



INSTITUT
CARDIOVASCULAIRE
PARIS
SUD

CARDIO
RUN
2023

15^{ème} CONGRÈS
DE PATHOLOGIE
CARDIO-VASCULAIRE

Sujet âgé: Traitement des lésions coronaires

Dr Hakim Benamer

ICPS Massy, La Roseraie, Aubervilliers, Hôpital FOCH, Suresnes





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Conflit d'intérêt: Absence

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ANGIOPLASTIE du SUJET AGE

C'est quoi?

C'est comme pour les plus jeunes



MAIS

Terrain plus fragile et pathologique
Lésions plus complexes
Stratégies thérapeutiques à adapter

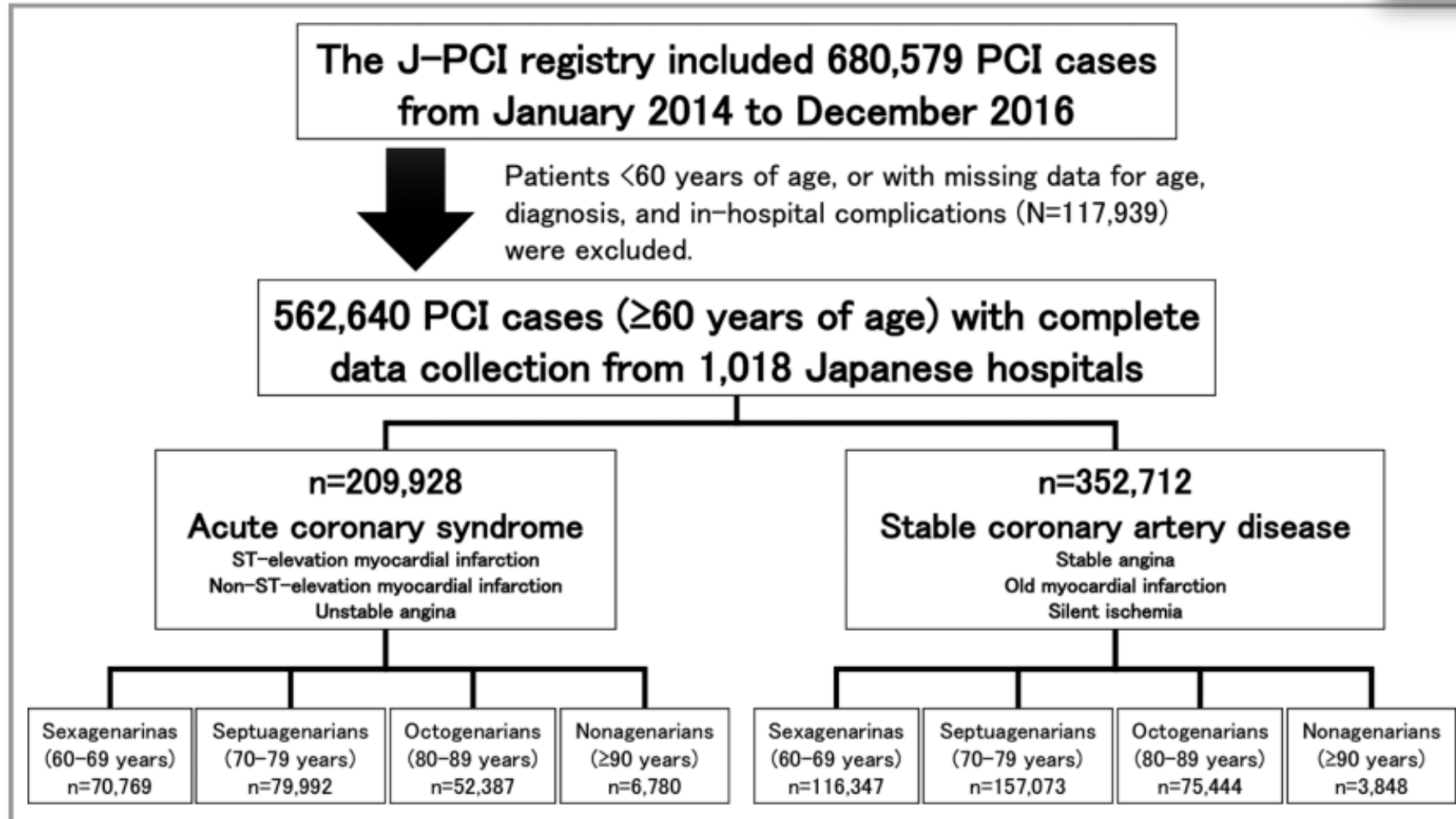


Figure 1. Flow chart of study enrollment. J-PCI registry indicates Japanese percutaneous coronary intervention registry; PCI, percutaneous coronary intervention.

L9;8:e011017.





Comparison of Outcomes After Percutaneous Coronary Intervention in Elderly Patients, Including 10 628 Nonagenarians: Insights From a Japanese Nationwide Registry (J-PCI Registry)

SCA

Table 3. In-Hospital Outcomes in Patients With ACS

Outcomes	Sexagenarians (60–69 y) (n=70 769)	Septuagenarians (70–79 y) (n=79 992)	Octogenarians (80–89 y) (n=52 387)	Nonagenarians (≥90 y) (n=6780)	P Value
Procedural success (final TIMI III flow)	69 510 (98.2)	78 426 (98.0)	51 156 (97.7)	6600 (97.3)	<0.001
In-hospital mortality	864 (1.22)	1248 (1.56)	1383 (2.64)	351 (5.18)	<0.001
Cardiac tamponade	78 (0.11)	160 (0.2)	175 (0.33)	20 (0.29)	<0.001
Cardiogenic shock	1105 (1.56)	1404 (1.76)	1225 (2.34)	198 (2.92)	0.001
Emergency operation	111 (0.16)	140 (0.18)	94 (0.18)	4 (0.06)	<0.001
Bleeding complications	242 (0.34)	400 (0.5)	404 (0.77)	76 (1.12)	<0.001
Access-site bleeding	125 (0.18)	216 (0.27)	227 (0.43)	46 (0.68)	0.001
Non-access-site bleeding	124 (0.18)	199 (0.25)	190 (0.36)	30 (0.44)	0.172

Values are reported as number (percentage). For the comparison of in-hospital outcomes among sexagenarians, septuagenarians, octogenarians, and nonagenarians, Pearson's χ^2 test was used. ACS indicates acute coronary syndrome; TIMI, Thrombolysis in Myocardial Infarction.



Comparison of Outcomes After Percutaneous Coronary Intervention in Elderly Patients, Including 10 628 Nonagenarians: Insights From a Japanese Nationwide Registry (J-PCI Registry)

Angor stable

Table 4. In-Hospital Outcomes in Patients With Stable CAD

Outcomes	Sexagenarians (60–69 y)	Septuagenarians (70–79 y)	Octogenarians (80–89 y)	Nonagenarians (≥90 y)	P Value
	(n=116 347)	(n=157 073)	(n=75 444)	(n=3848)	
Procedural success (final TIMI III flow)	113 905 (97.9)	154 105 (98.1)	74 048 (98.1)	3777 (98.2)	<0.001
In-hospital mortality	76 (0.07)	144 (0.09)	156 (0.21)	24 (0.62)	<0.001
Cardiac tamponade	85 (0.07)	217 (0.14)	164 (0.22)	15 (0.39)	<0.001
Cardiogenic shock	291 (0.25)	510 (0.32)	365 (0.48)	32 (0.83)	<0.001
Emergency operation	48 (0.04)	83 (0.05)	55 (0.07)	4 (0.1)	0.83
Bleeding complications	154 (0.13)	276 (0.18)	259 (0.34)	21 (0.55)	<0.001
Access-site bleeding	107 (0.09)	191 (0.12)	176 (0.23)	8 (0.21)	<0.001
Non-access-site bleeding	48 (0.04)	92 (0.06)	85 (0.11)	13 (0.34)	<0.001

Values are reported as number (percentage). For the comparison of in-hospital outcomes among sexagenarians, septuagenarians, octogenarians, and nonagenarians, Pearson's χ^2 test was used. CAD indicates coronary artery disease; TIMI, Thrombolysis in Myocardial Infarction.

ANGIOPLASTIE du SUJET AGE

- ✓ Particularités des lésions
- ✓ Impact du calcium sur le pronostic
- ✓ Outils pour les lésions calcifiées
- ✓ Les difficultés de l'angioplastie du TC
- ✓ Association aux lésions valvulaires



Comparison of Outcomes After Percutaneous Coronary Intervention in Elderly Patients, Including 10 628 Nonagenarians: Insights From a Japanese Nationwide Registry (I-PCI Registry)

Characteristics	Sexagenarians (60–69 y)	Septuagenarians (70–79 y)	Octogenarians (80–89 y)	Nonagenarians (≥90 y)	P Value
	(n=70 769)	(n=79 992)	(n=52 387)	(n=6780)	
No. of diseased vessels					
1-Vessel disease	41 569 (58.7)	44 610 (55.8)	27 853 (53.2)	3500 (51.6)	<0.001
2-Vessel disease	18 790 (26.6)	22 375 (28.0)	15 041 (28.7)	1975 (29.1)	<0.001
3-Vessel disease	10 058 (14.2)	12 633 (15.8)	9222 (17.6)	1290 (19.0)	<0.001
Left main trunk lesion	2868 (4.1)	4077 (5.1)	3112 (5.9)	398 (5.9)	<0.001
Target coronary artery					
Right coronary artery	25 291 (35.7)	29 170 (36.5)	19 340 (36.9)	2668 (39.4)	<0.001
Left main trunk–left anterior descending artery	37 021 (52.3)	41 611 (52.0)	27 987 (53.4)	3782 (55.8)	<0.001
Left circumflex artery	16 554 (23.4)	18 987 (23.7)	12 375 (23.6)	1399 (20.6)	<0.001
Bypass graft	323 (0.5)	605 (0.8)	382 (0.7)	19 (0.3)	<0.001

J Am Heart Assoc. 2019;8:e011017.



Management of Acute Coronary Syndrome in the Older Adult

Po
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art

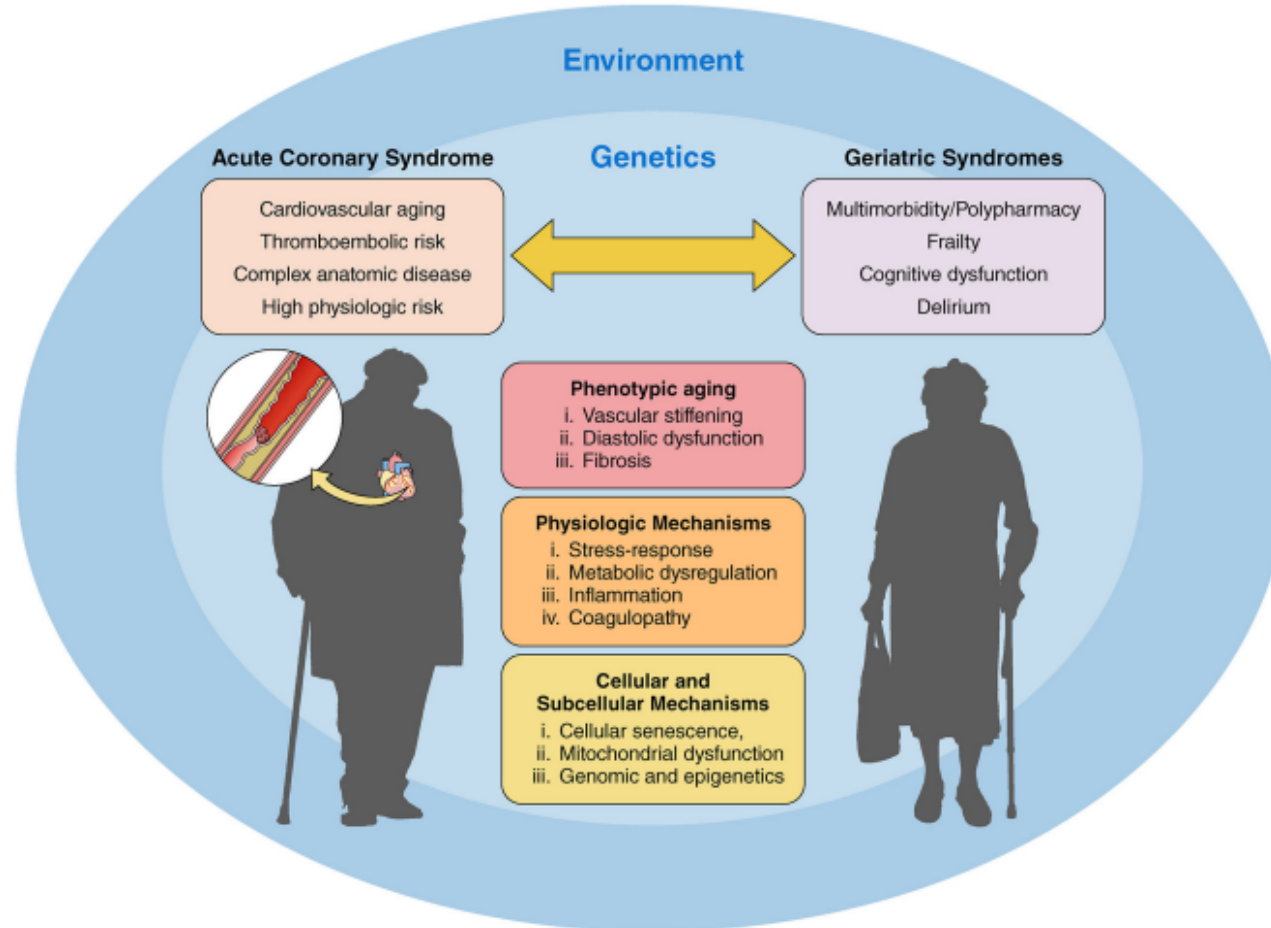


Figure 1.
The bidirectional association between acute coronary syndrome and geriatric syndromes. Several factors influence this bidirectional association including phenotypic aging, physiologic mechanisms, cellular and subcellular mechanisms, genetics, and the environment.



ANGIOPLASTIE du SUJET AGE

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IMPACT des CALCIFICATIONS

10-Year All-Cause Mortality Following Percutaneous or Surgical Revascularization in Patients With Heavy Calcification



Hideyuki Kawashima, MD,^{a,b} Patrick W. Serruys, MD, PhD,^{a,c} Hironori Hara, MD,^{a,b} Masafumi Ono, MD,^{a,b} Chao Gao, MD,^{a,d} Rutao Wang, MD,^{a,d} Scot Garg, MD, PhD,^e Faisal Sharif, MD, PhD,^a Robbert J. de Winter, MD, PhD,^b Michael J. Mack, MD, PhD,^f David R. Holmes, MD,^g Marie-Claude Morice, MD,^h Arie Pieter Kappetein, MD, PhD,ⁱ Daniel J.F.M. Thuijs, MD, PhD,ⁱ Milan Milojevic, MD, PhD,^{l,j} Thilo Noack, MD,^k Friedrich-Wilhelm Mohr, MD, PhD,^k Piroze M. Davierwala, MD,^{l,m} Yoshinobu Onuma, MD, PhD,^a for the SYNTAX Extended Survival Investigators

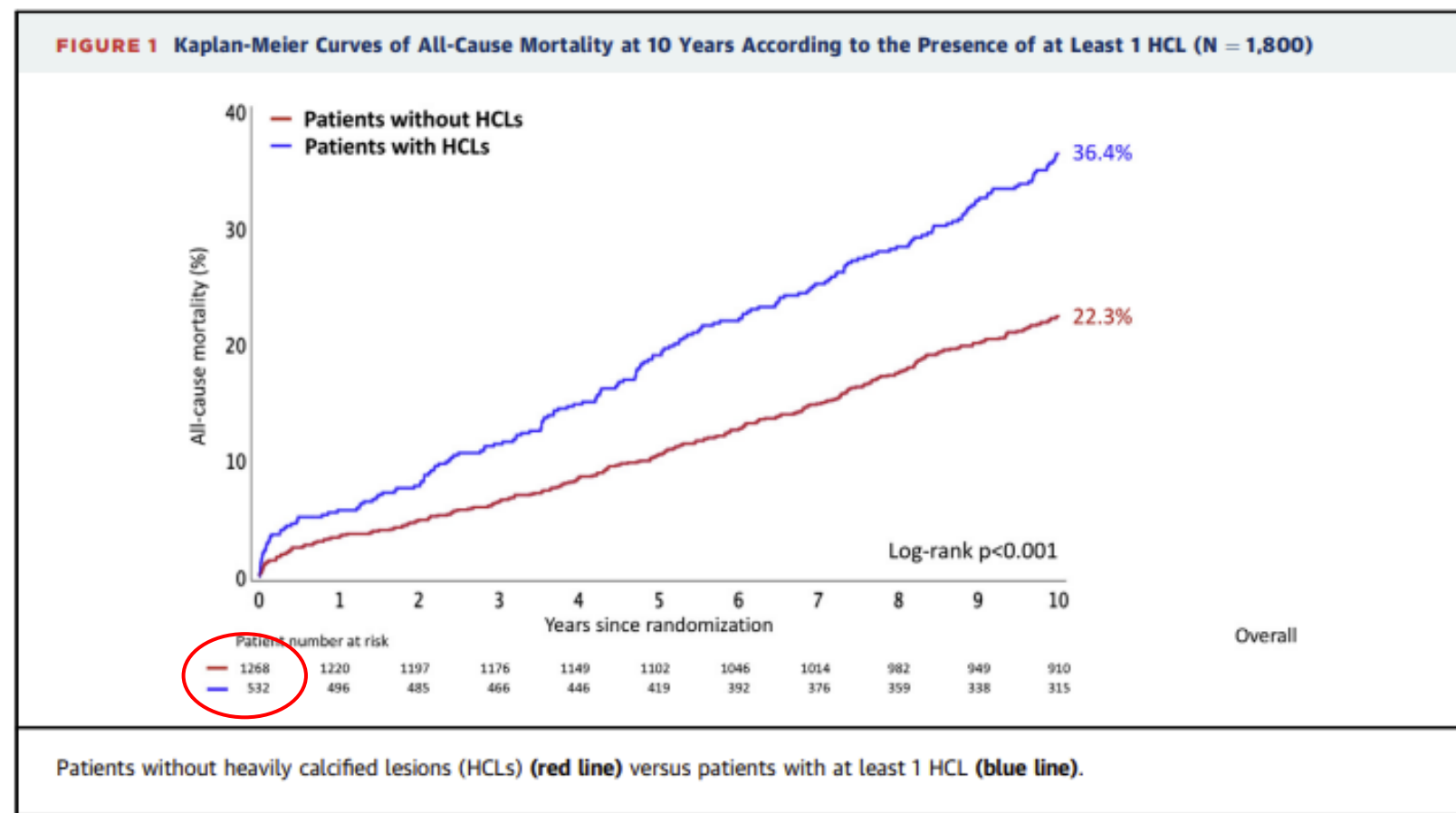
METHODS This substudy of the **SYNTAXES** (Synergy Between PCI With Taxus and Cardiac Surgery Extended Survival) study assessed **10-year all-cause mortality** according to the presence of HCLs within lesions with >50% diameter stenosis and identified during the calculation of the anatomical SYNTAX (Synergy Between PCI With Taxus and Cardiac Surgery) score among **1,800 patients** with the 3-vessel disease and/or left main disease randomized to PCI or CABG in the SYNTAX trial. Patients with HCLs were further stratified according to disease type (3-vessel disease or left main disease) and assigned treatment (PCI or CABG).



IMPACT des CALCIFICATIONS

Impact Ca++

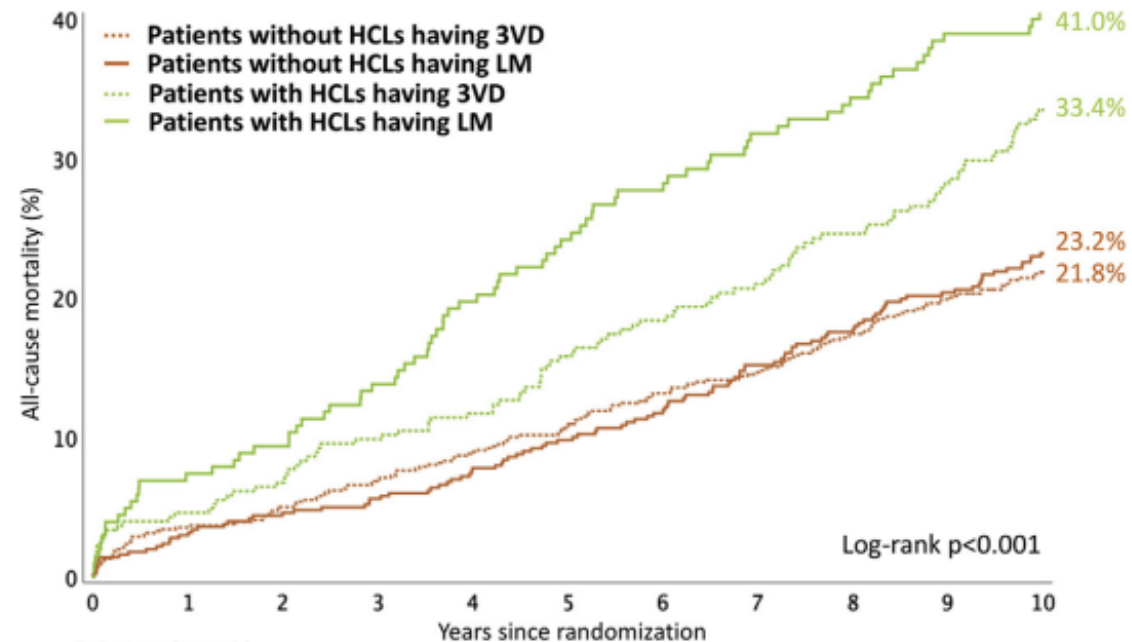
10-Year All-Cause Mortality Following Percutaneous or Surgical Revascularization in Patients With Heavy Calcification



IMPACT des CALCIFICATIONS

Impact Ca++
Tritroncs TC

FIGURE 2 Kaplan-Meier Curves of All-Cause Mortality at 10 Years Stratified According to the Presence of at Least 1 HCL and Disease Type (3VD or LM Disease) (N = 1,800)



	0	1	2	3	4	5	6	7	8	9	10
Patients without HCLs having 3VD (orange dotted line)	766	733	720	705	689	670	634	620	600	580	560
Patients without HCLs having LM (orange solid line)	502	487	477	471	460	432	412	394	382	369	350
Patients with HCLs having 3VD (green dotted line)	329	308	301	291	283	267	250	242	230	219	202
Patients with HCLs having LM (green solid line)	203	188	184	175	163	152	142	134	129	119	113

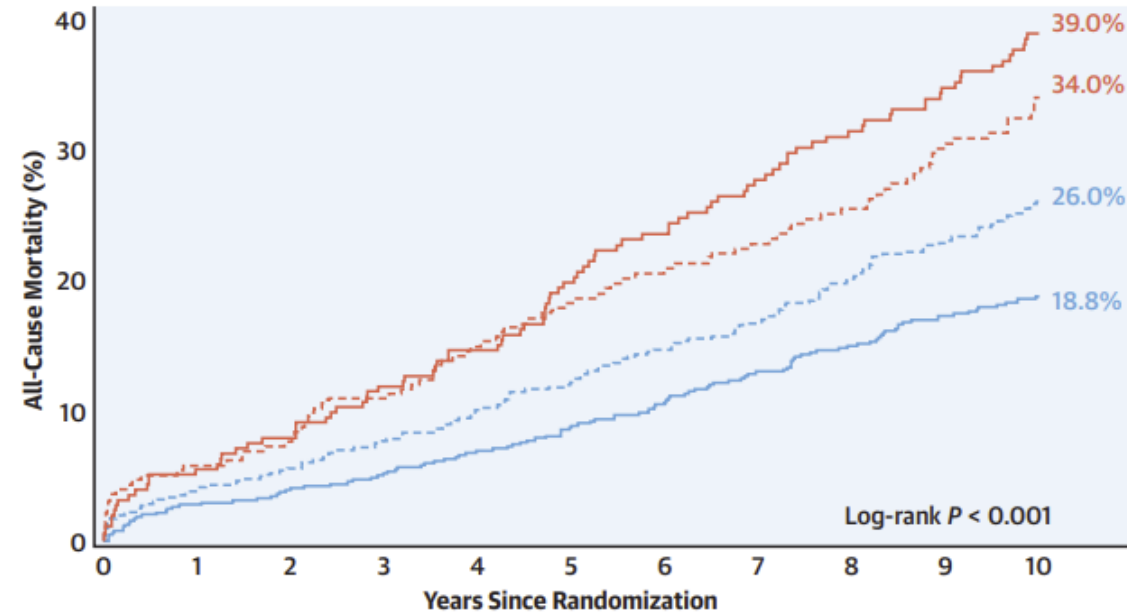
Patients without heavily calcified lesions (HCLs) with 3-vessel disease (3VD) (orange dotted line) versus patients without HCLs with left main (LM) disease (orange solid line) versus patients with HCLs with 3VD (green dotted line) versus patients with HCLs with LM disease (green solid line).



IMPACT des CALCIFICATIONS

Impact Ca++
ATL vs Pontages

CENTRAL ILLUSTRATION Kaplan-Meier Curves of All-Cause Mortality According to the Presence of at Least 1 Heavily Calcified Lesion and Randomized Treatment With PCI or CABG (N = 1,800)



No. at risk:

--- 627	602	591	578	563	536	503	488	468	449	422
— 641	618	606	598	586	566	543	526	514	500	488
--- 276	258	253	244	232	221	208	202	194	181	170
— 256	238	232	222	214	198	184	174	165	157	145

--- Patients Without HCL Undergoing PCI — Patients Without HCL Undergoing CABG
 --- Patients With HCL Undergoing PCI — Patients With HCL Undergoing CABG



ANGIOPLASTIE du SUJET AGE

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- ✓ Association aux lésions valvulaires



Les outils

Ballons non compliants très haute pression

Balloons coupants

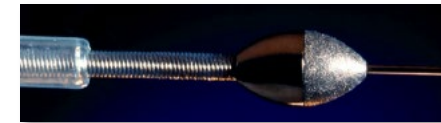
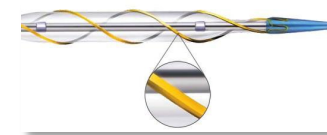
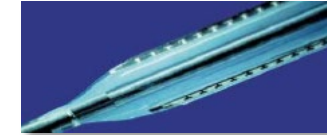
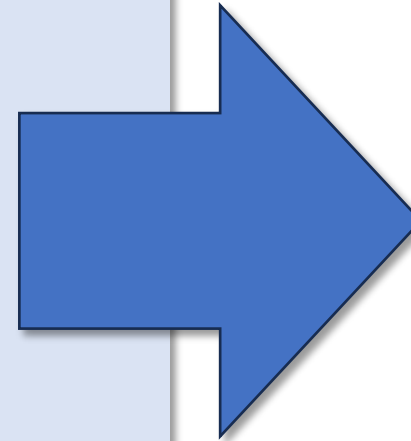
Scoring ballons

Athérectomie rotative

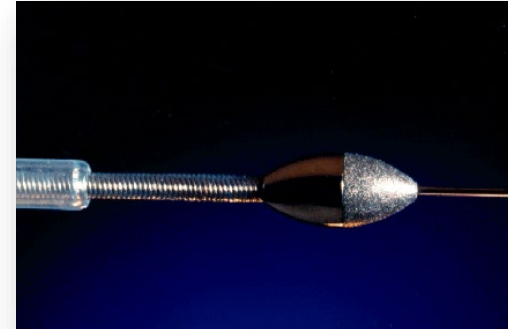
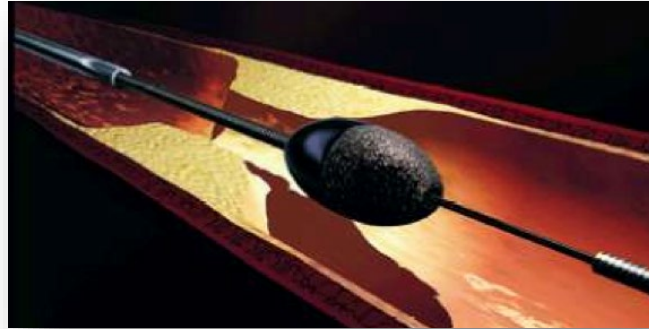
Laser

Lithotripsie intravasculaire Shockwave™

Athérectomie orbitale



ROTABLATOR



160 à 200.000 T/min

- **Modification de la plaque (Forage et fissuration)**
- **Amélioration de la compliance vasculaire et de la lésion**
- **Poussière d'athérome (Low Flow possible)**

L'athérectomie orbitale: comment ça marche ?

Double mécanisme d'action

Athérectomie orbitale

Force centrifuge $F = \frac{m \cdot V^2}{R}$

Action bi-directionnelle elliptique

>> réduction plaque

Couronne sertie de diamants

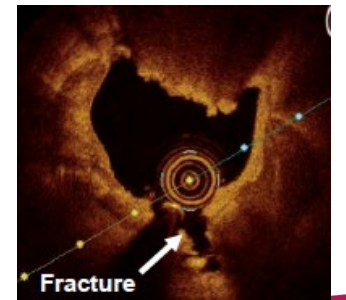
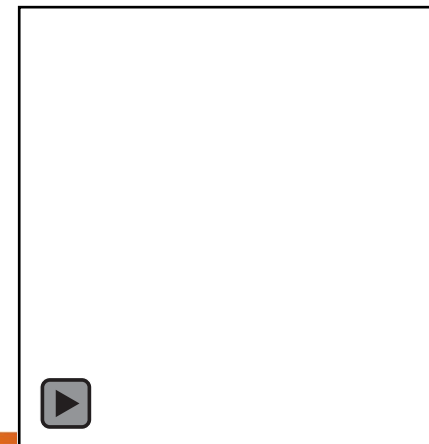
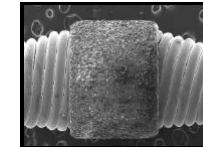
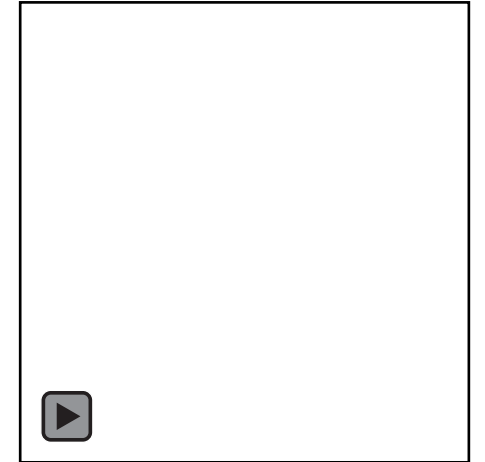
2 vitesses: 80 000 / 120 000 T/mn

2.5 – 4 mm

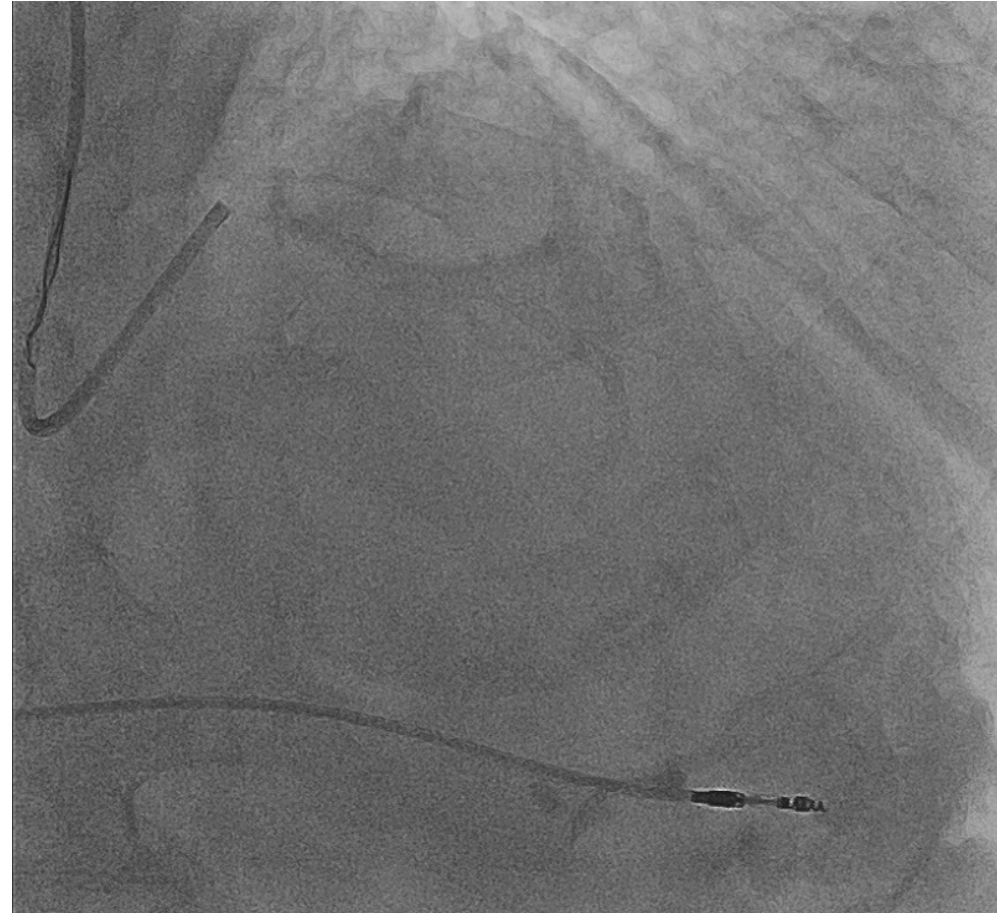
Modification de la plaque

Forces pulsatiles

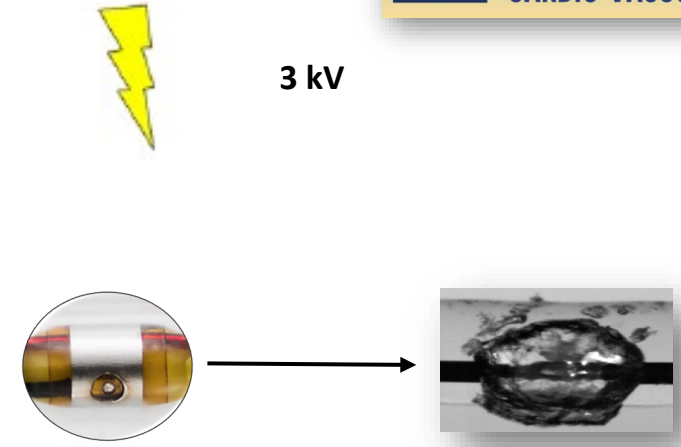
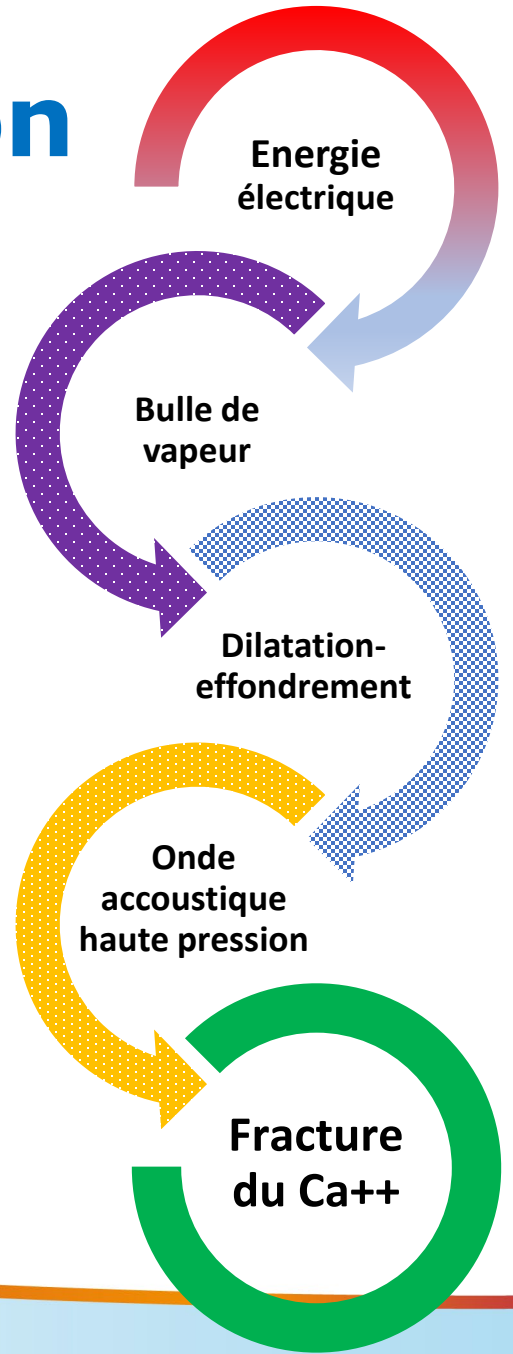
Action en profondeur



Exemple



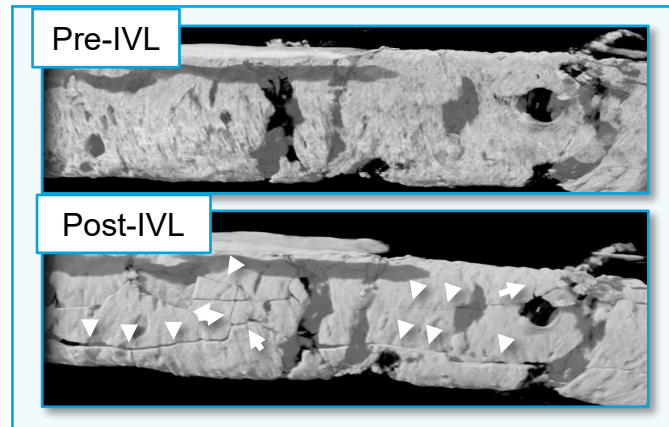
Shock Wave Mécanisme d'action



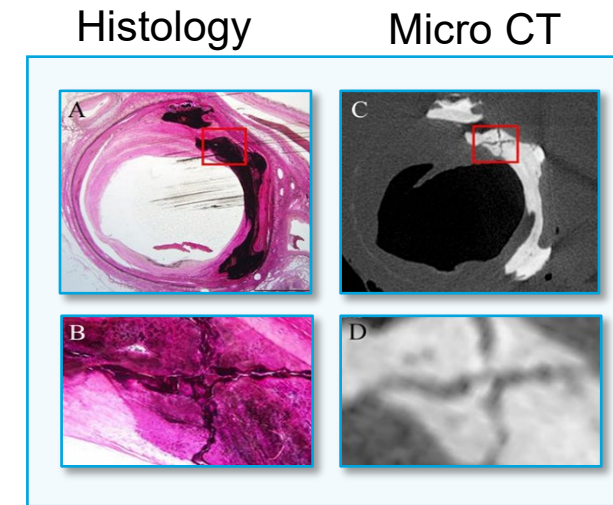
≈ 50 ATM
Profondeur: 3 – 7 mm



Résultats: les micro-fractures

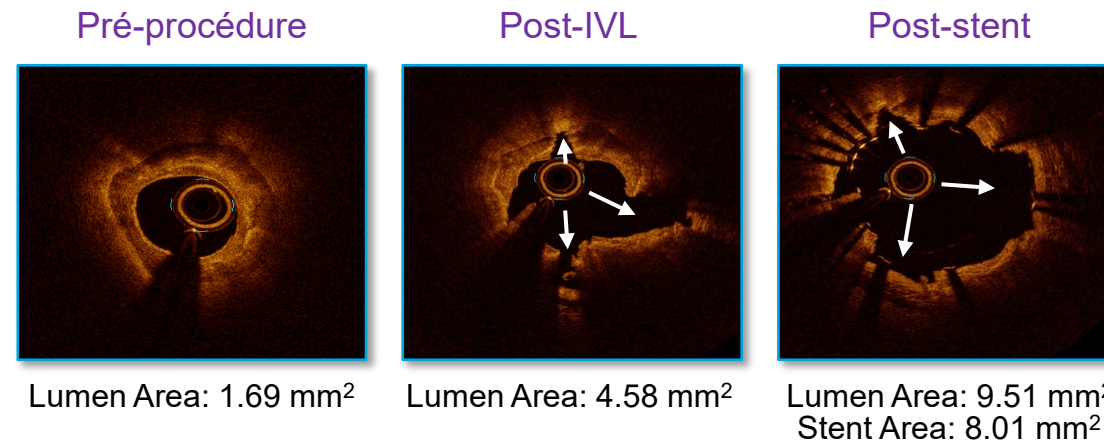


Cadaveric Superficial Femoral Artery (Micro CT)

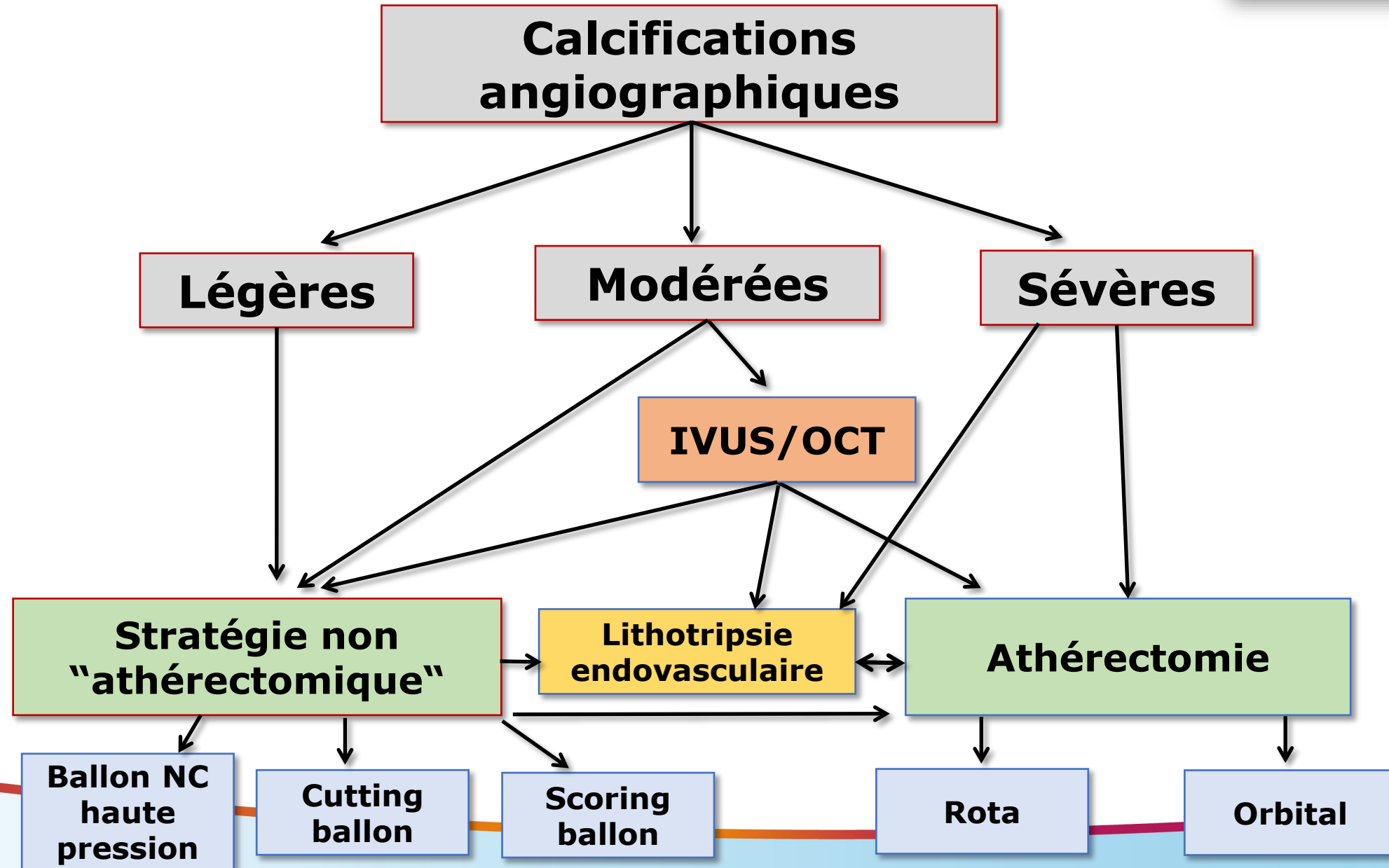


Courtesy: Renu Virmani

Histologic & Micro CT after IVL Treatment (SFA)



Algorithme décisionnel



ANGIOPLASTIE du SUJET AGE

- ✓ Particularités des lésions
- ✓ Impact du calcium sur le pronostic
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- ✓ Les difficultés de l'angioplastie du TC
- ✓ Association aux lésions valvulaires



ANGIOPLASTIE du TC CALCIFIÉ



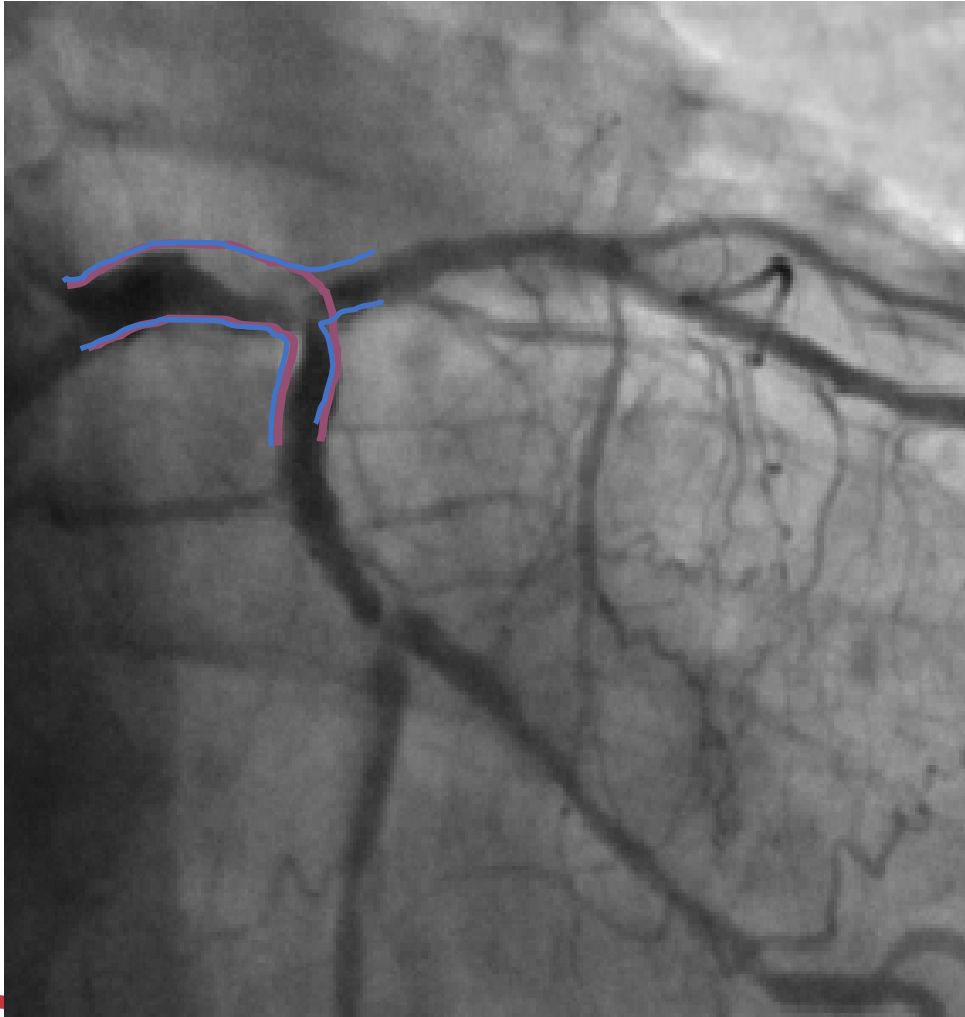
Complexité de
l'angioplastie du TC

Complexité de
l'angioplastie des
lésions calcifiées



LES COMPLEXITES DE L'ATL DU TC

Patient 82 ans FE à 28%



LA BONNE RECETTE

- ✓ Bon support
- ✓ CPIA ?
- ✓ 2 guides
- ✓ Provisional ?
- ✓ MB or SB first ?
- ✓ **Rotablator, Shockwave ou orbital**
?
- ✓ Stent sizing (Loi Fractal)
- ✓ Ostium

LES COMPLEXITES DE L'ATL DU TC

La procédure



LES COMPLEXITES DE L'ATL DU TC

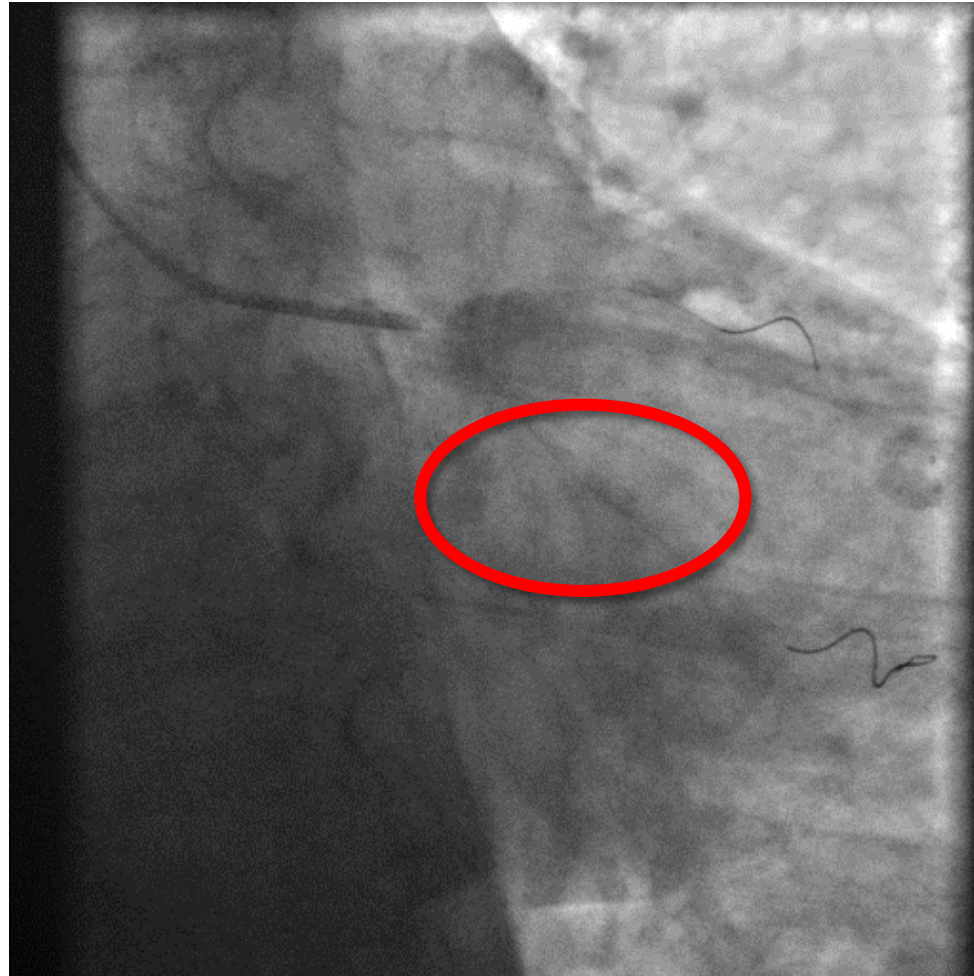
La procédure

POT
REFRANCHISSEMENT GUIDE VERS IVA
KISSING



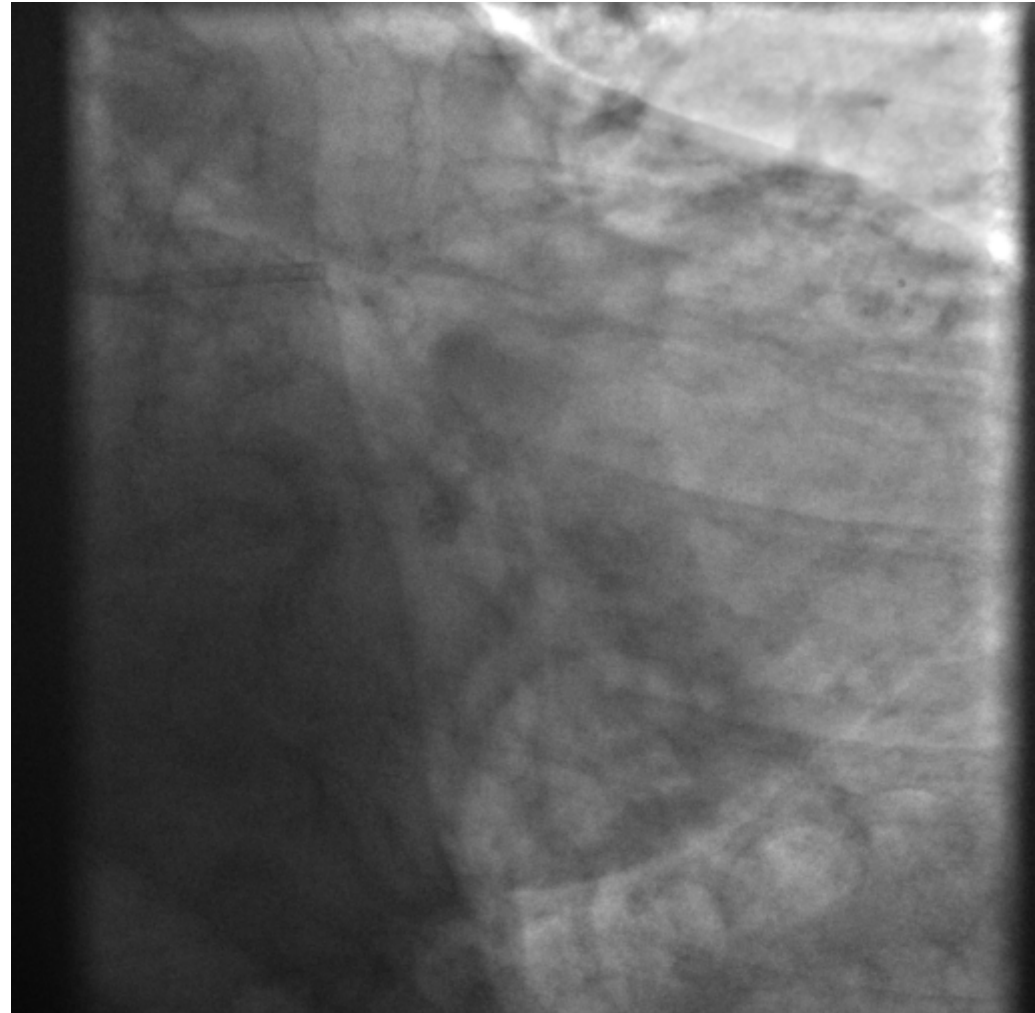
LES COMPLEXITES DE L'ATL DU TC

La procédure



LES COMPLEXITES DE L'ATL DU TC

La procédure



ANGIOPLASTIE du SUJET AGE

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TC Calcifié et RAC

- Population âgée et fragile avec comorbidité,
- Lésion du TC souvent calcifiée,
- Particularités du TC ostial: paroi aortique!
- Problèmes techniques d'une angioplastie de lésion ostiale
- Etendue myocardique en aval très importante?
- Problème de tolérance hémodynamique?



CONTEXTE CLINIQUE

Antécédents

- ▶ Femme de 81 ans
- ▶ HTA, dyslipidémie, surcharge pondérale
- ▶ Mort subite chez le frère à 67 ans
- ▶ Absence de comorbidité, bon état général

Histoire de la maladie

- ▶ Angor de novo, élévation modérée de la troponine en ville
- ▶ Souffle systolique 3/6 au foyer aortique
- ▶ ECG: RSR, sous-décalage inféro-apico-latéral
- ▶ FEVG préservée, HVG modérée, RAC serré : GM 44 mmHg, S 0,9 cm², HTAP 50mmHg
- ▶ Créatininémie 89µmol/l, Hb 13g/dL

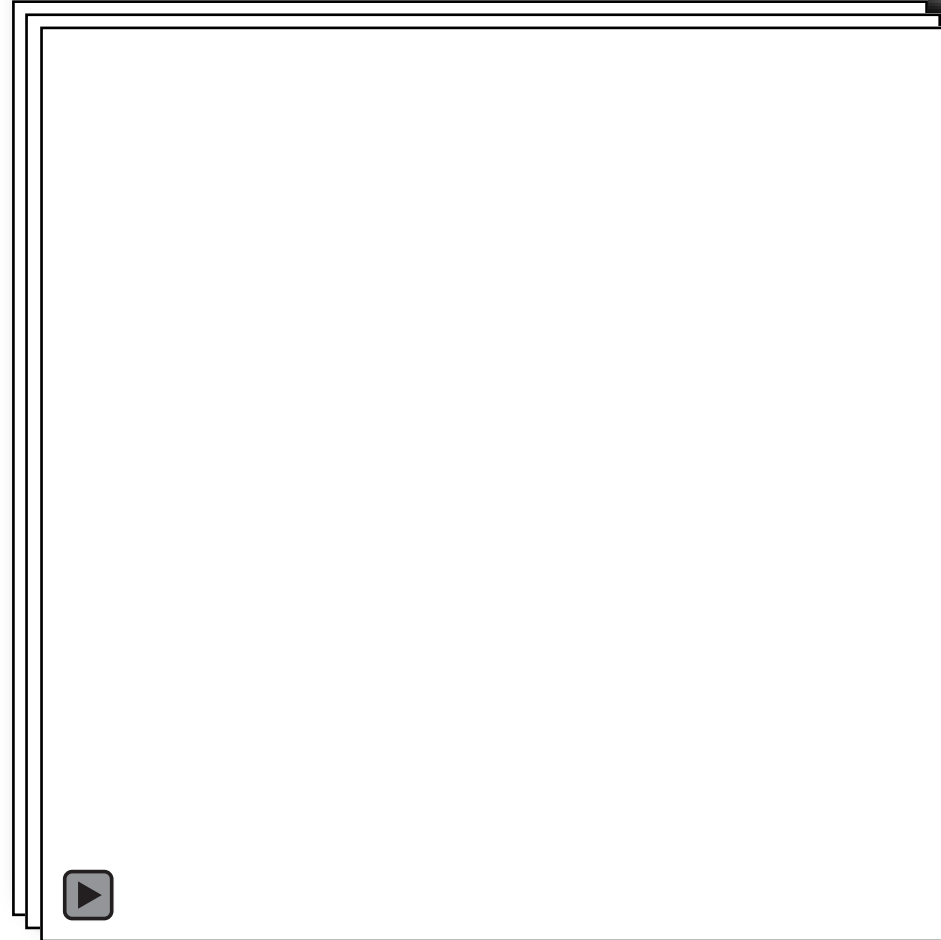


EN SALLE DE CORONAROGRAPHIE...

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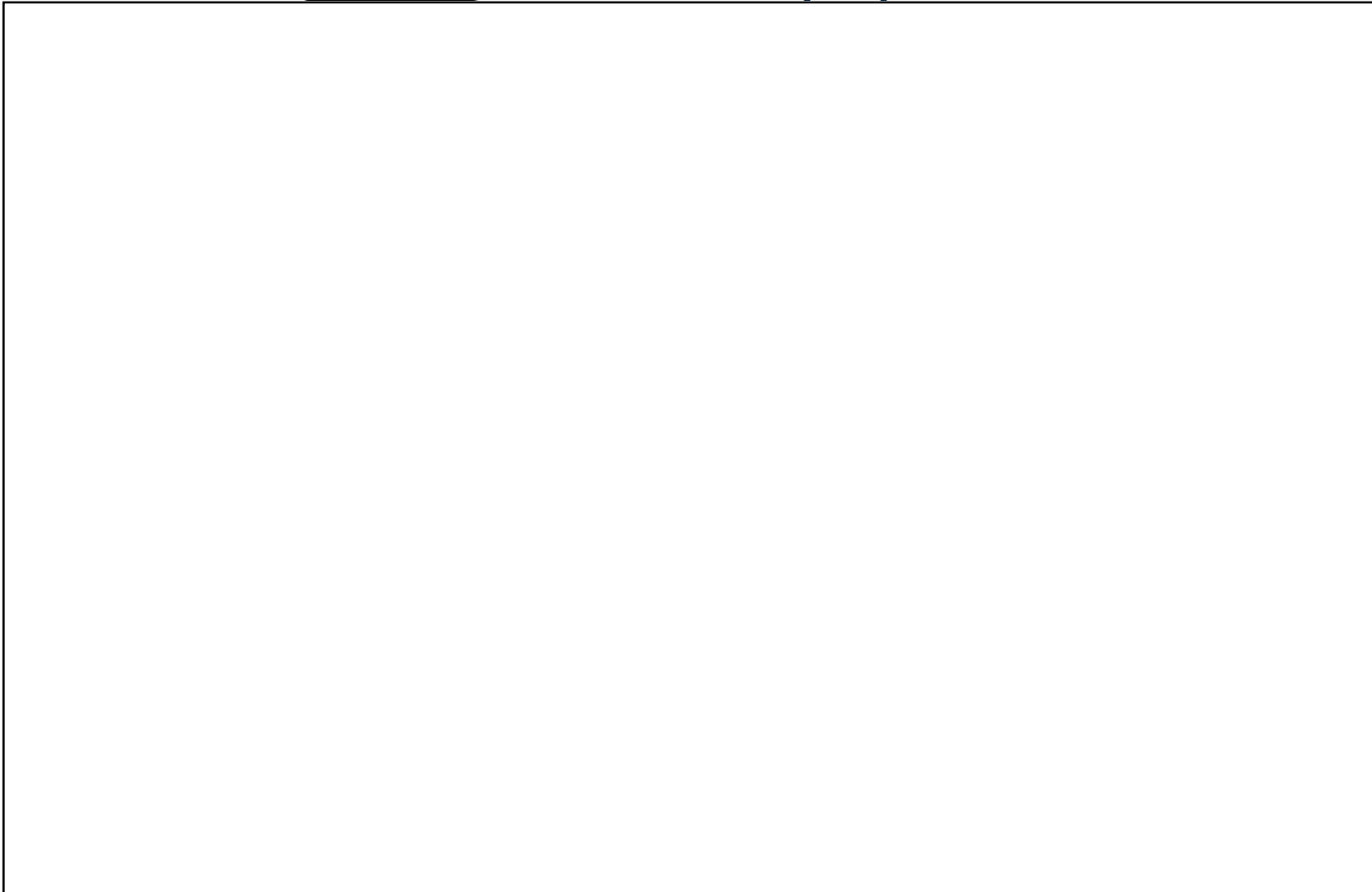
Voie radiale droite 5F



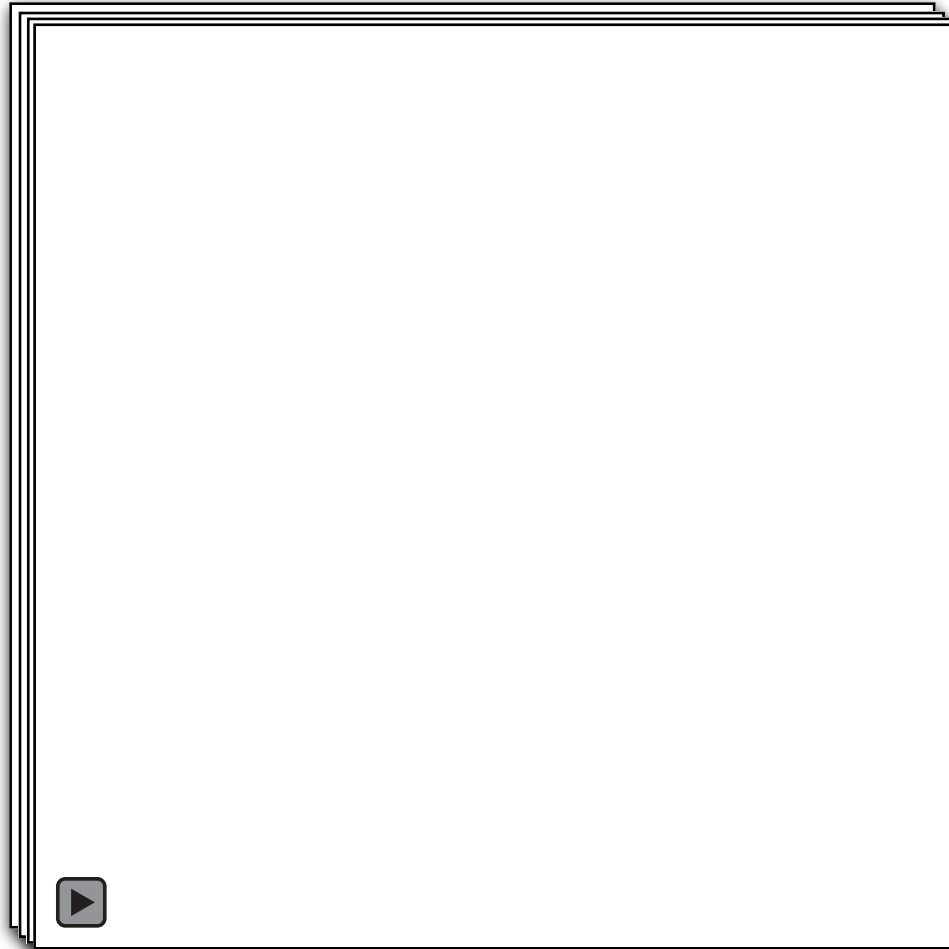
Cathéter Diag. JR2,5F



Stratégie de préparation de



PREPARATION PAR LITHOTRIPSIE

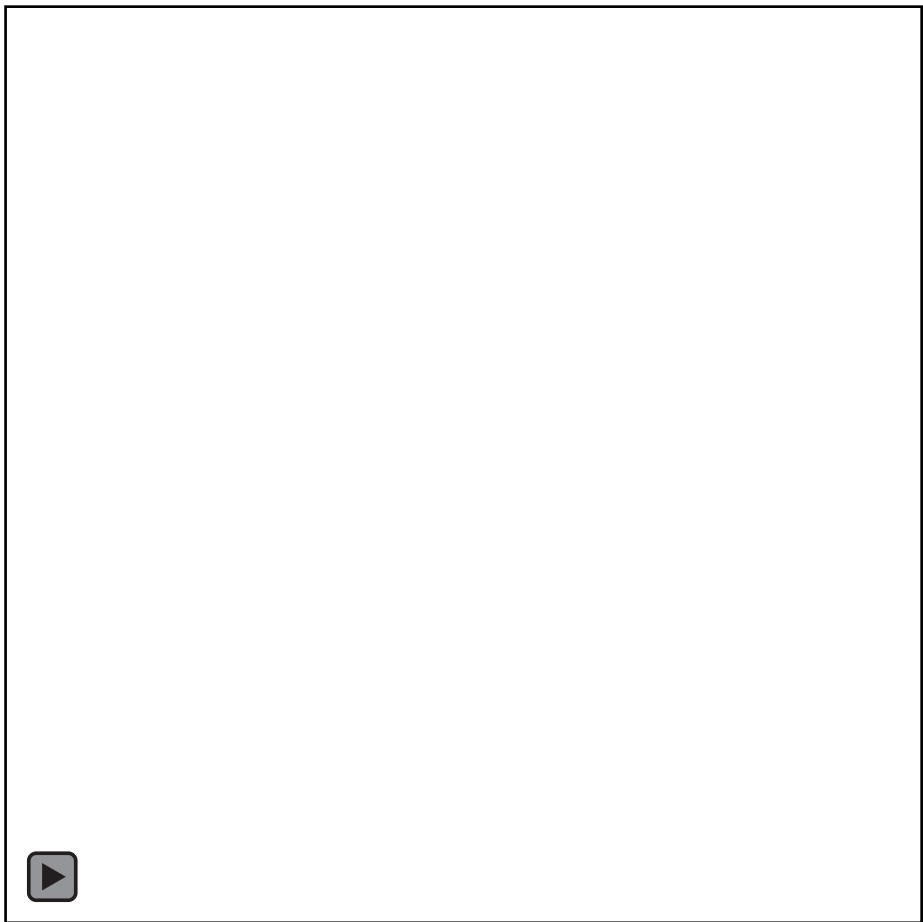
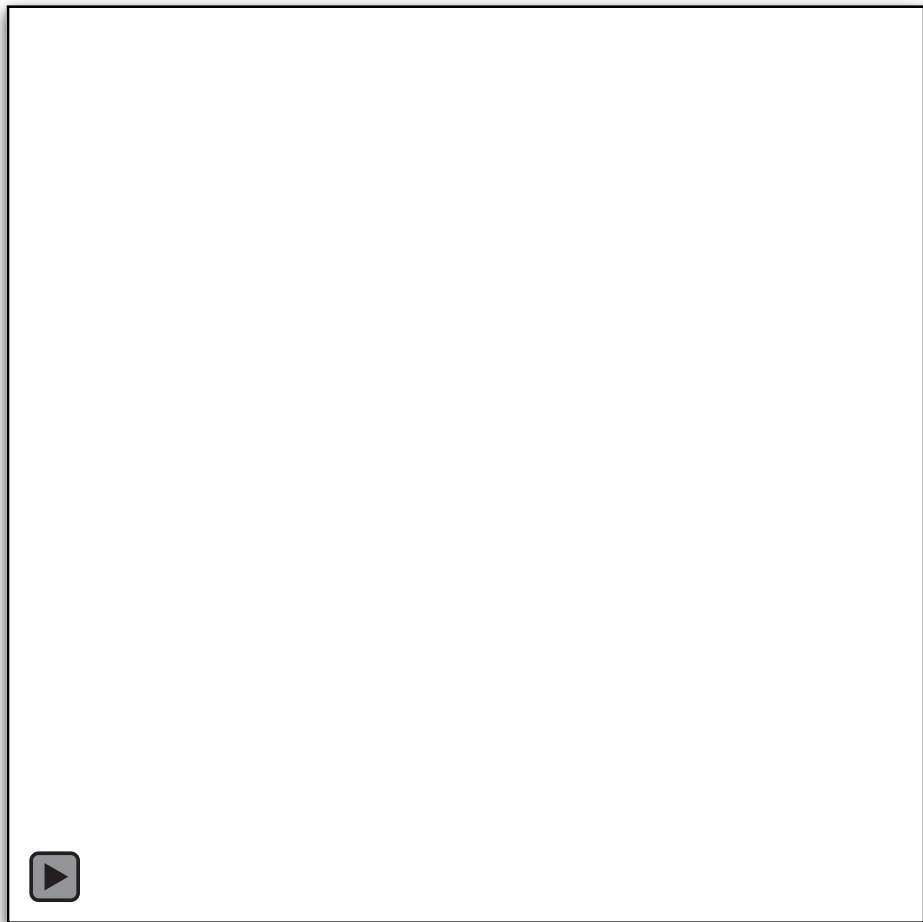


**Parfaite Tolérance
hémodynamique
pendant l'inflation**

**Shockwave Intravascular Lithotripsy System
Ballon 3.0/12 mm**



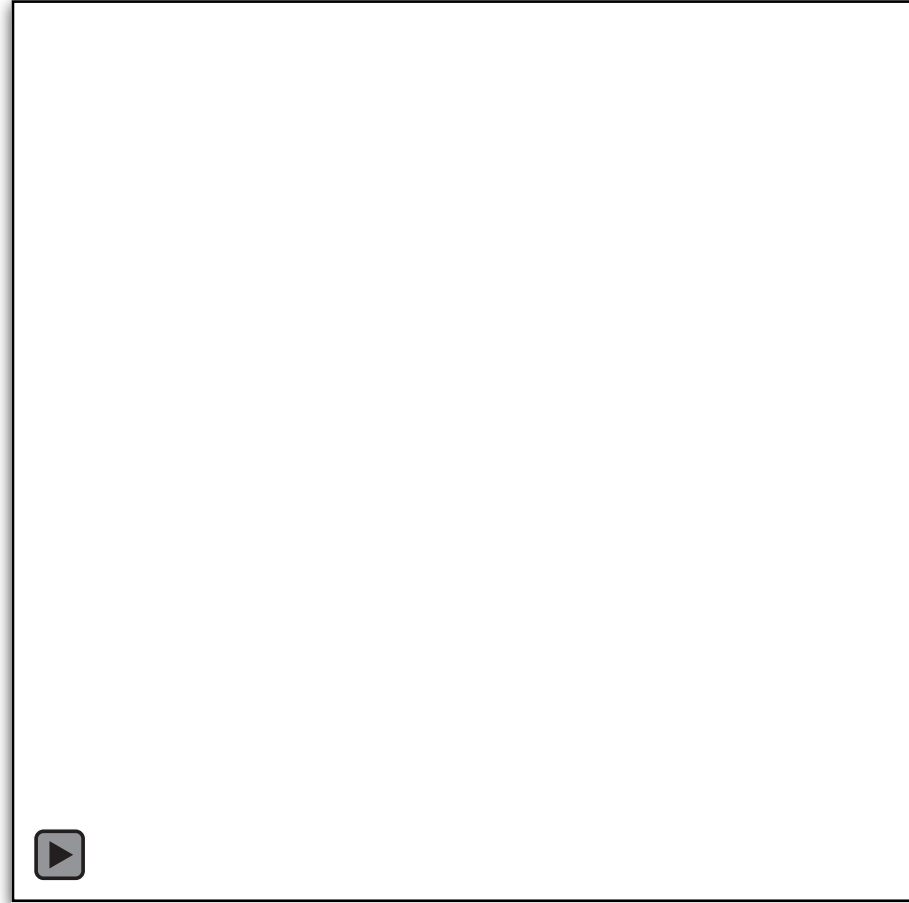
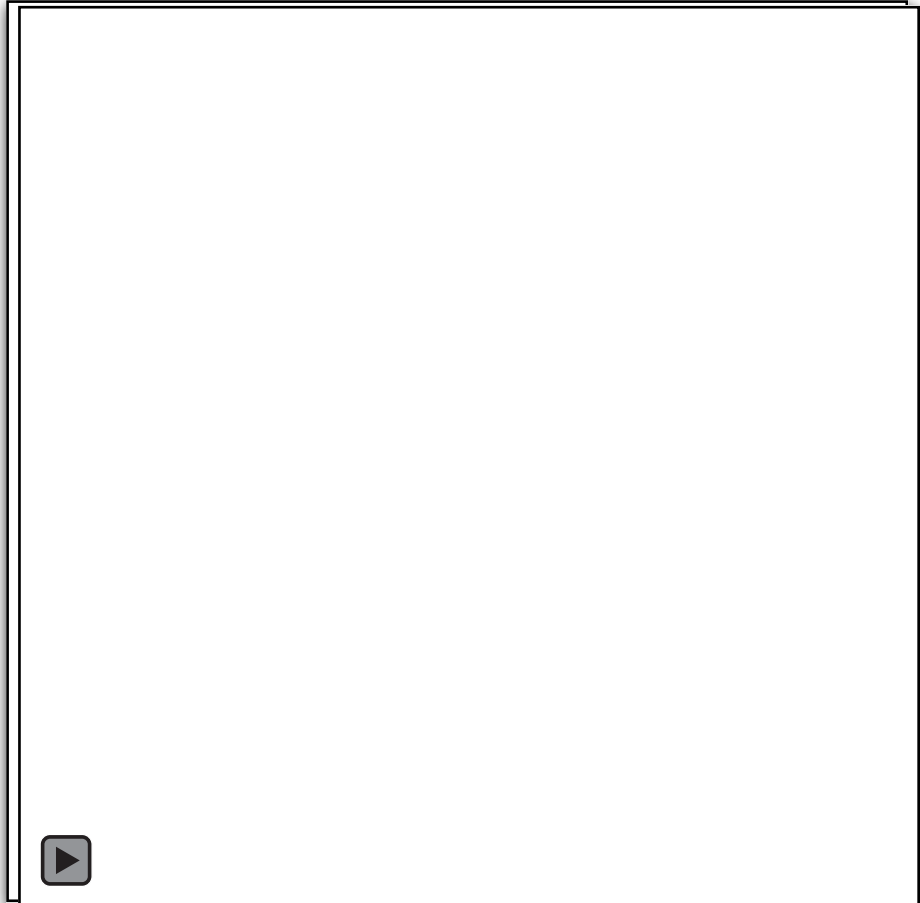
PRE-DILATATION ET RESULTAT INTERMADIAIRE



Ballon non-compliant Accuforce 3.5/8mm
Inflation à 18 atm

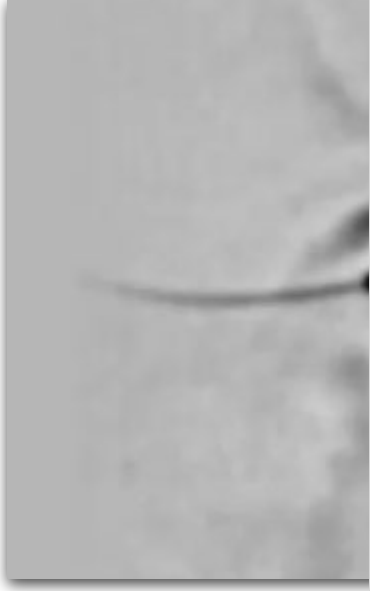


IMPLANTATION DU STENT

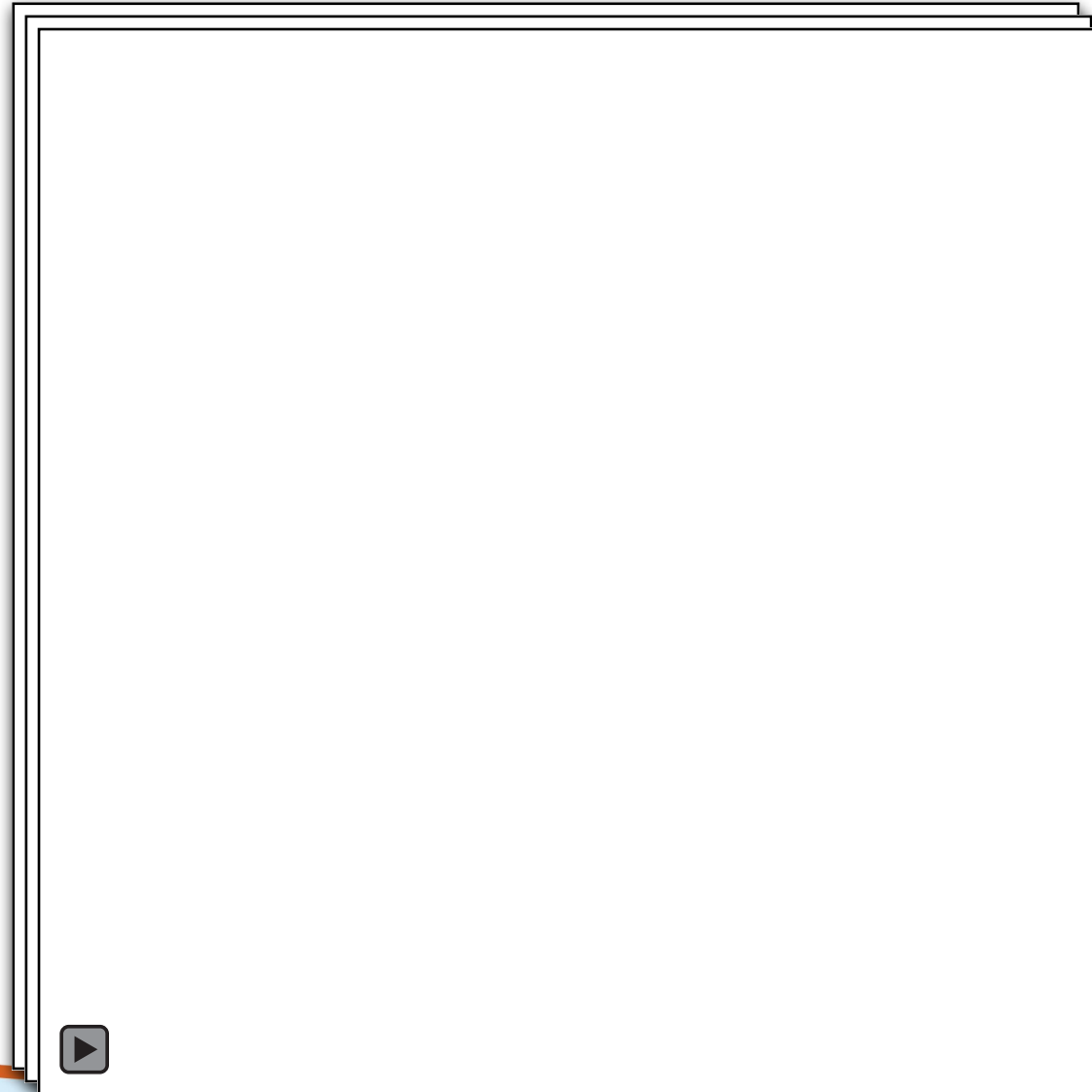


Stent actif Xience Sierra 4.0/8mm
Inflation à 18 atm





RESULTAT FINAL



oles

43pg/mL

dans les suites



CONCLUSION

E

Terrain fragile
Tares multiples
Risque hémorragique

C



S

ntes cardiaques
ciées (Valves...)

S

