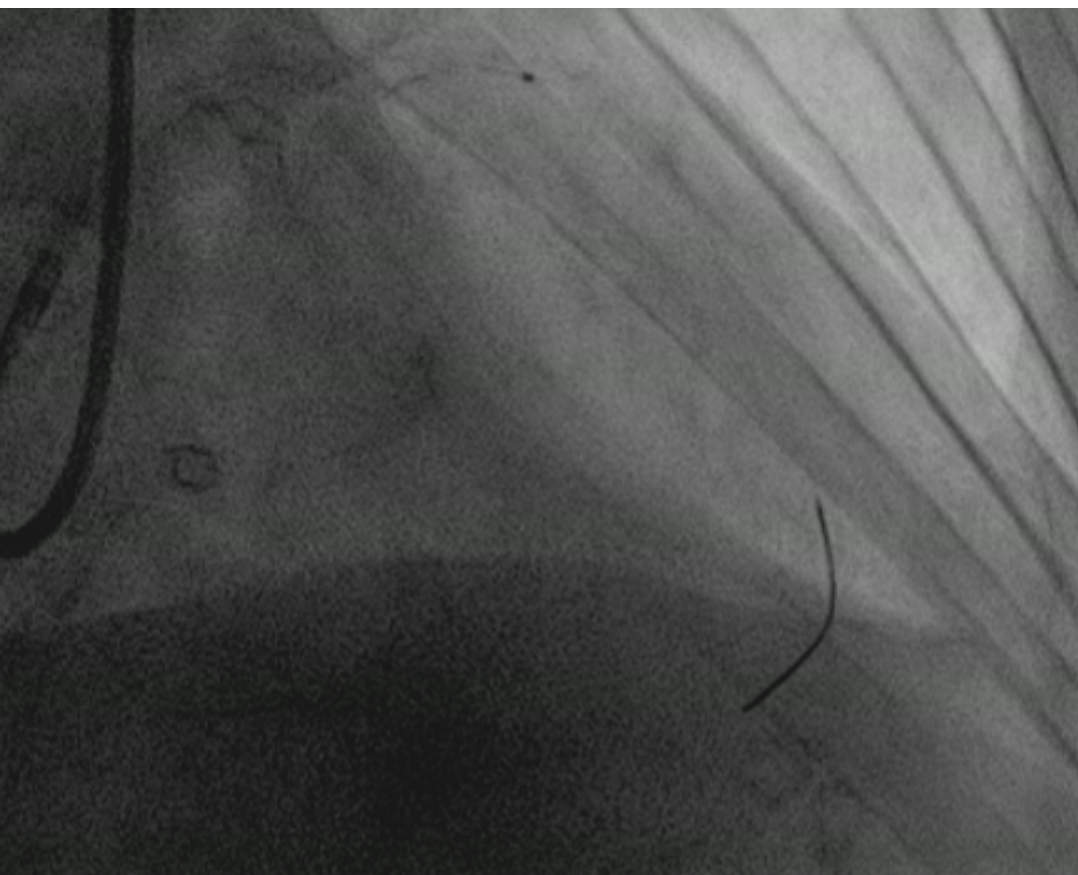


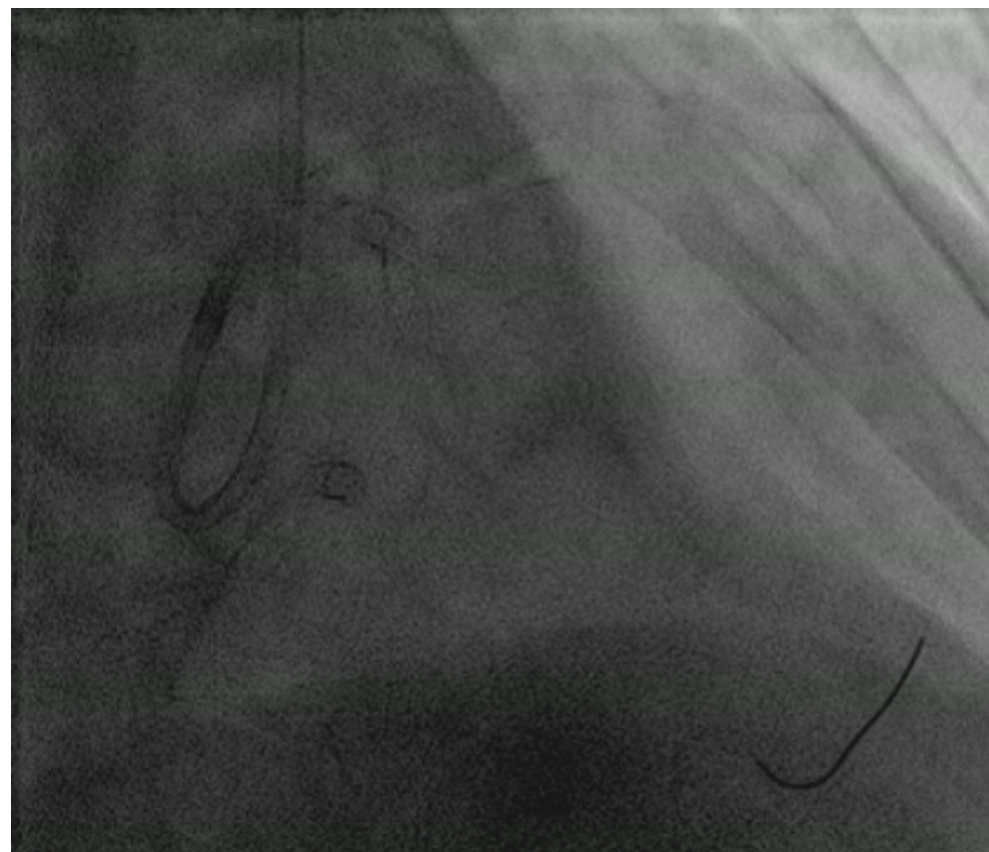
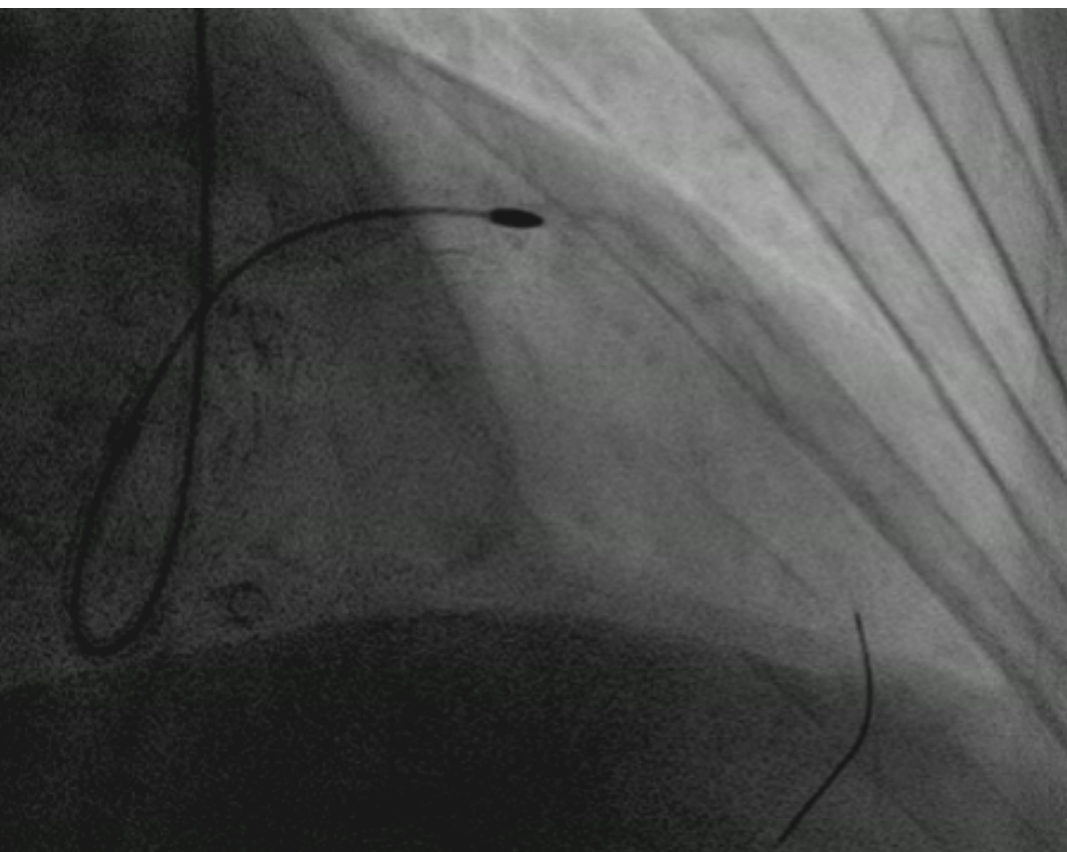


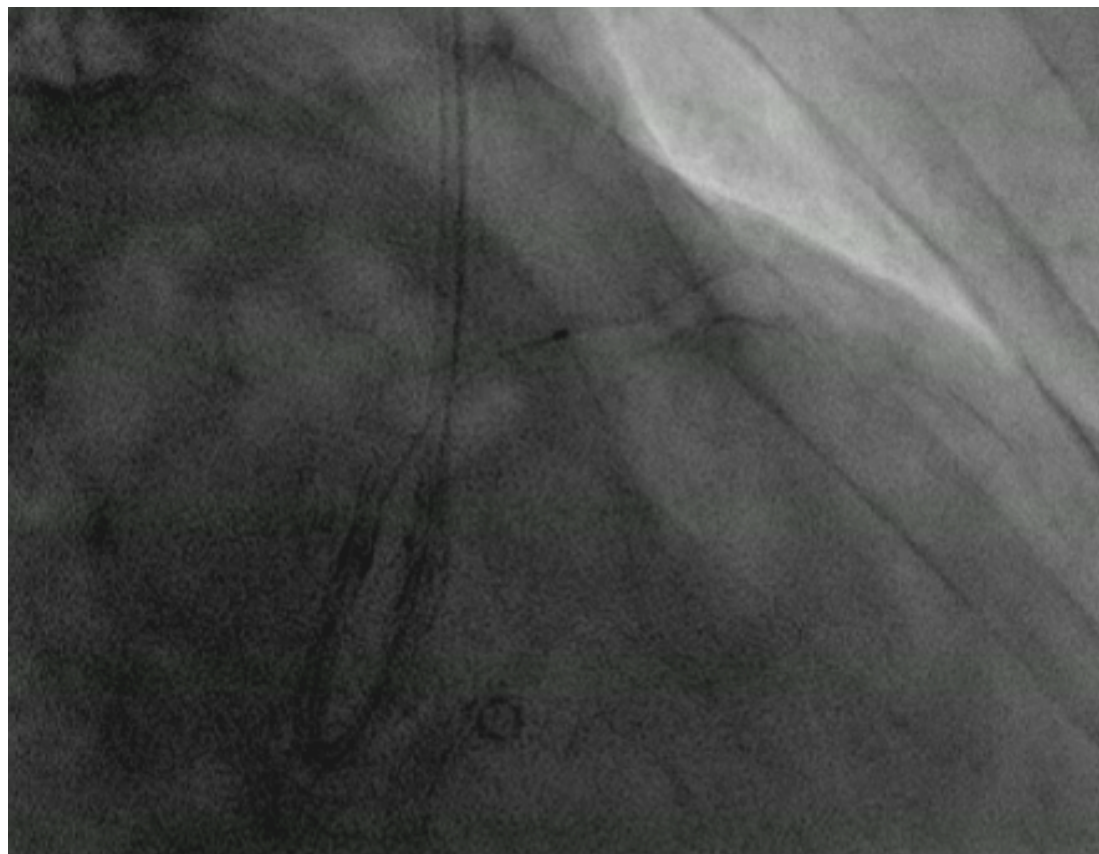
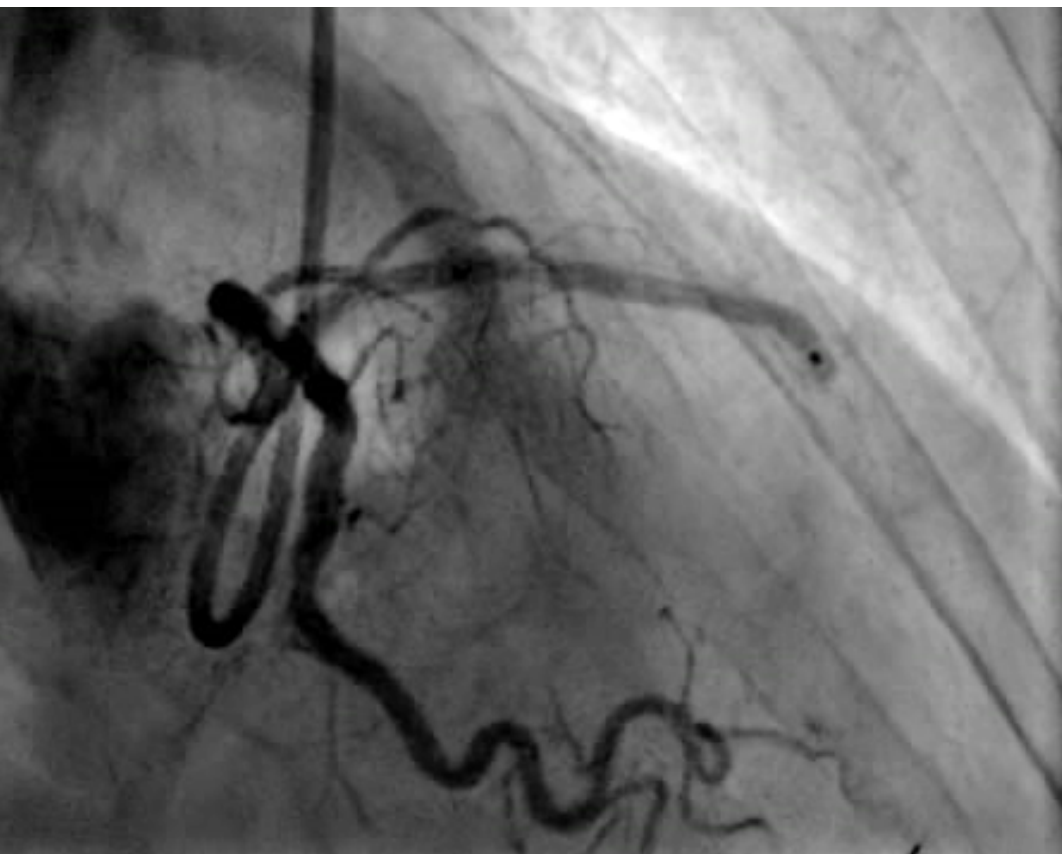


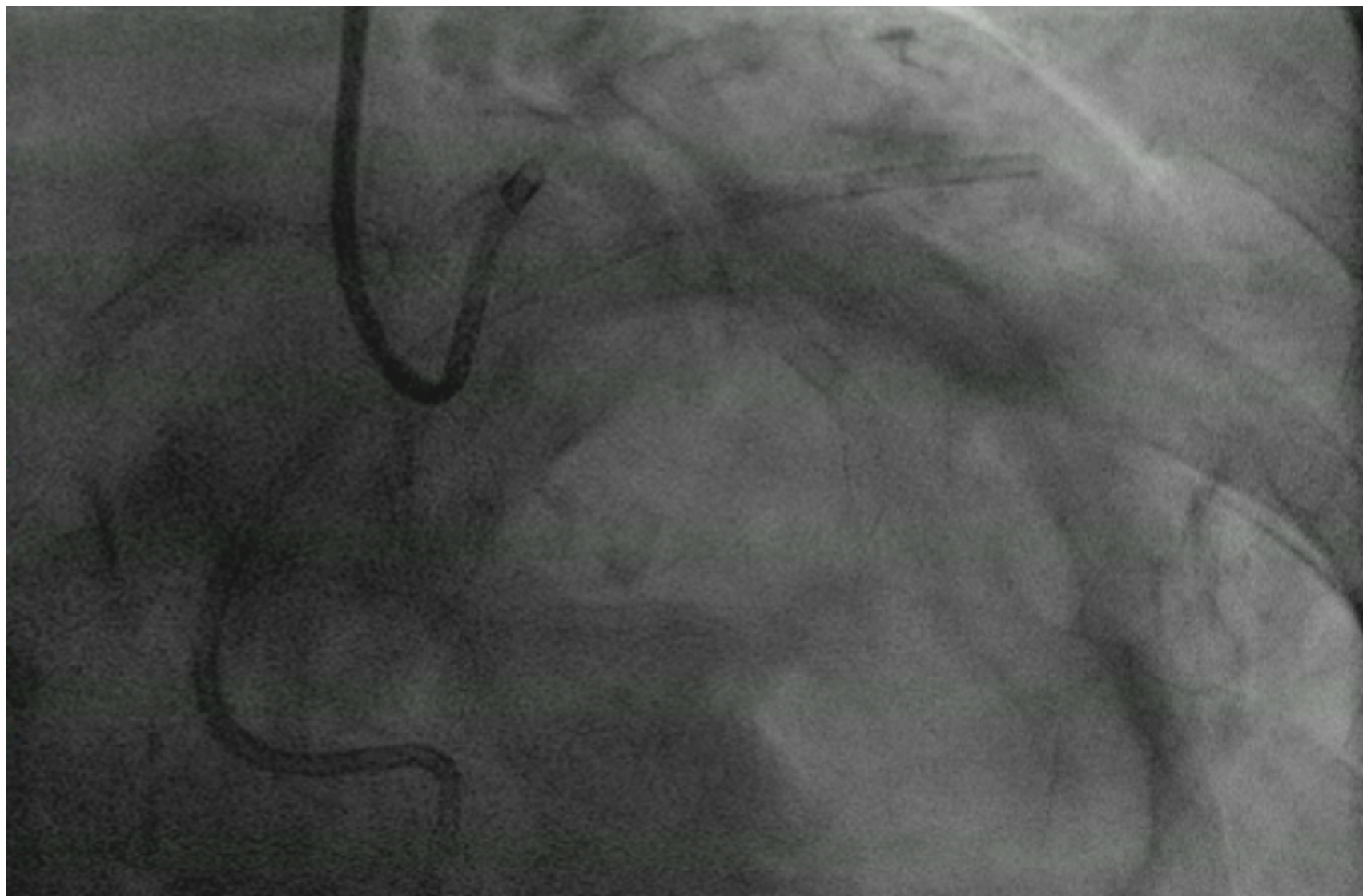


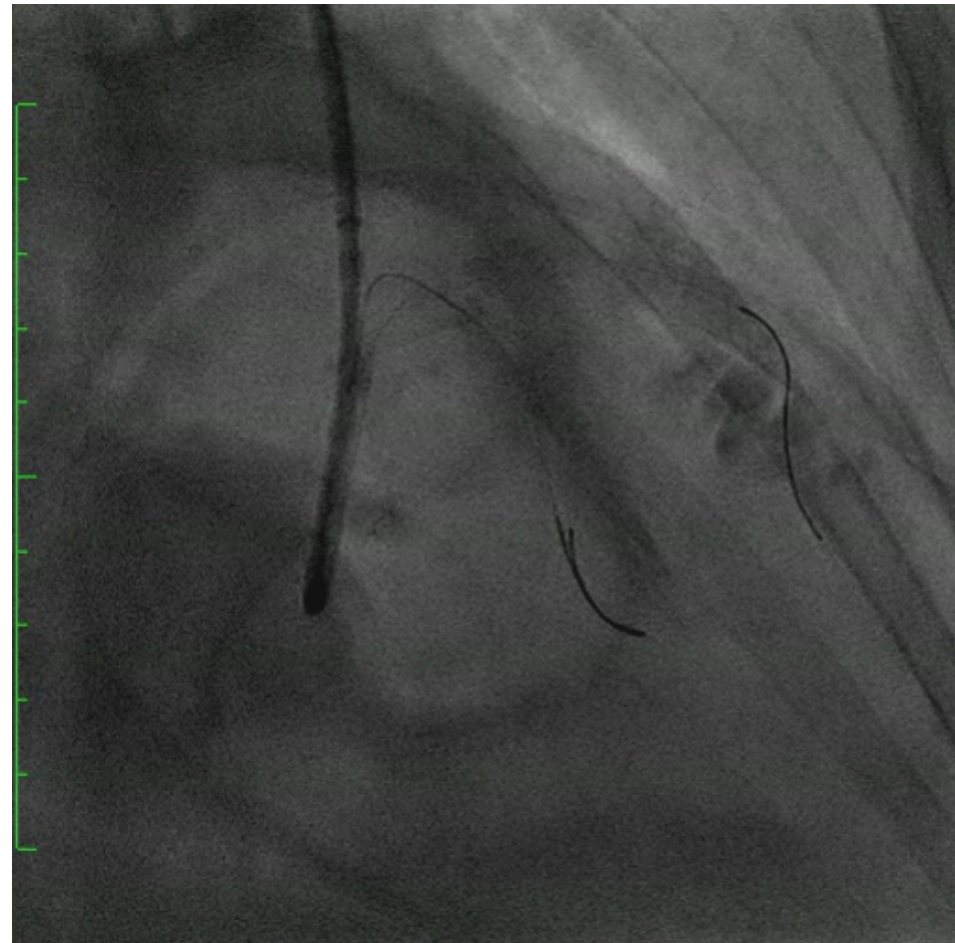
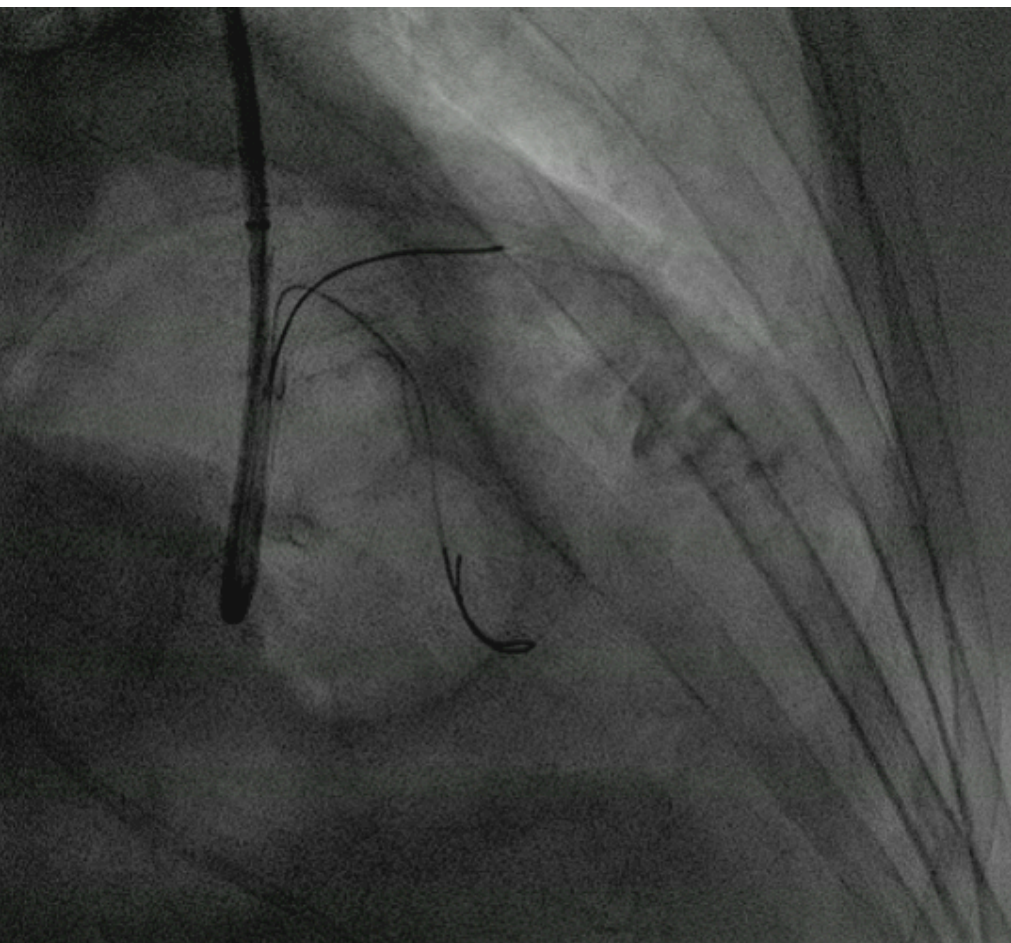








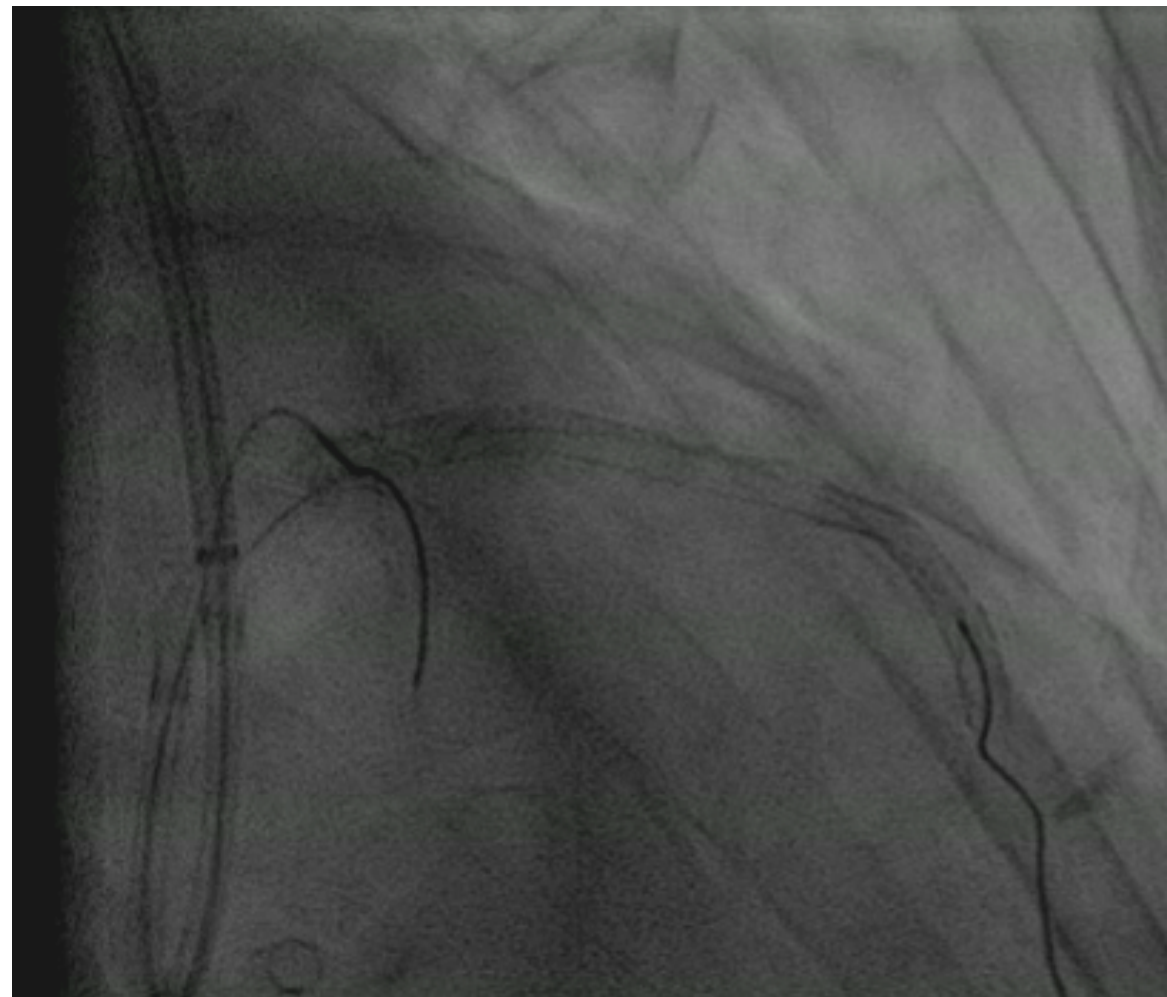
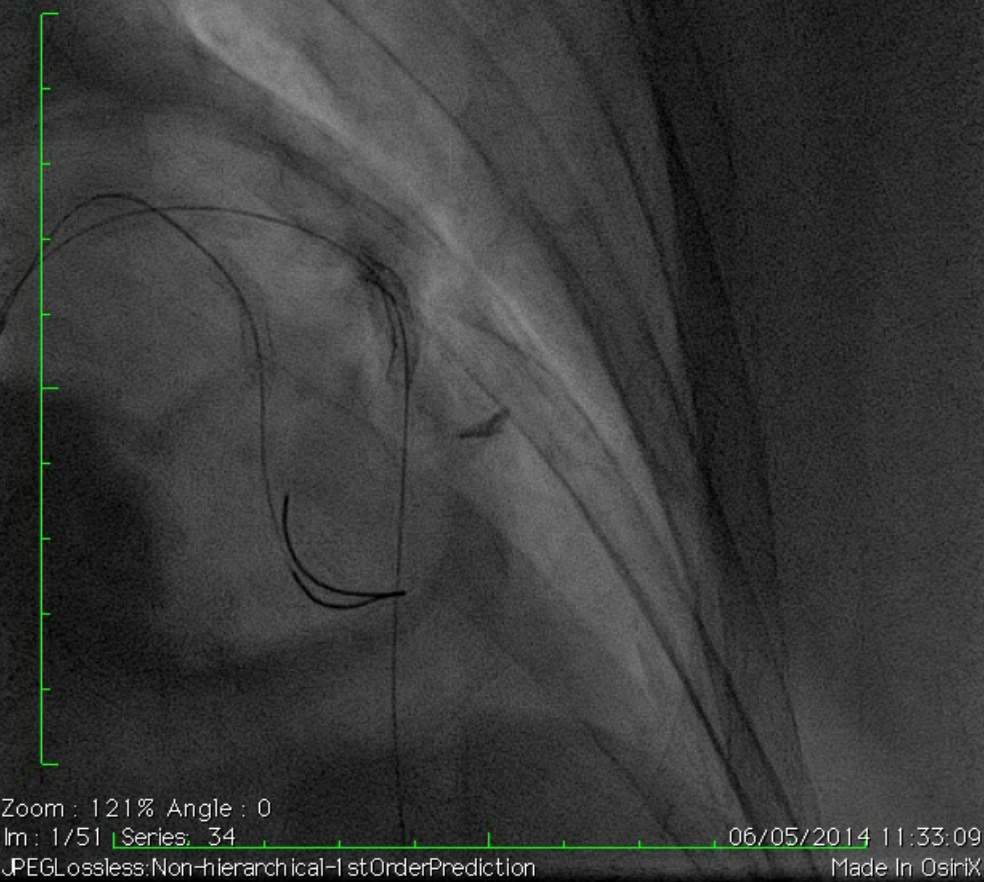




Taille de l'image : 512 x 512  
NF : 128 LF : 220

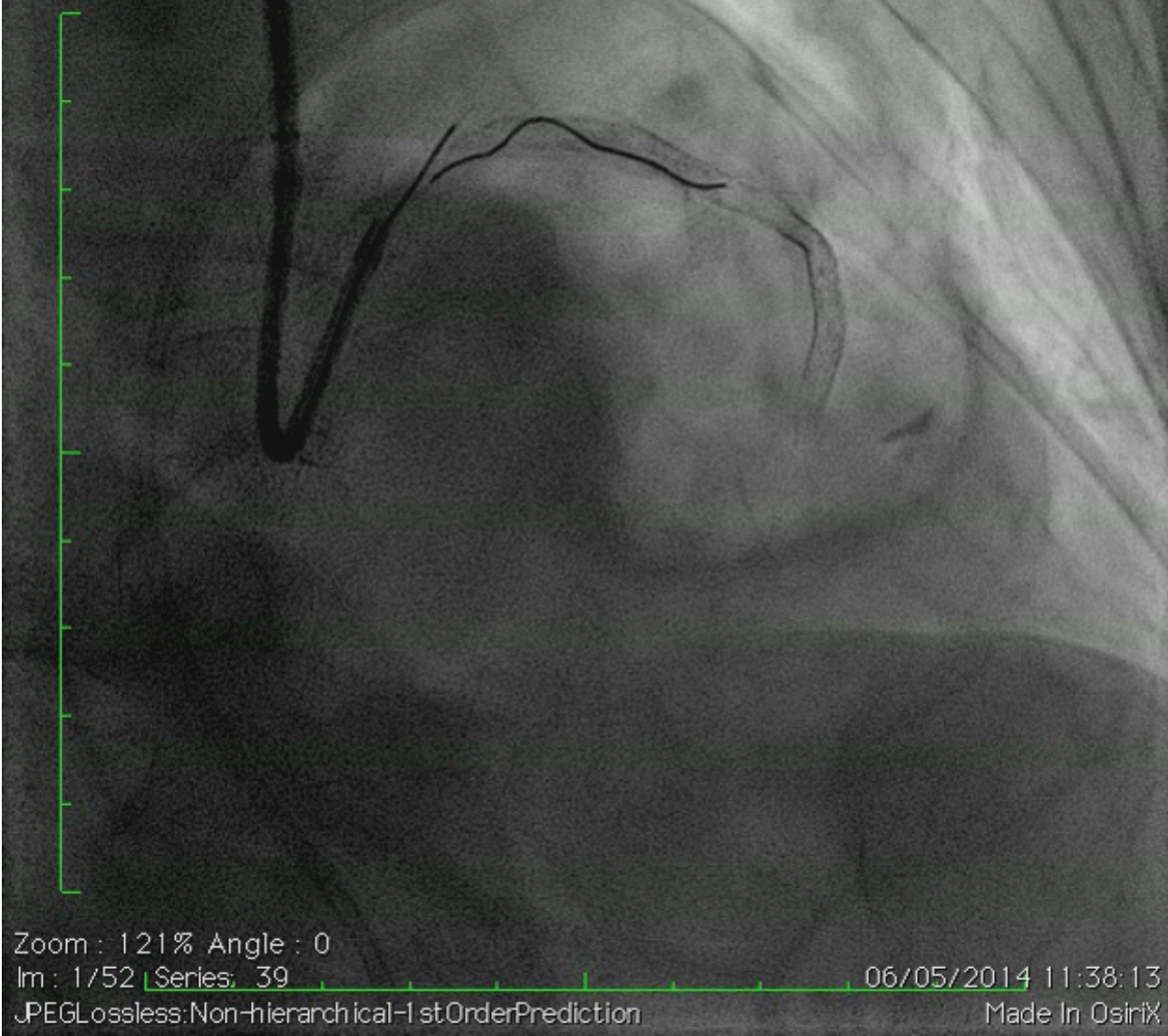
Montarelli Olga 1406644 ( 87 y , 86 y )

Cardio Scopie 15 I-S  
Cardio Scopie 15 I-S



Taille de l'image : 512 x 512  
NF : 128 LF : 169

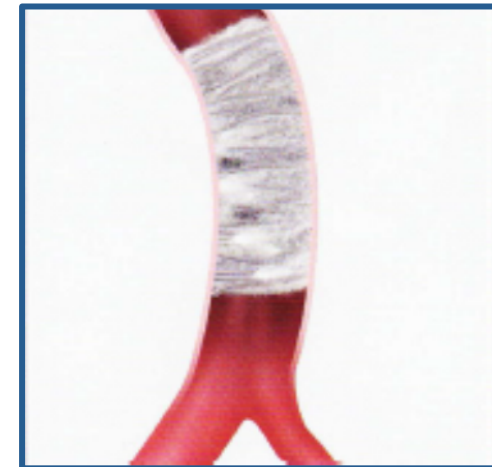
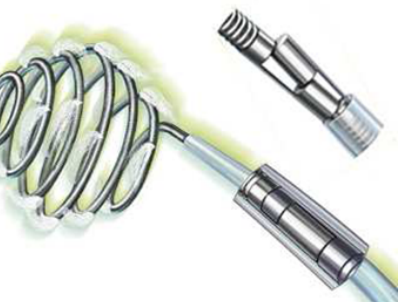
Montarello Olga 1406644 ( 87 y , 86 y )  
Cardio Scopie 15 I-S  
Cardio Scopie 15 I-s



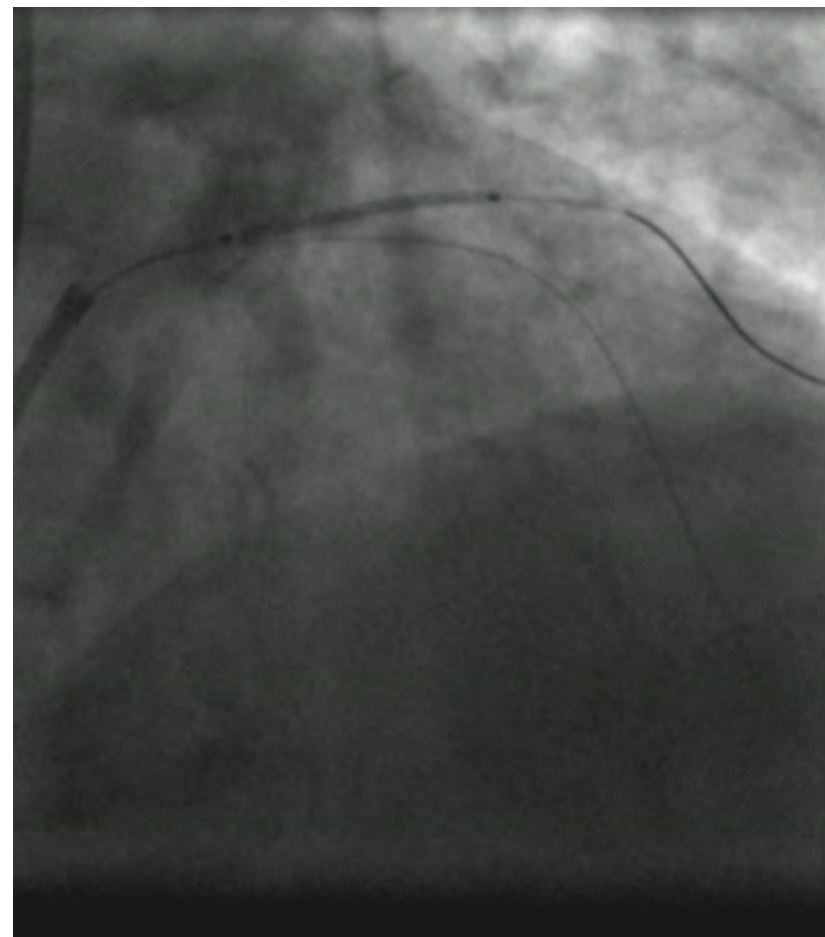
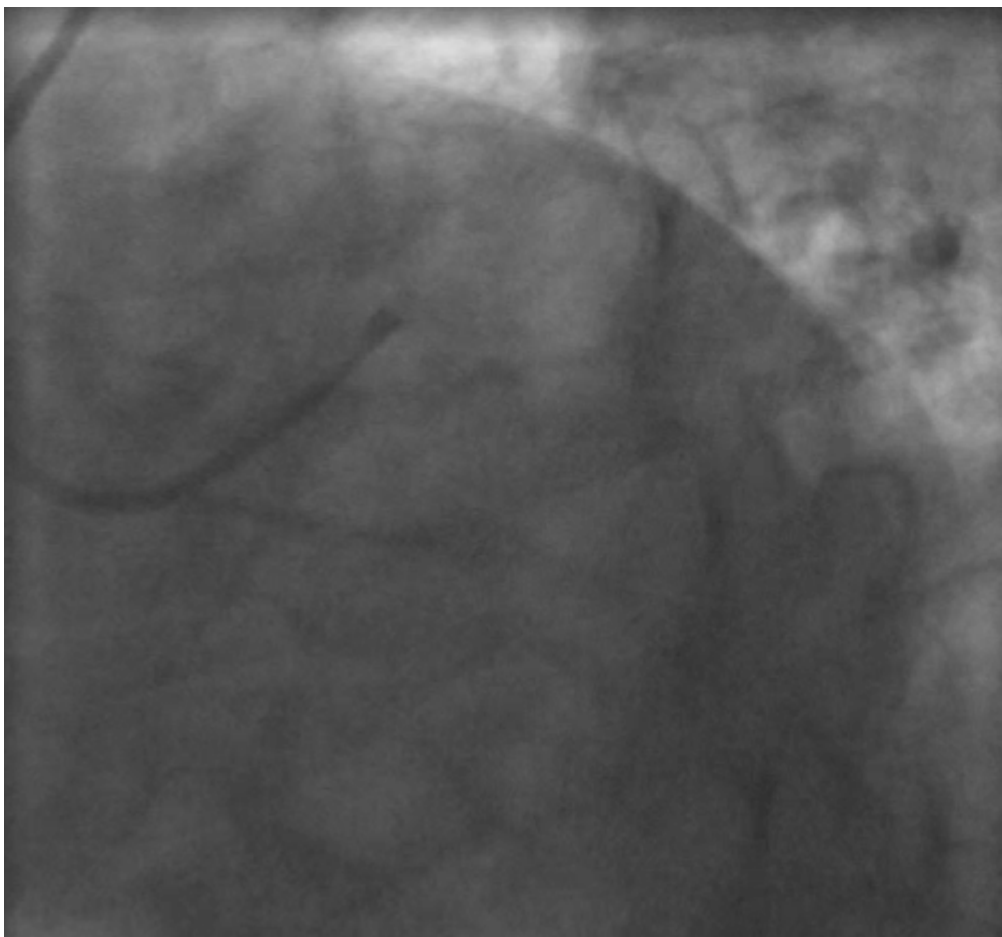
# COILS

disponibles à partir de 2 mm de diamètre d'artère à boucher

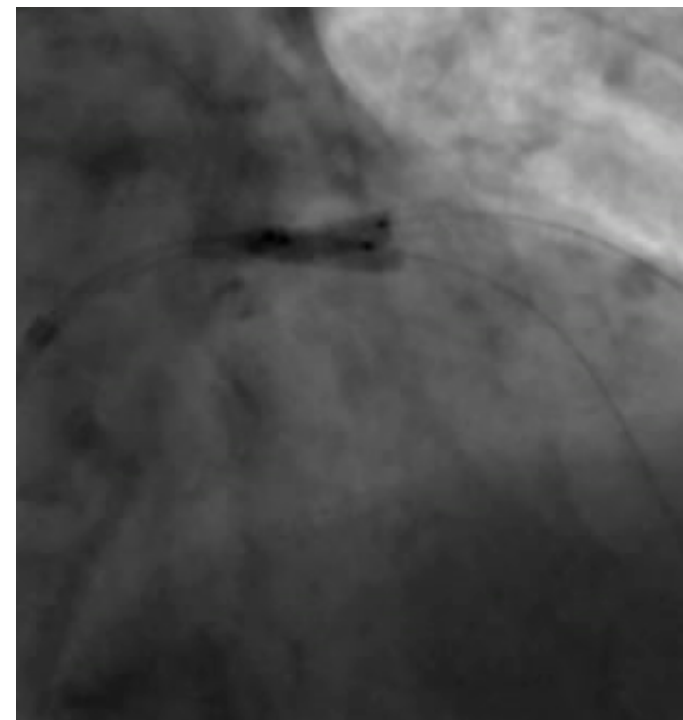
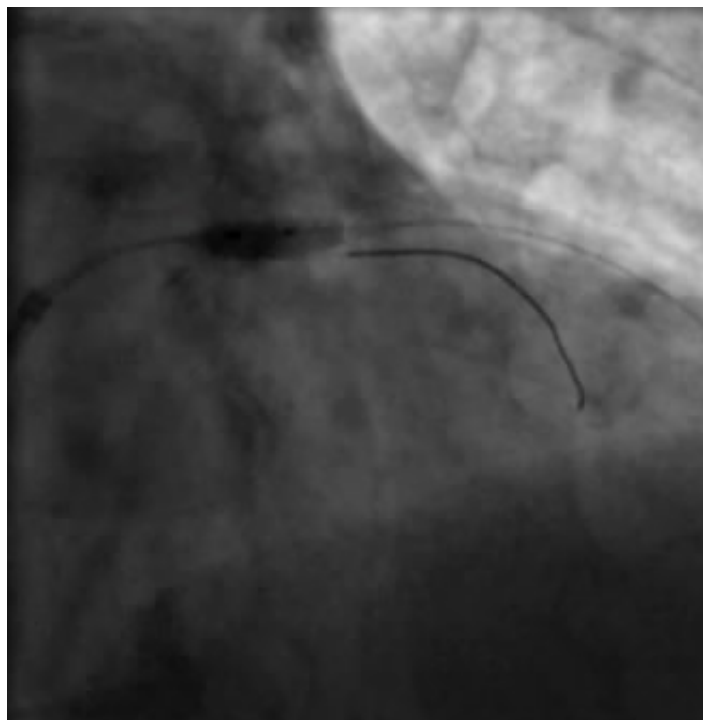
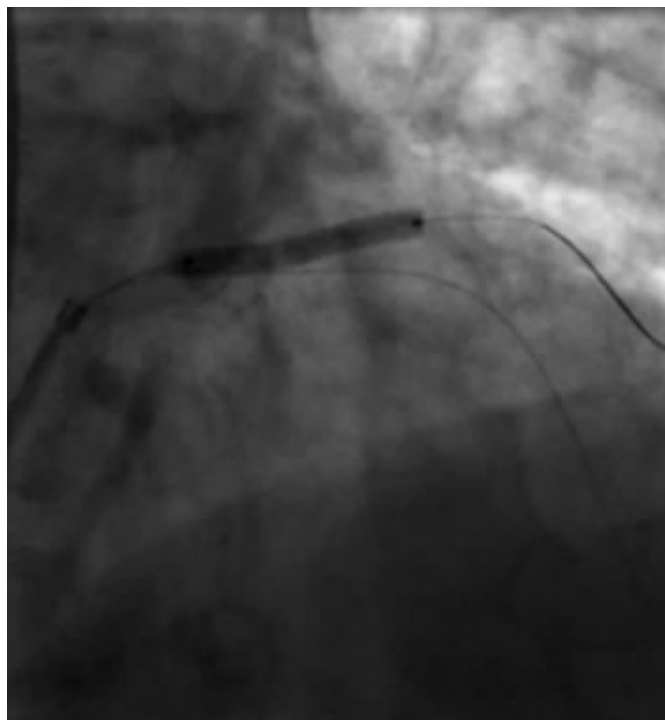
Coils fibrés, de préférence à détachement contrôlé délivrés via un microcath

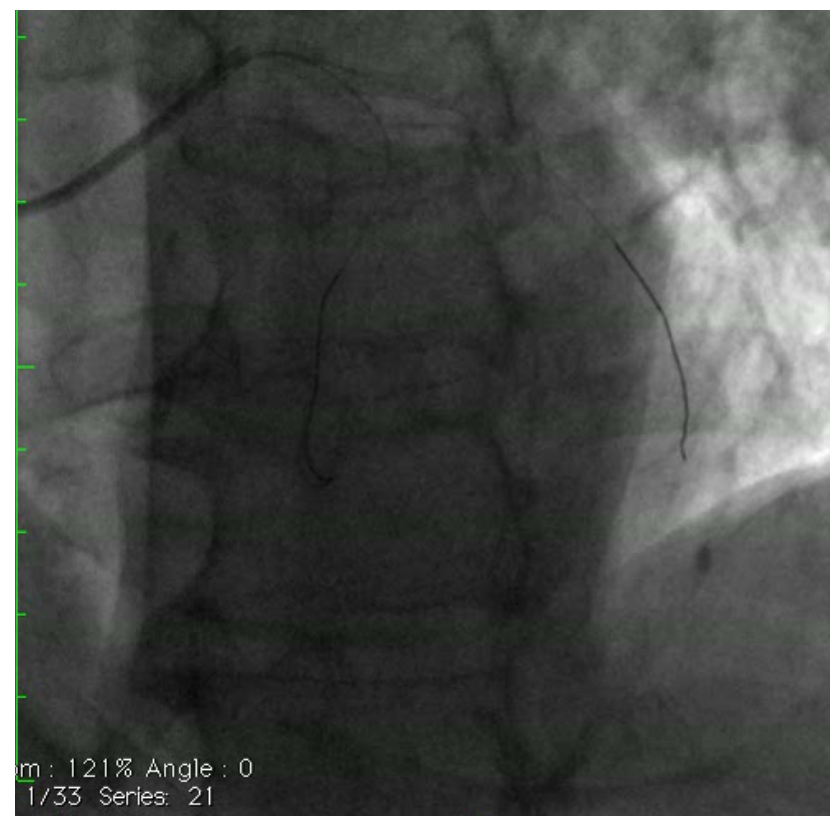
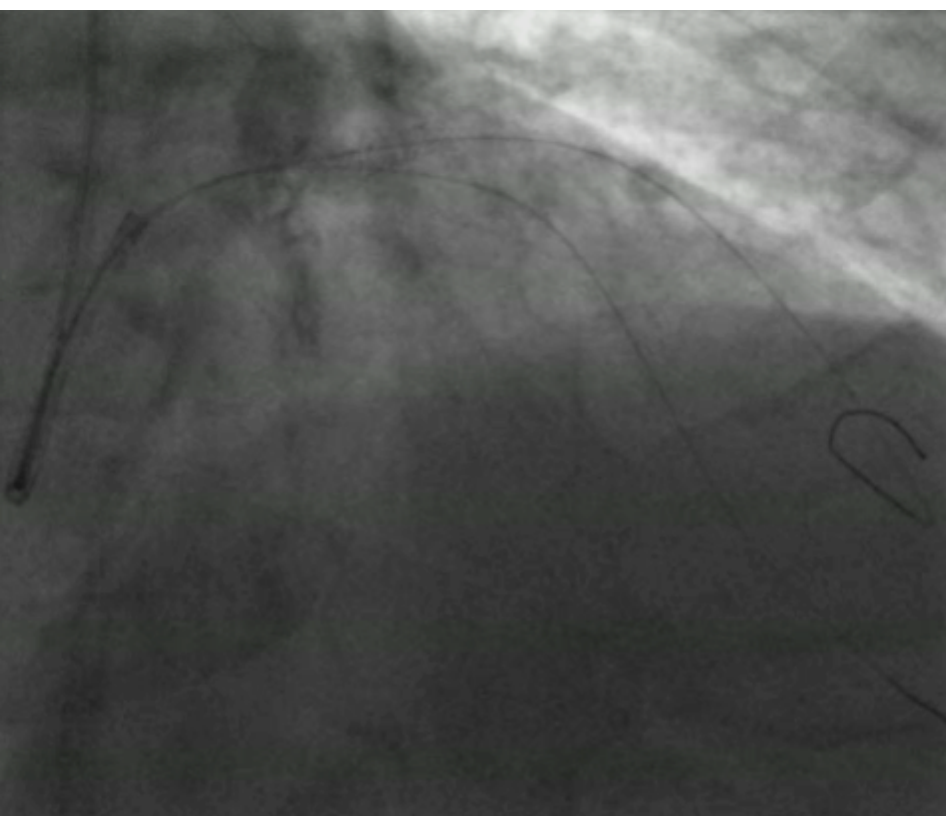


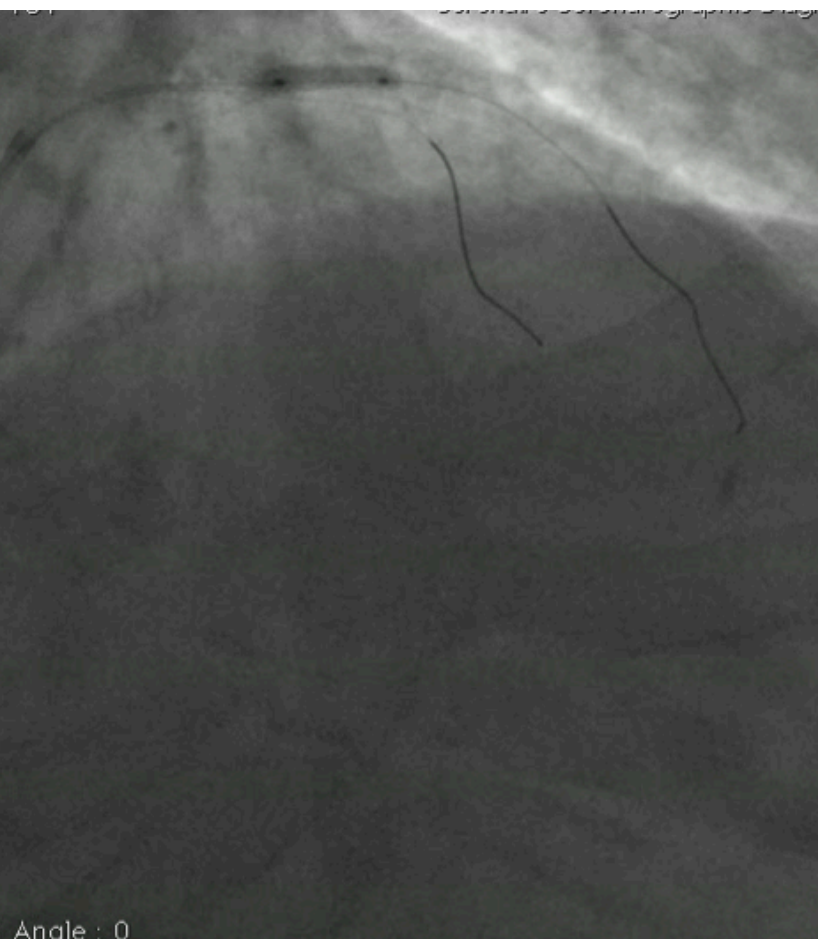




Courtesy of Benjamin Faurie GHM Grenoble

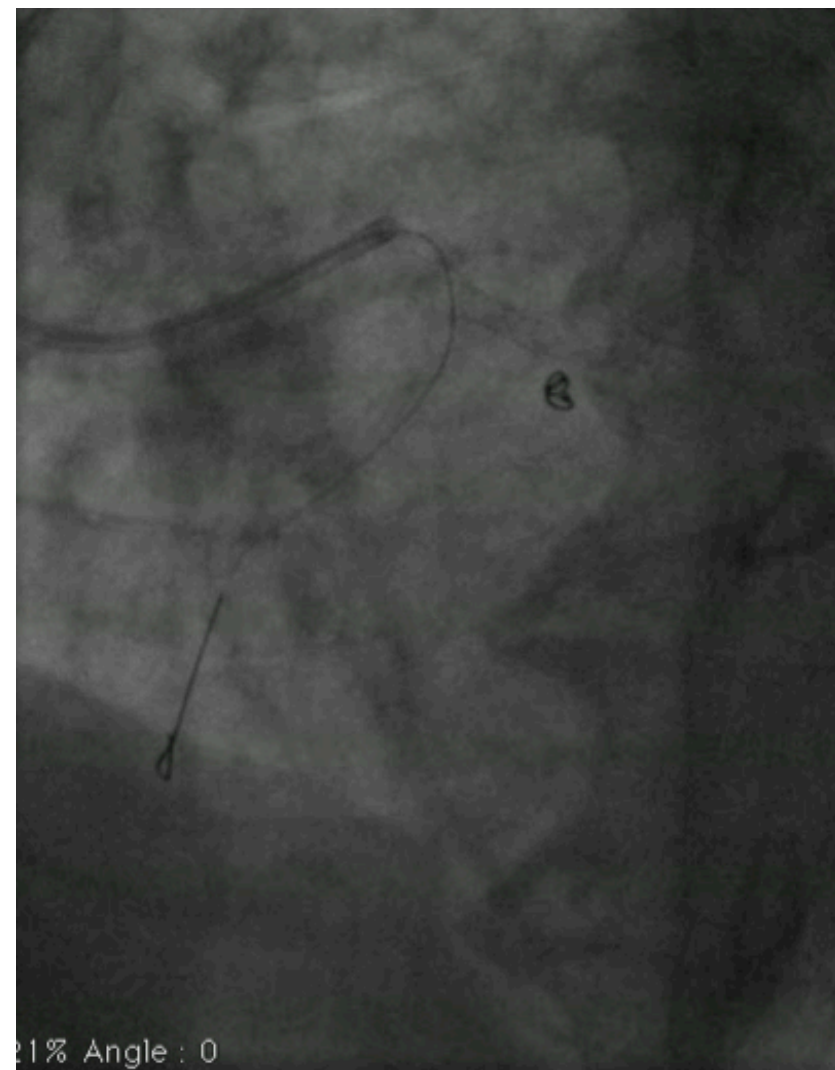




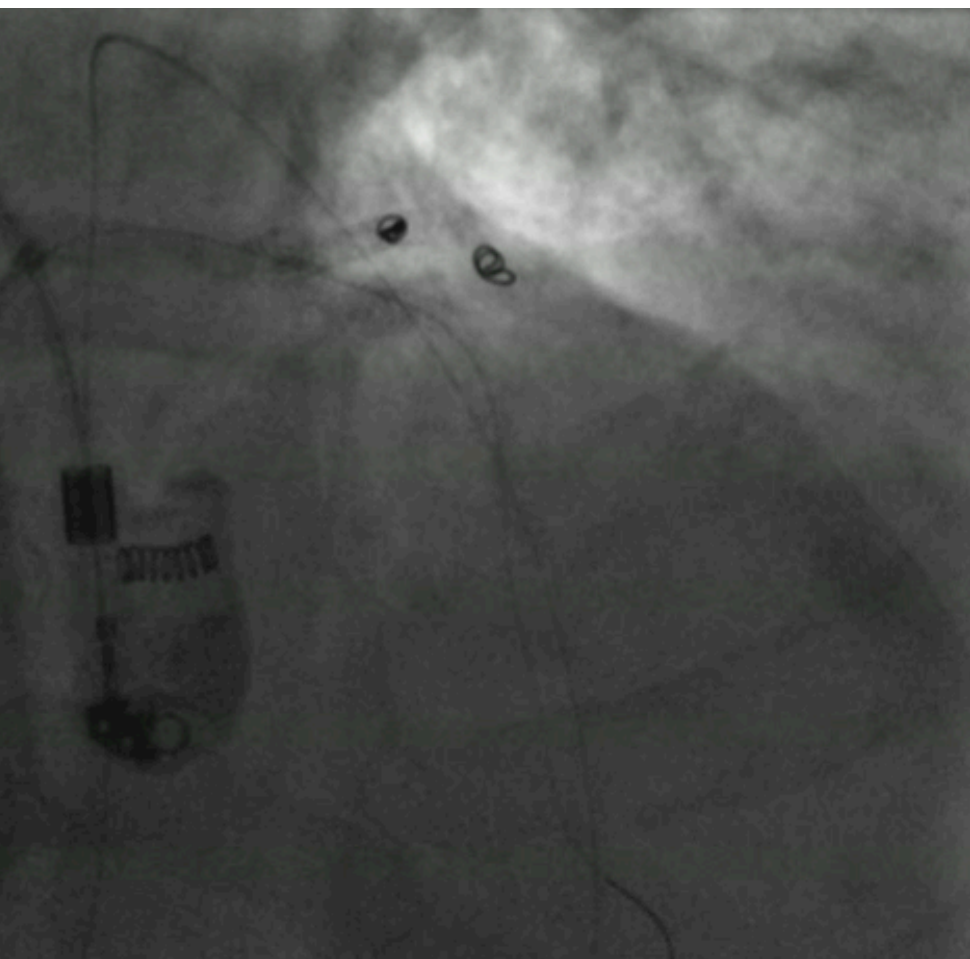




% Angle : 0  
size : 70



21% Angle : 0



# Conclusions

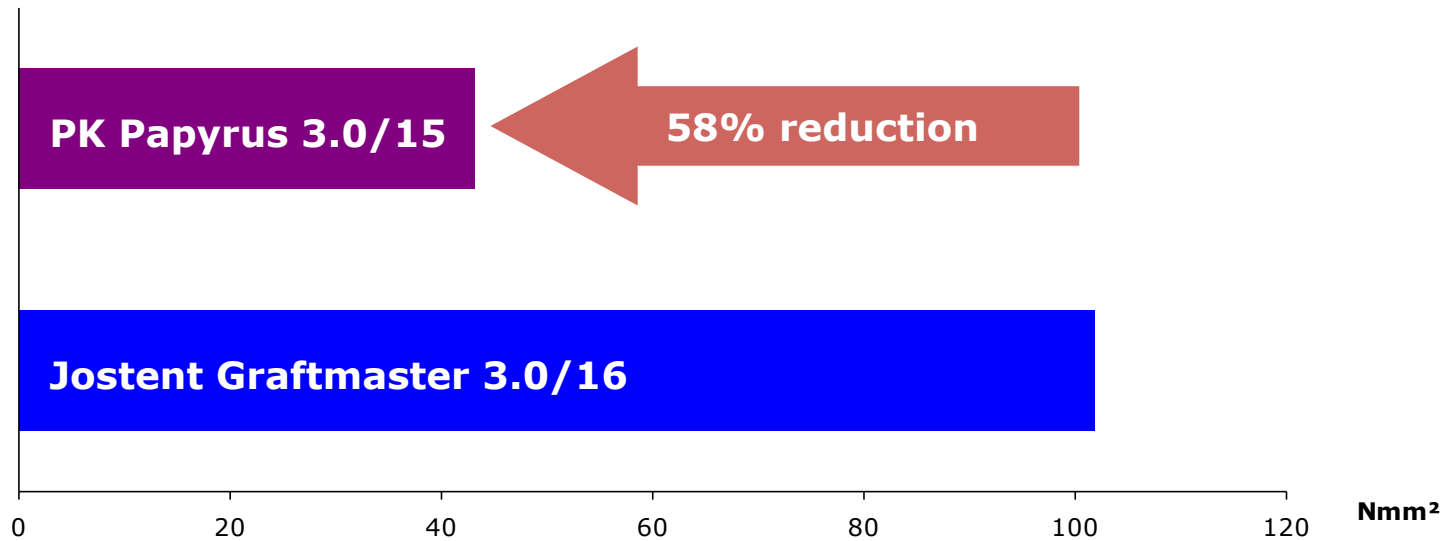
- Conduite à tenir immuable.. (ballon d'hémostase, antagonisation, ETT, drainage, cure de la perforation..)
- Matériel en salle .... (stent couvert, coils, cell saver, redon aspiratif...)
- Coils...entraînez vous!



PK Papyrus is highly flexible, even when crimped on the delivery system

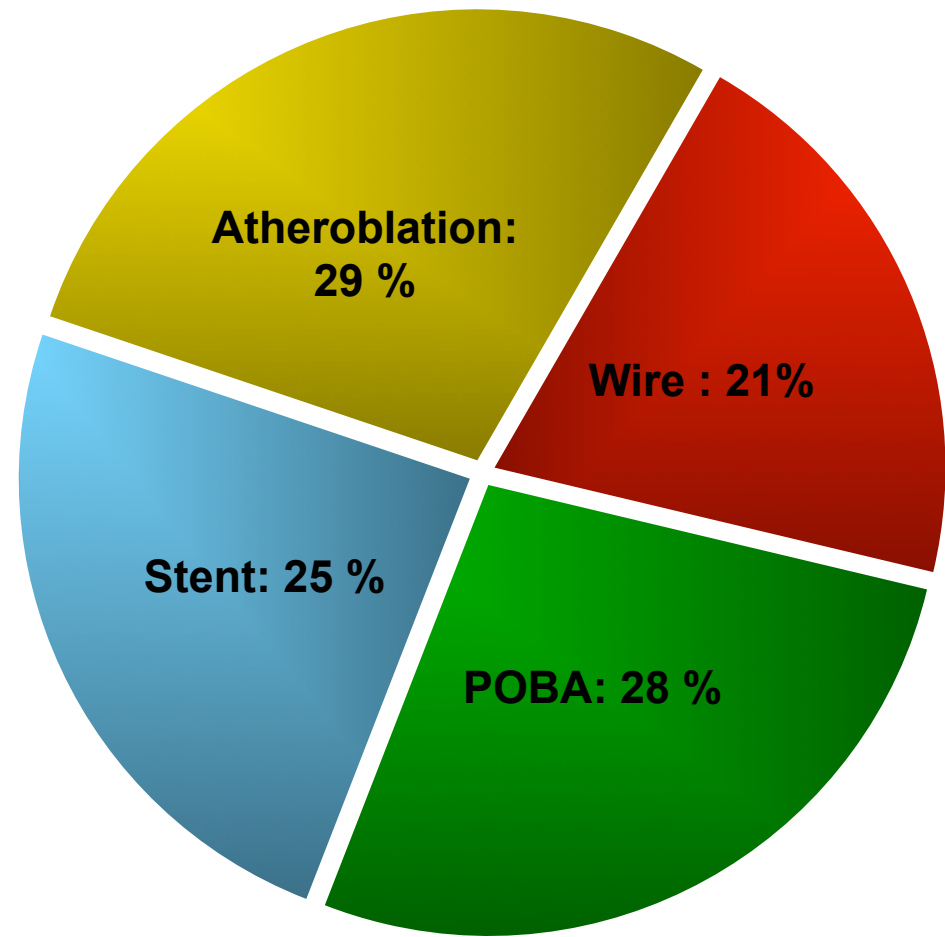
## High bending flexibility and low crossing profile for optimal deliverability

### Bending stiffness of crimped stent



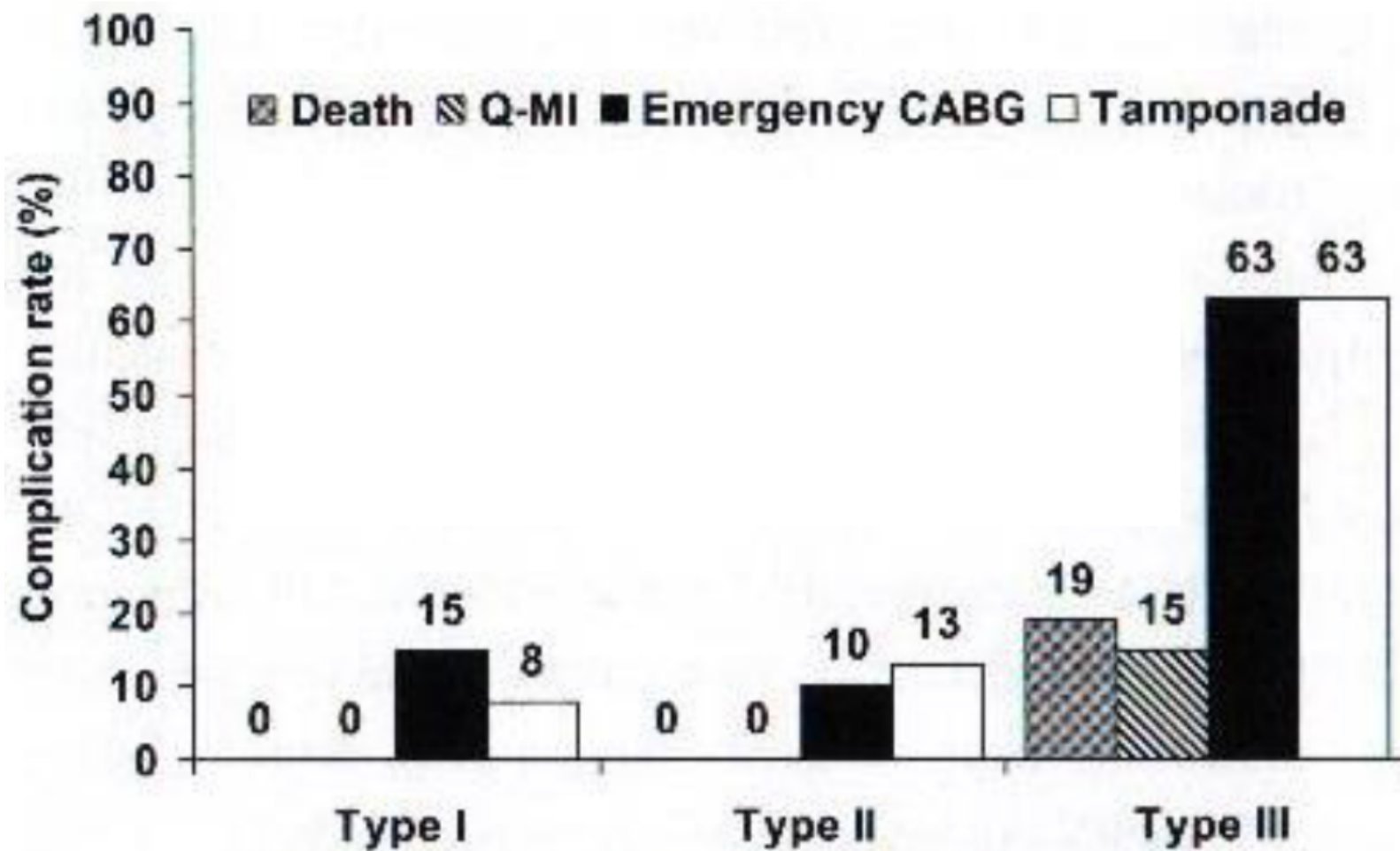
Data on file at BIOTRONIK

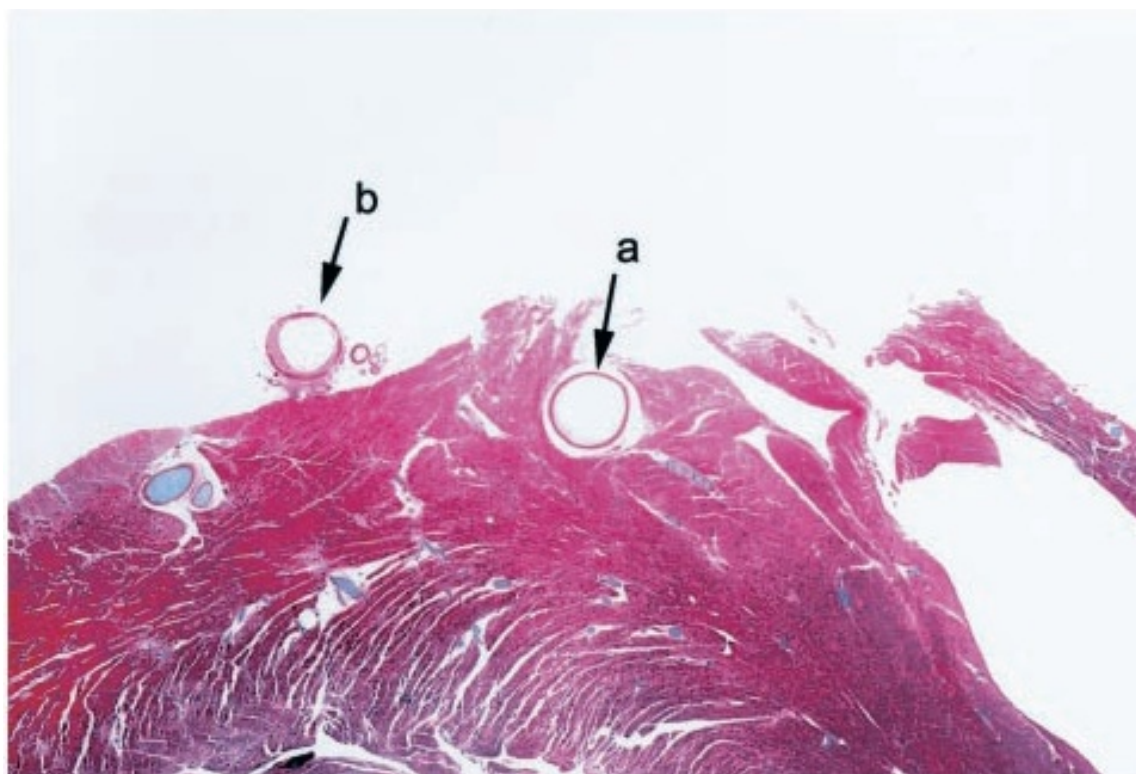




*Javaid. Am J Cardiol 2006;98:911-914*

- Perforation : 0.4 à 0.5 % des procédures
  - (atherectomie , GW... 50 à 95% des perforations)
- Ballon : 0.1 à 0.2%
- Ratio B/A > 1.2
- Petites artères
- Sinuosités
- Calcifications
- CTO
- Classification : 3 types





**a : artère intramyocardique (66 $\mu$ m)  
b : artère épiscopardique (405 $\mu$ m)**