PESTO

European Heart Journal (2016) **37**, 1208–1216
doi:10.1093/eurheartj/ehw711

CLINICAL RESEARCH
Acute coronary syndromes

Mechanisms of stent thrombosis analysed by optical coherence tomography: insights from the national PESTO French registry

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Conflits d'intérêts

Consultant : Abbott, Terumo, Medtronic

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ACS with ST+ coronarography in acute phase (<12h) due to stent thrombosis
(all types of stents, acute; subacute; late and very late)

Optimal thrombectomy
(mechanical and/or médics : thrombo-aspiration, anti GpIIb-IIIa...)

TIMI 3 flow obtained
Consent patient
OCT faisable

If NO at of 3 items :
No enrollment OCT, registry

Note diagnose hypothesis and management before OCT
Immediate OCT or defered (MIMI, D1-D7) decided by the operator
Treatment guided by OCT

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N=229 patients with suspected ST

↓

N=134 patients screened for inclusion

Deferred OCT analysis in 70% of the cases

↓

→ ***N=2 pre-procedural cardiac arrest***
N=3 procedures with no OCT (inability to perform OCT)
N=3 absence of consent
N=3 absence of definite stent thrombosis

N=123 patients included

Core lab analysis :
3 independent reviewers, unaware of baseline characteristcs

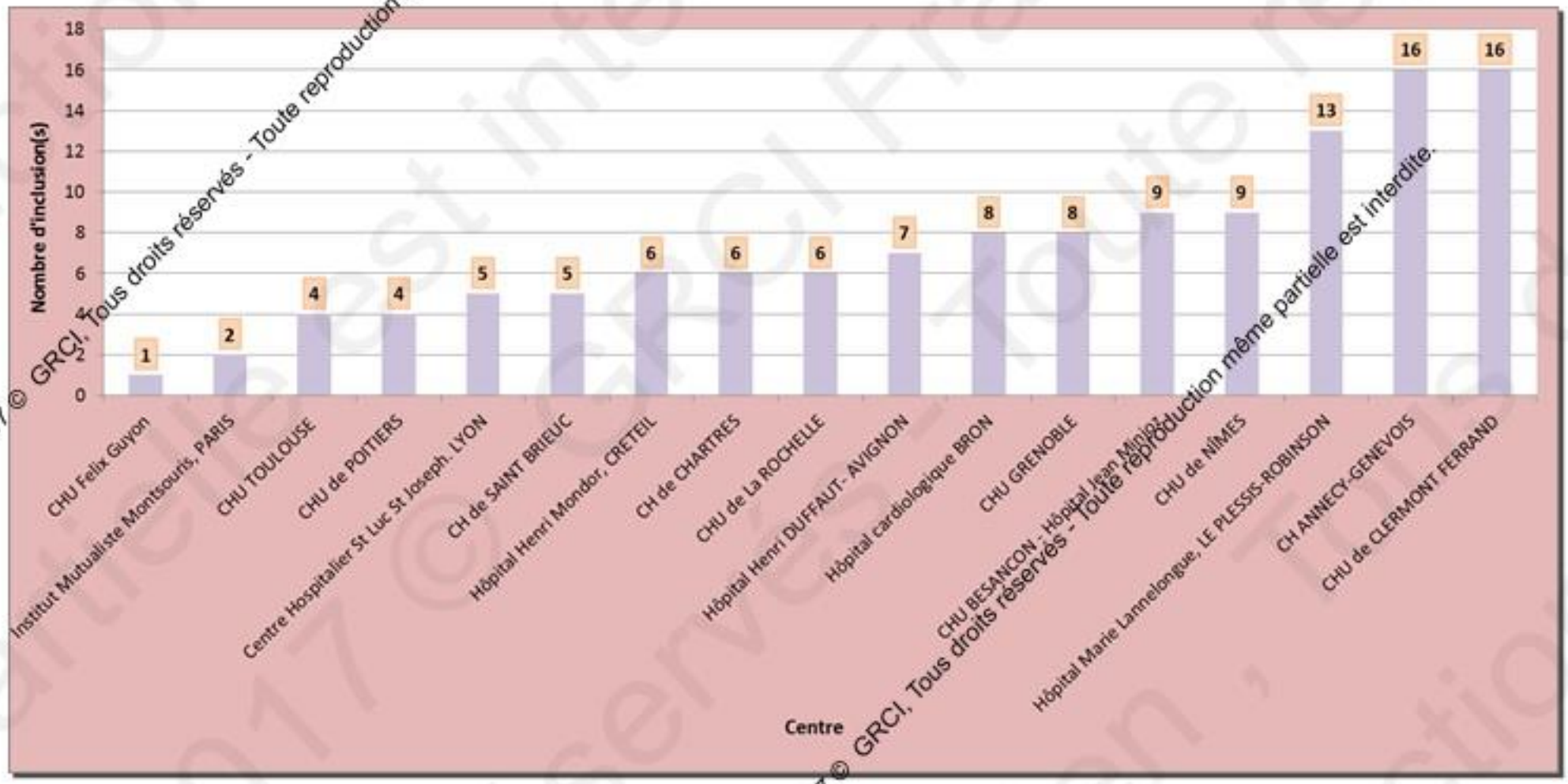
↓

→ ***N=3 patients excluded for inadequate OCT quality***

N=120 patients included in final analysis

PEST

Thanks to all the centers:



Caractéristiques population

Age (years)	61.6 ± 1.1
Male gender (%)	89
Previous STEMI (%)	68
Active smoking (%)	35
Dyslipidemia (%)	86
Hypertension (%)	56
Diabetes (%)	28
Recent (<15 d) modification of antiplatelet therapy (%)	22
Presentation mode:	
STEMI (%)	82
NSTEMI (%)	17
Unstable Angina (%)	1

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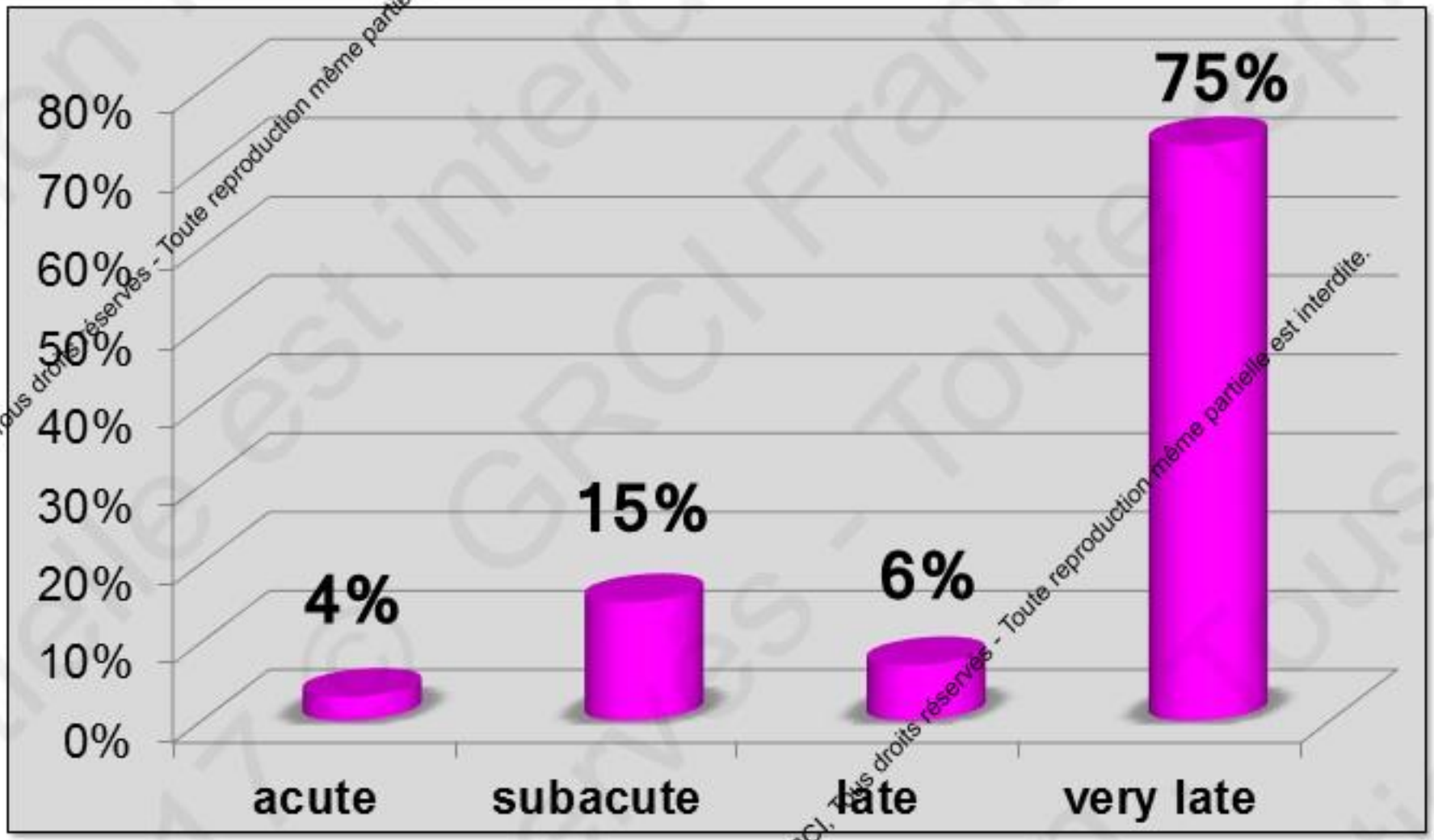
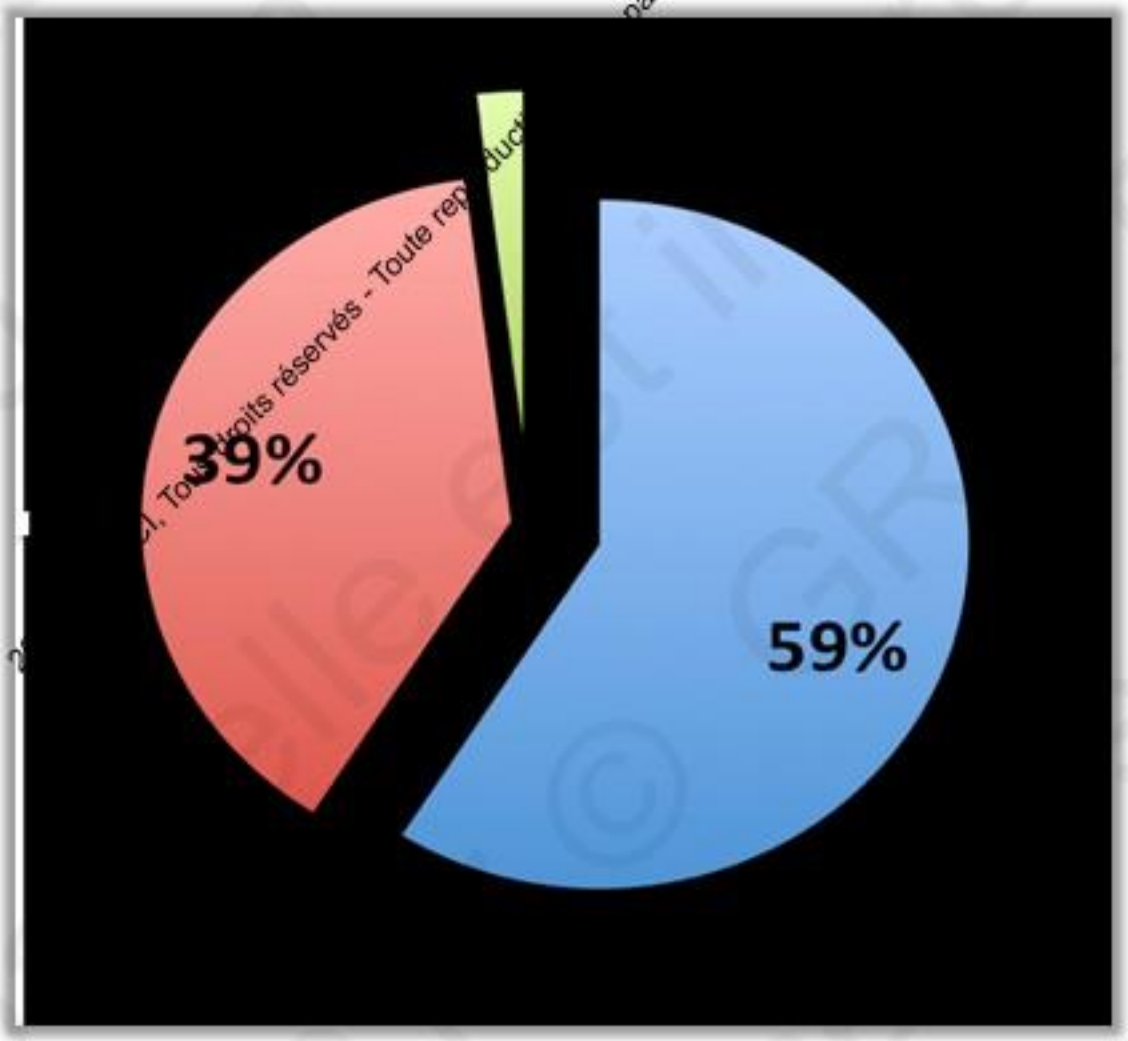
Type de thrombose

Analyse 120 patients



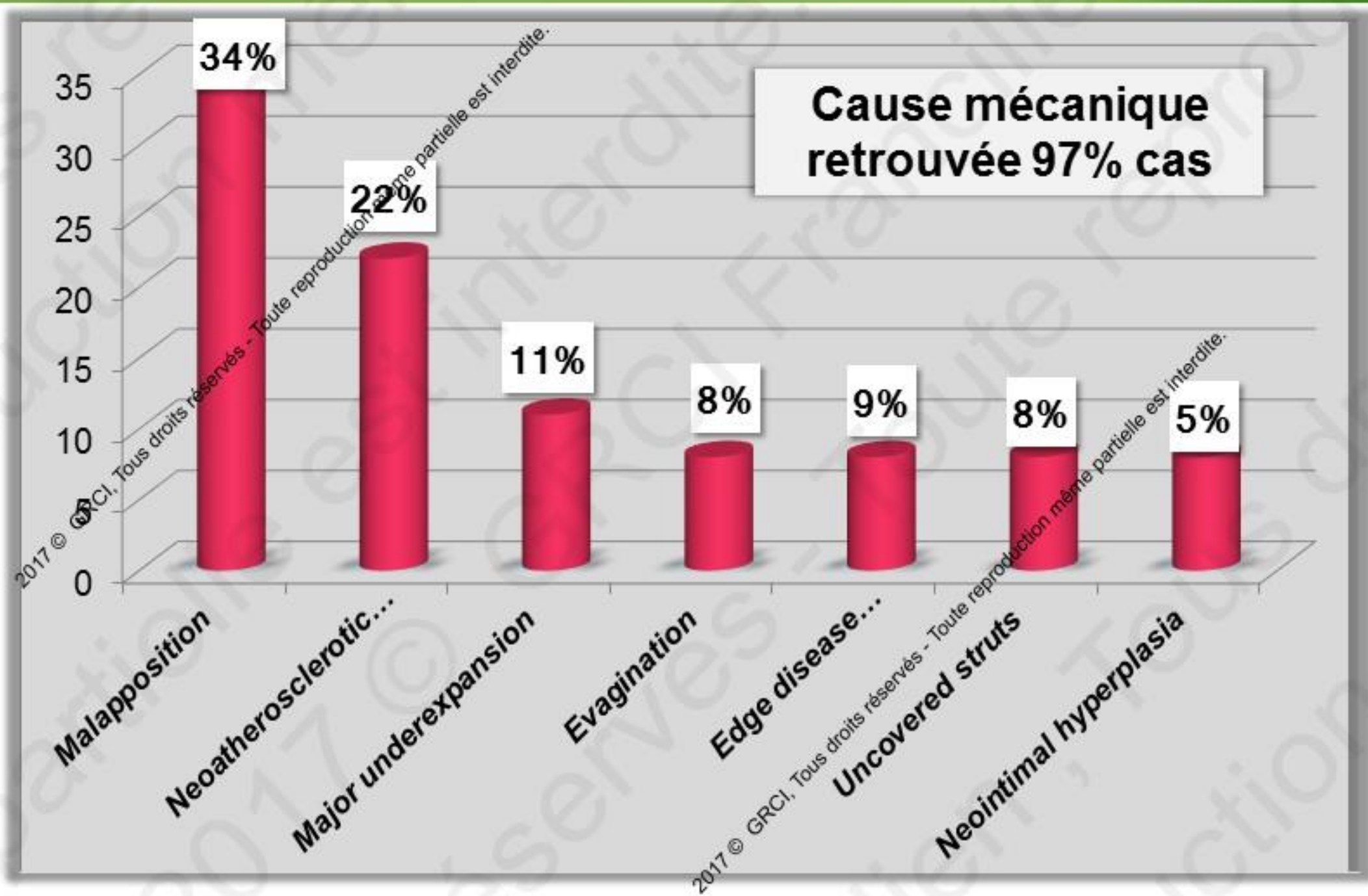
Délai moyen 4,3 ans

Type de stent



- Drug Eluting stent
- Bare Metal stent
- Bioresorbable Vascular Scaffold

Causes de Thrombose



Mécanisme de thrombose/ présentation

	Global (n=120)	Acute+ Subacute ST (n=23)	Late+ Very Late ST (n=97)	p
Malapposition (%)	34.2	47.8	30.9	0.12
Ruptured Neoatherosclerosis (%)	22.5	0	27.8	0.004
Underexpansion (%)	10.8	26.1	7.2	0.02
Coronary Evagination (%)	8.3	0	10.3	0.11
Edge related disease progression (%)	9	4.3	8.2	0.45
Isolated uncovered struts (%)	8.3	0	10.3	0.11
Neointimal hyperplasia (%)	5	0	5.2	0.34
Edge dissection (%)	1	4.3	0	0.19
No cause identified (%)	4	13	1	0.02

Mécanisme de thrombose/stent

	BMS (n=47)	DES (n=71)	p
Acute + Subacute ST (%)	19.1	18.3	0.91
Late + Very Late ST (%)	80.9	81.7	0.91
Index PCI to ST delay (y)	6.5±0.9	3.1±0.4	<0.001
Malapposition (%)	31.9	35.2	0.71
Ruptured Neoatherosclerosis (%)	36.2	14.1	0.005
Underexpansion (%)	6.4	12.7	0.22
Coronary Evagination (%)	2.1	12.7	0.04
Edge related disease progression (%)	12.8	4.2	0.09
Isolated uncovered struts (%)	4.3	11.3	0.16
Neointimal hyperplasia (%)	4.3	4.2	1.0
Edge dissection (%)	0	1.4	0.61
No cause identified (%)	0	5.6	0.13

Mécanisme de thrombose/stent

	BMS (n=47)	DES (n=71)	p
Acute + Subacute ST (%)	19.1	18.3	0.91
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Neointimal hyperplasia (%)	4.3	4.2	1.0
Edge dissection (%)	0	1.4	0.61
No cause identified (%)	0	5.6	0.13

Est-ce que l'OCT change la stratégie de prise en charge?

Décision Thérapeutique

Clinical Presentation, Management, and Outcomes of Angiographically Documented Early, Late, and Very Late Stent Thrombosis

7049 stents thrombosis (2009-2010)
19% early ST, 61% very late ST
No endocoronary imaging

	Early ST	Late ST	Very Late ST
POBA	48.8	44.1	30.1
New DES placed	26.9	35.2	47
New BMS placed	24.3	20.7	22.9

Amstrong EJ. JACC Interv. 2012

Décision Thérapeutique

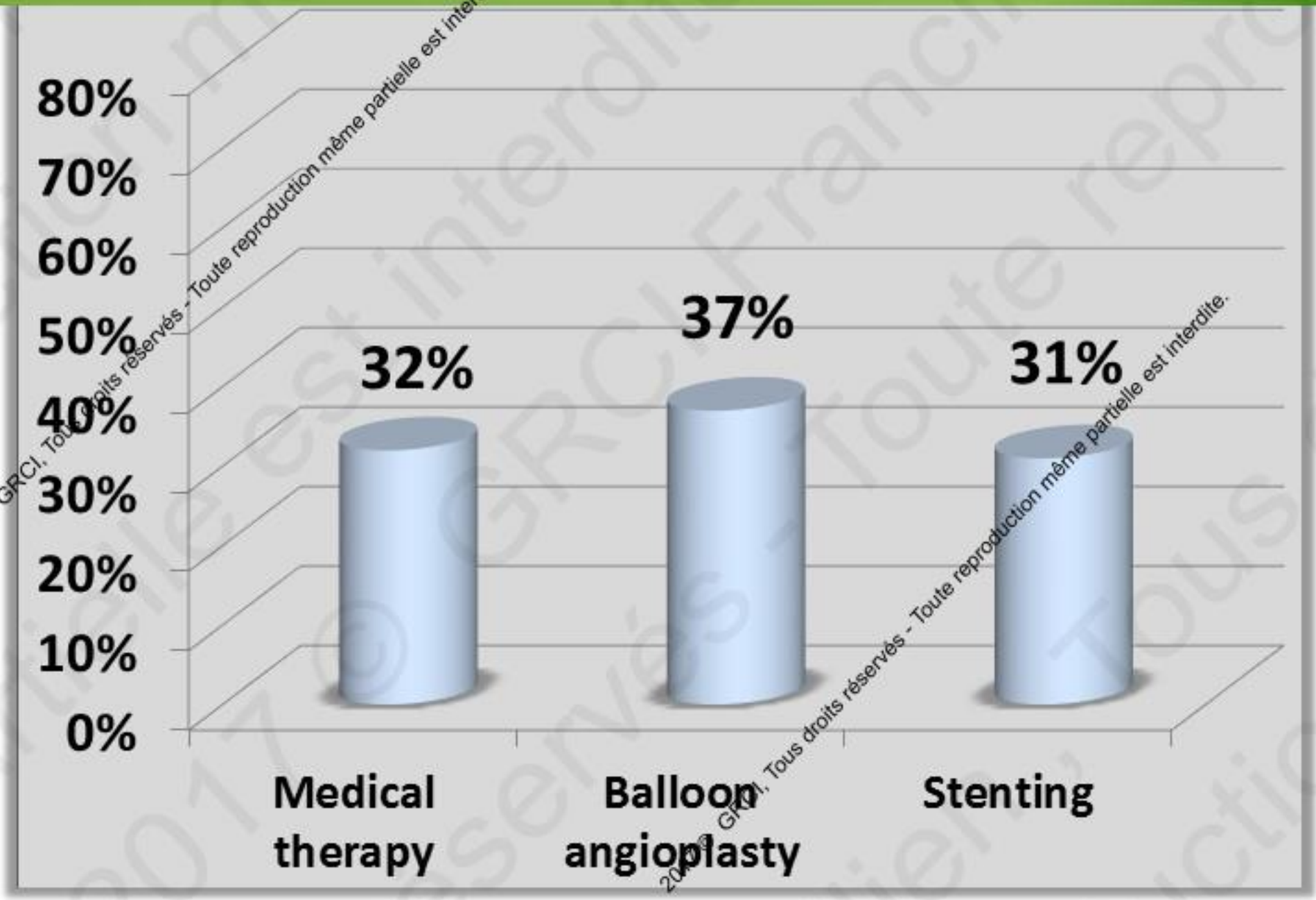
Angiographic cause of stent thrombosis	
Undetermined	42%
Probable	36%
Certain	12%

In 55% of the cases, the operators reported that OCT influenced the management strategy

Recommendations for the clinical value of intracoronary diagnostic techniques

Recommendations	Class[a]	Level[b]	Ref.[c]
FFR to identify haemodynamically relevant coronary lesion(s) in stable patients when evidence of ischaemia is not available.	I	A	50,51,713
FFR-guided PCI in patients with multivessel disease.	IIa	B	54
IVUS in selected patients to optimize stent implantation.	IIa	B	702,703,706
IVUS to assess severity and optimize treatment of unprotected left main lesions.	IIa	B	705
IVUS or OCT to assess mechanisms of stent failure.	IIa	C	
OCT in selected patients to optimize stent implantation.	IIb	C	

Décision Thérapeutique



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Y-a-t il une différence dans les mécanismes de thromboses de stent actifs de 1ère et 2ème génération ?

International Journal of Cardiology 227 (2017) 161–165

Contents lists available at ScienceDirect

International Journal of Cardiology

journal homepage: www.elsevier.com/locate/ijcard

Mechanical abnormalities associated with first- and second-generation drug-eluting stent thrombosis analyzed by optical coherence tomography in the national PESTO French registry

Nicolas Amabile [a,*], Charlotte Trouillet [b], Nicolas Meneveau [c], Claire Marie Tissot [d], Loic Belle [e], Nicolas Combaret [f], Grégoire Range [g], Michel Pansieri [h], Regis Delaunay [i], Sébastien Levesque [j], Thibault Lhermusier [k], François Derimay [l], Pascal Motreff [f], Christophe Caussin [a], Géraud Souteyrand [f]

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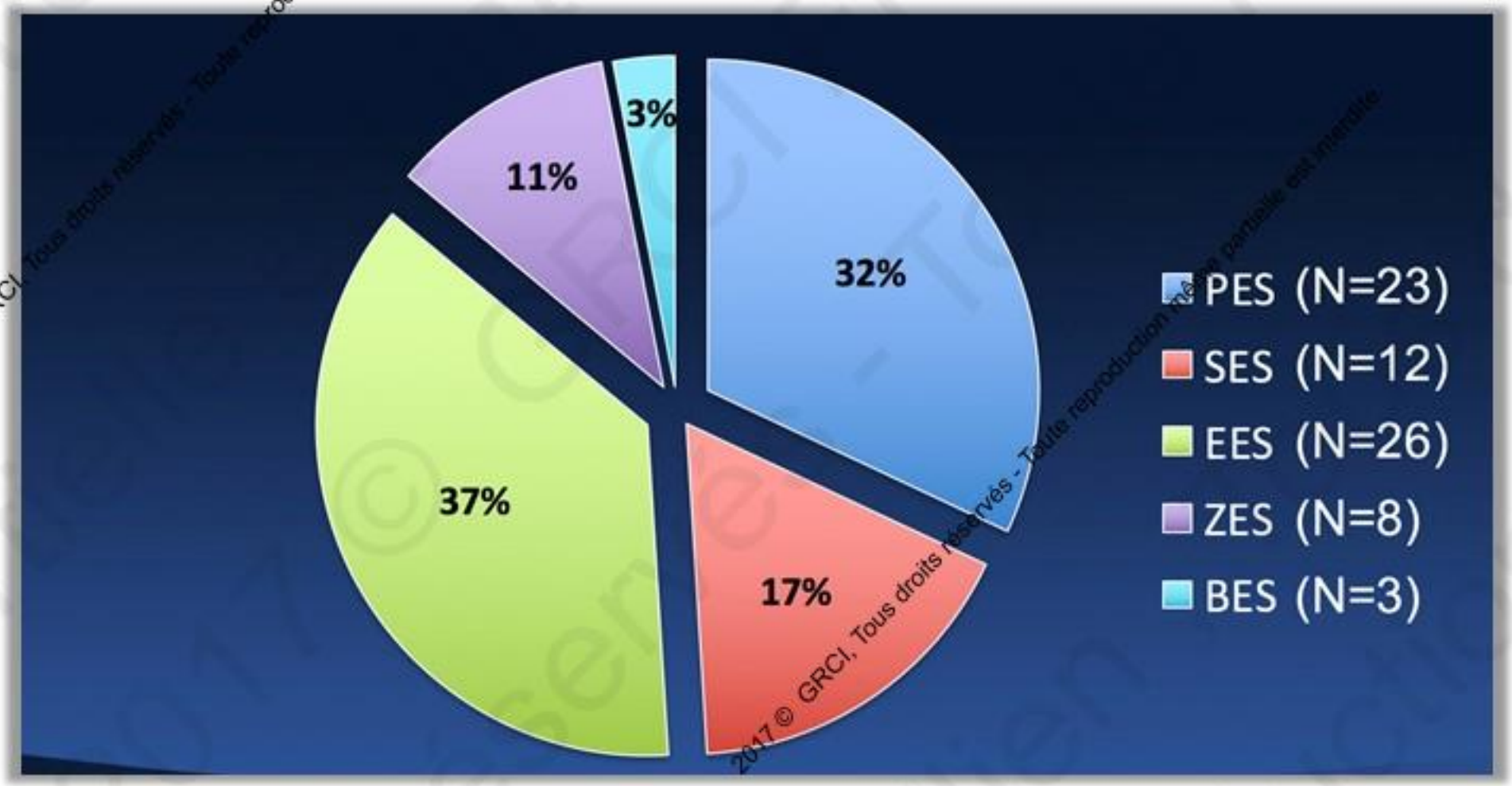
Resultats

N=71 patients avec thrombose de stents actifs dans l'analyse finale



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	DES 1G (n=35)	DES 2G (n=34)	p
Acute + Subacute ST (%)	6	29	0.009
Late + Very Late ST (%)	94	71	0.009
Index PCI to ST delay (y)	3.8 (2.6-6.5)	1.1 (0.04-2.3)	<0.001
Malapposition (%)	26	35	0.39
Ruptured Neoatherosclerosis (%)	26	3	0.008
Underexpansion (%)	6	21	0.07
Coronary Evagination (%)	17	9	0.25
Edge related disease progression (%)	3	6	0.49
Isolated uncovered struts (%)	6	17	0.14
Neointimal hyperplasia (%)	0	12	0.05
Edge dissection (%)	0	3	0.51
No cause identified (%)	0	9	0.11

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Patients presenting with LST+VLST (n=57)

	DES 1G (n=33)	DES 2G (n=24)	p
Index PCI to ST delay (y)	4.1 (2.8-6.7)	1.8 (1.1-2.9)	<0.001
Malapposition (%)	24	38	0.28
Ruptured Neoatherosclerosis (%)	27	4	0.02
Underexpansion (%)	6	13	0.35
Coronary Evagination (%)	18	13	0.42
Edge related disease progression (%)	3	8	0.38
Isolated uncovered struts (%)	8	18	0.25
Neointimal hyperplasia (%)	0	17	0.03
Edge dissection (%)	0	0	1.0
No cause identified (%)	0	0	1.0

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- In this prospective registry, DES thrombosis mainly occurred ≥ 1 year after initial procedure and involved 1st and 2nd generation DES.

- Ruptured neoatherosclerosis was more frequent in DES 1g than in DES 2g group, but this observation might be related to the longer delay between initial PCI and ST in paclitaxel- or sirolimus-eluting stents patients compared to the others.

Régime antiagrégant plaquettaire et PESTO

Advance Publication by-J-STAGE

Circ J
doi:10.1253/circj.CJ-17-0181

ORIGINAL ARTICLE
Imaging

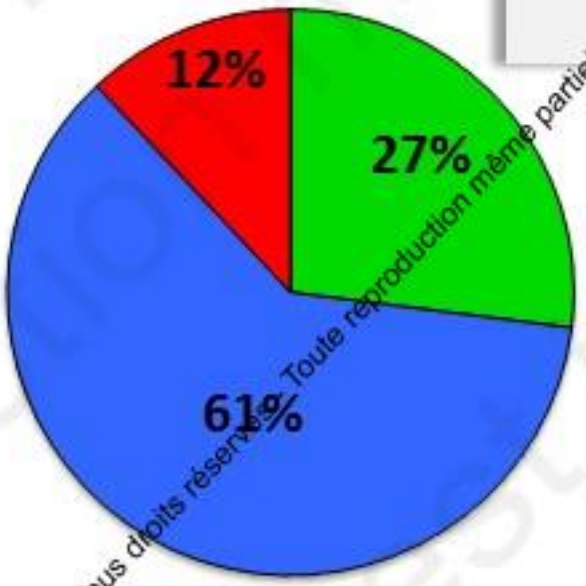
Antiplatelet Drug Regimen in Patients With Stent Thrombosis

— Insights From the PESTO French Optical Coherence Tomography Registry —

Nicolas Amabile, MD, PhD; Guillaume Cayla, MD, PhD; Pascal Motreff, MD, PhD; Charlotte Trouillet, MD; Grégoire Range, MD; Olivier Dubreuil, MD; Estelle Vautrin, MD; François Derimay, MD; Lionel Mangin, MD; Nicolas Meneveau, MD, PhD; Christophe Caussin, MD; Géraud Souteyrand, MD

PESTO

Traitement antiagrégant plaquettaire au moment de la thrombose



- Double Antiplatelet Therapy (n=30)
- Single Antiplatelet therapy (n=74)
- No Antiplatelet Therapy (n=16)

Un récent (<15 jours) changement dans AAP notée chez 22% des patients

	DAPT	SAPT	No APT	p
Recent change in APT regimen, n (%)	1 (3)	16 (22)	9 (56)	<0.001
Reasons for APT modification:				
Discontinuation, n (%)	30 (100)	28 (38)	2 (13)	0.29
Interruption, n (%)	0	28 (38)	2 (13)	0.12
Disruption, n (%)	0	18 (24)	12 (74)	0.03

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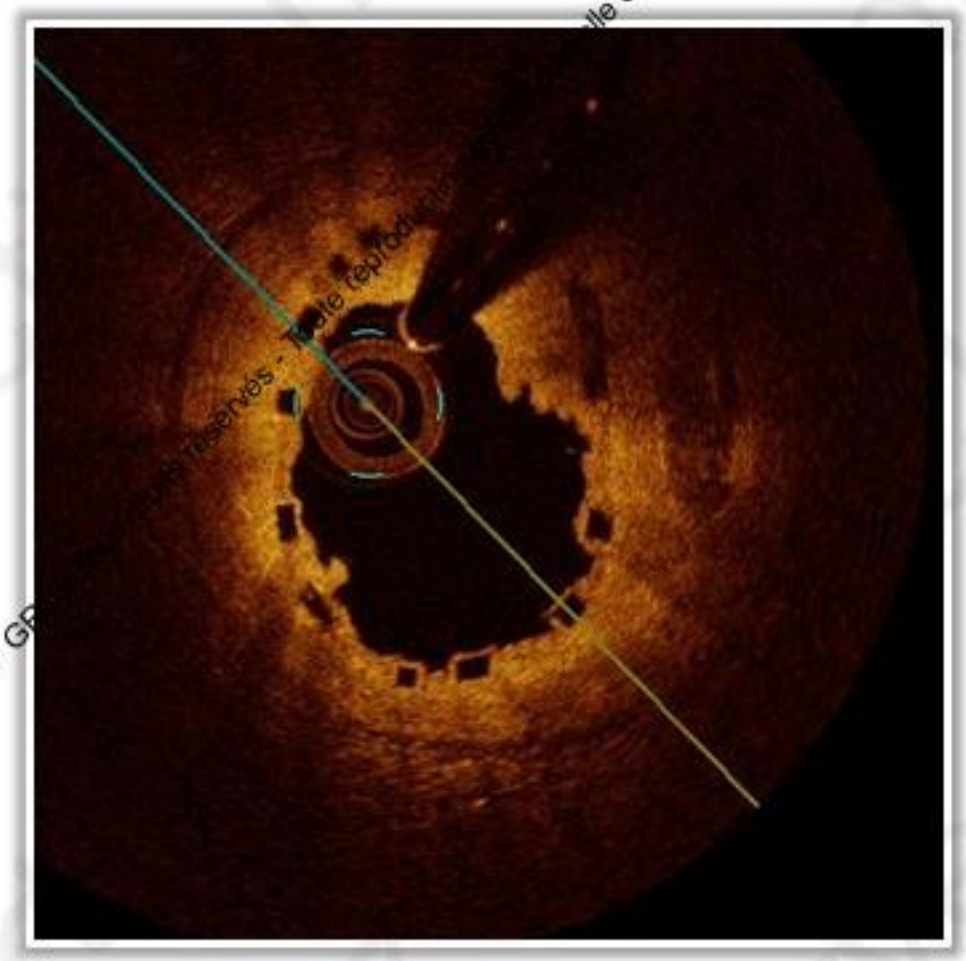
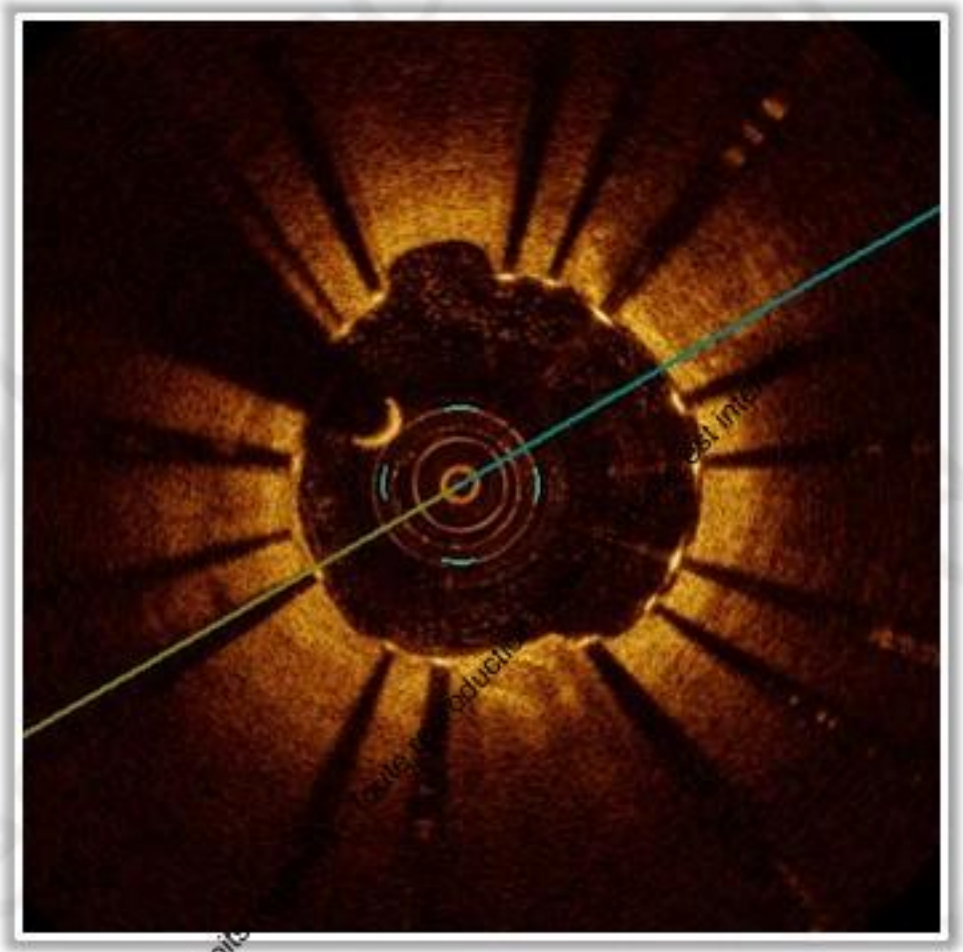
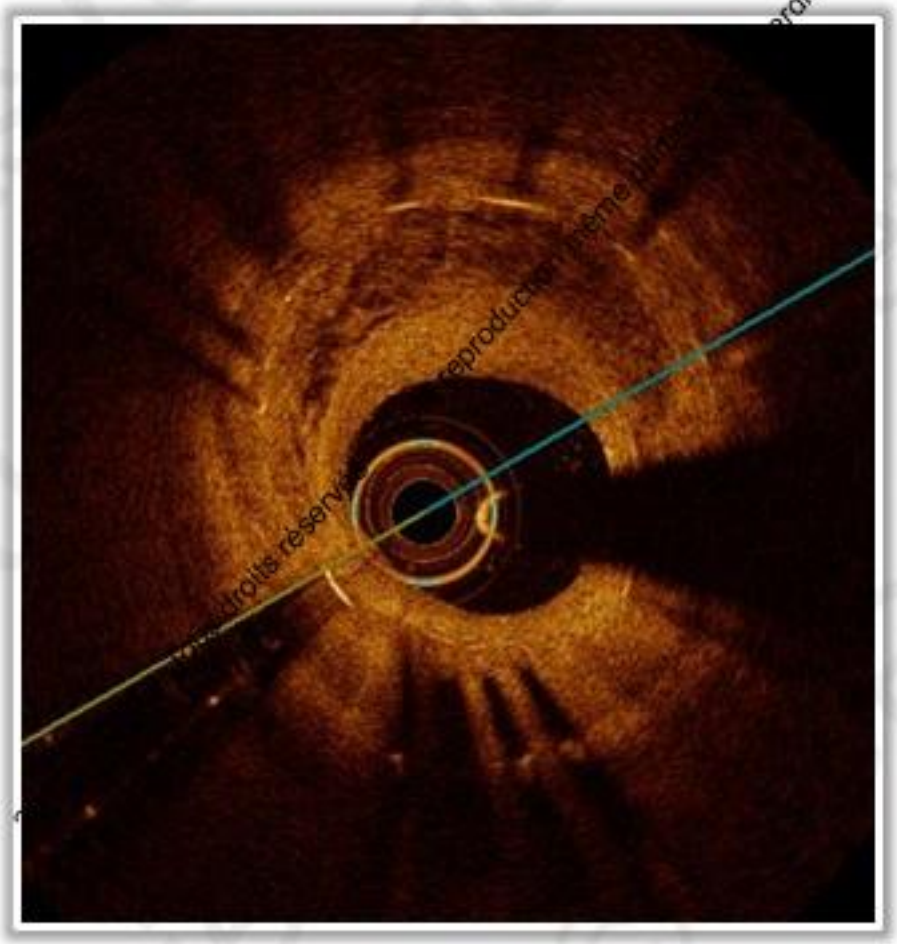


BVS sous expansion

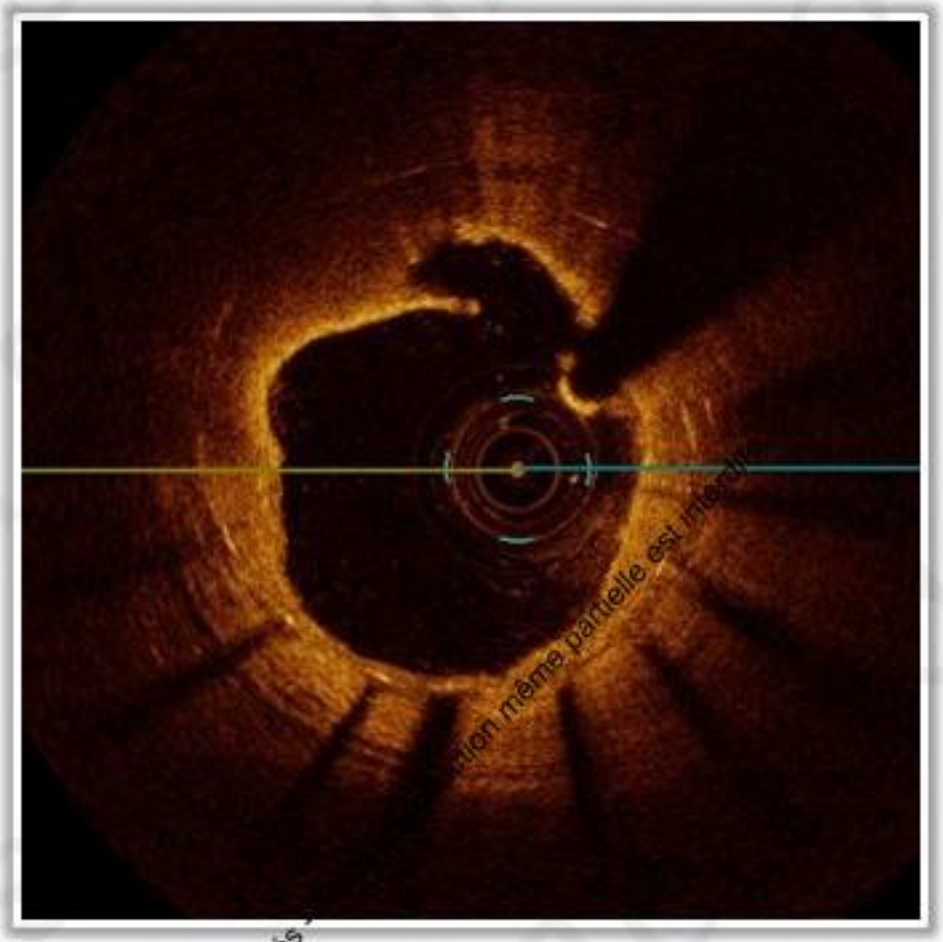


Struts non couvertes

PESTO

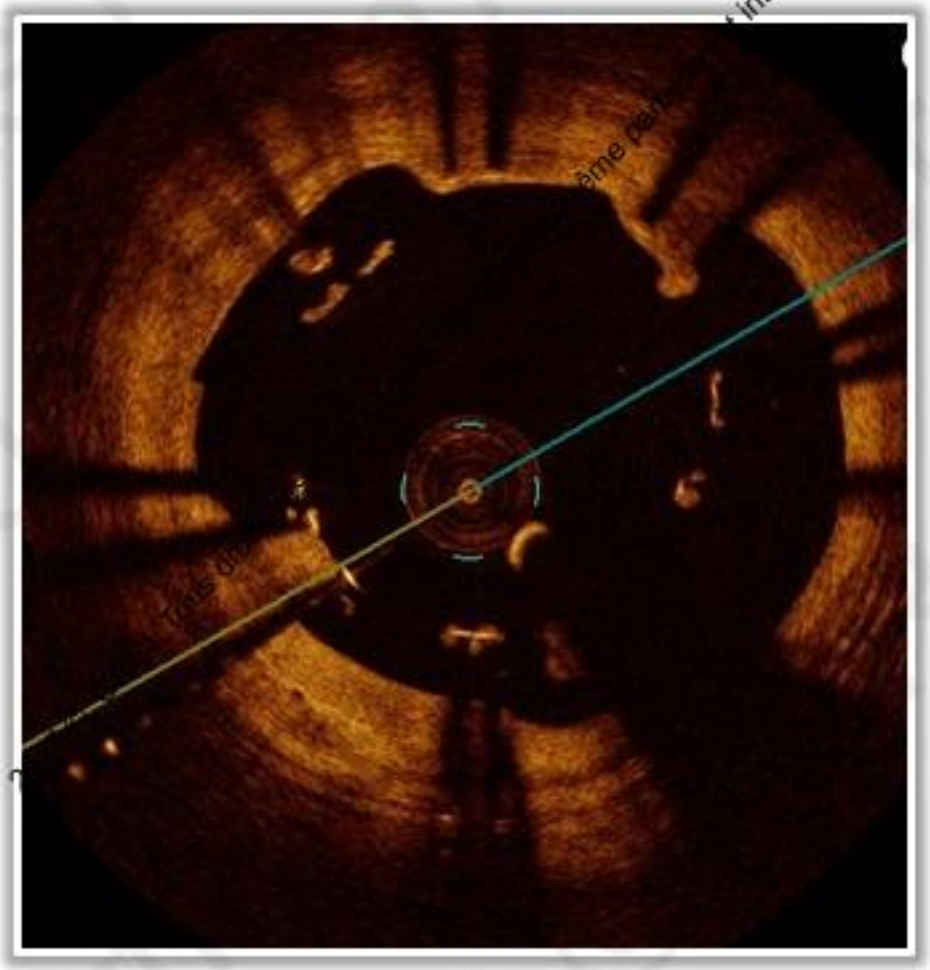


Resténose avec présence de néoathérosclérose

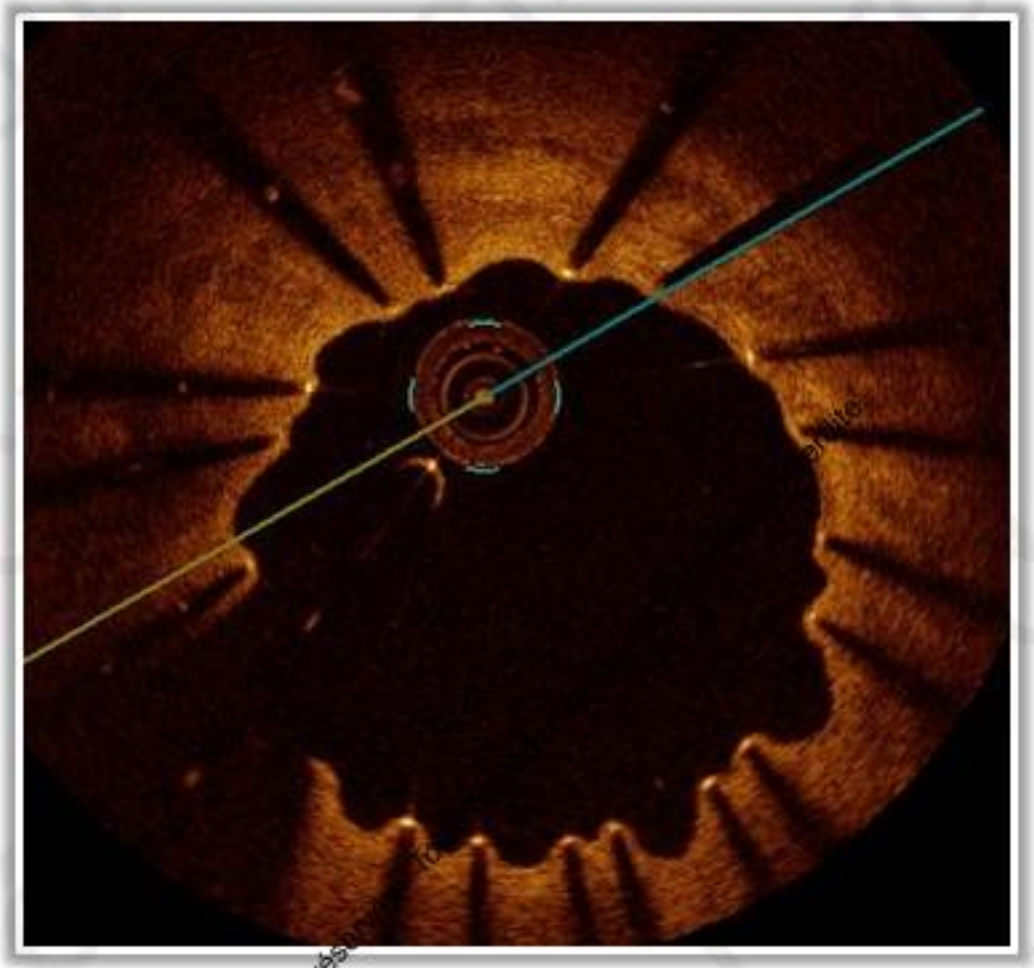


Rupture de plaque avec néoathérosclérose

PESTO

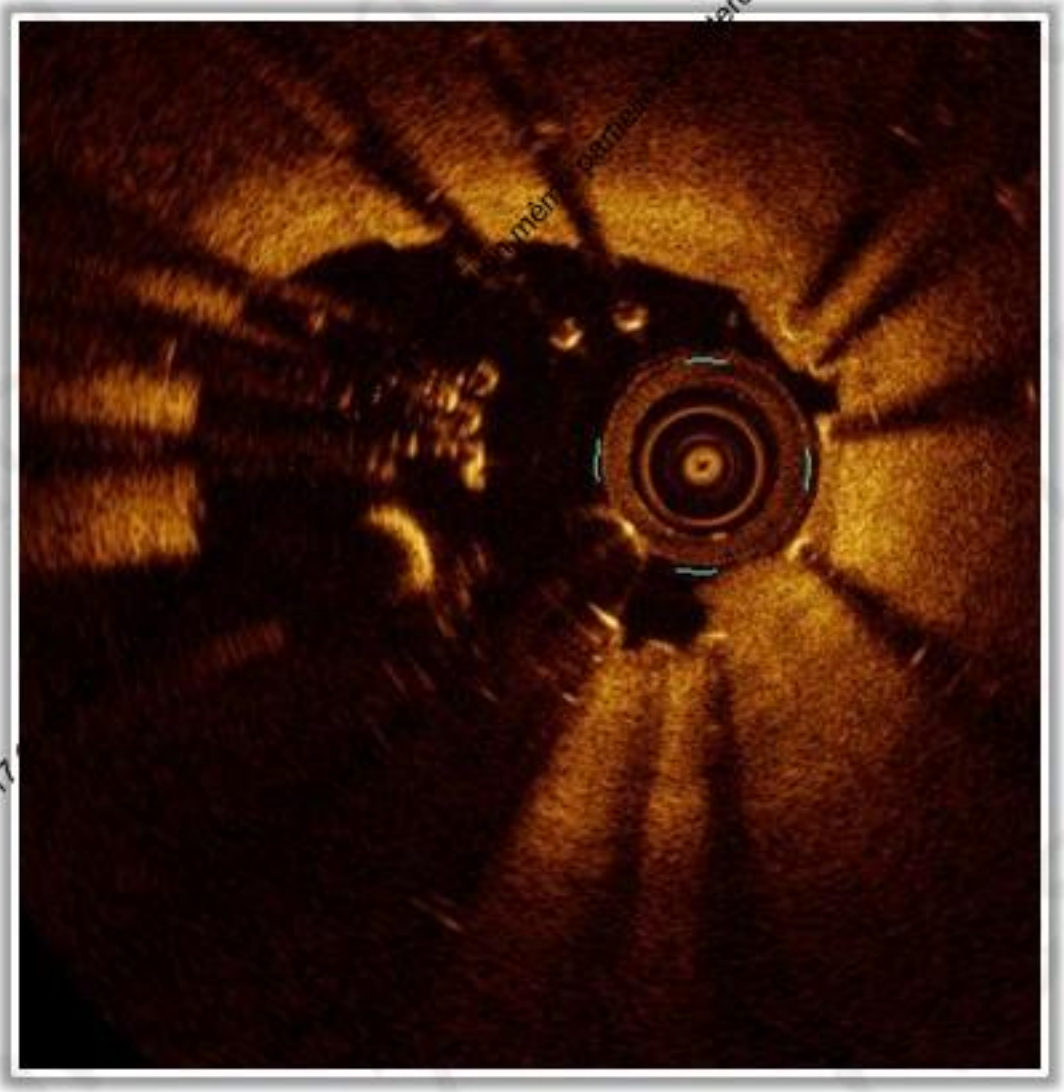


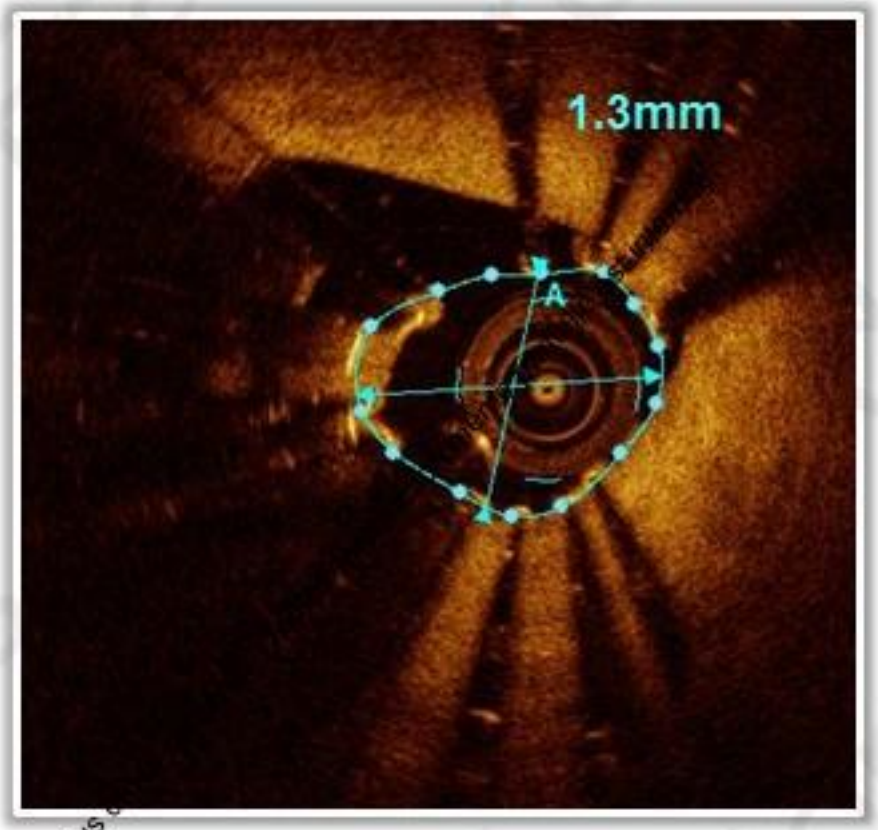
Malapposition



Struts non couvertes et évagination

PESTO





Sous-expansion stent actif.
… à J15!

LIMITES

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Pas de test systématique sur résistance aux antiagrégants plaquettaires

Certains patients présentant une thrombose de stent n'ont pu être inclus dans étude (absence de restauration TIMI 3, angioplastie au ballon..)

Limites de l'OCT : lésions distales, fibre OCT ne franchissant pas

CONCLUSION

PESTO

Coronarographie pas suffisante pour diagnostic thrombose de stent

Mécanismes multifactoriels

OCT aide pour diagnostic et prise en charge

Néoathérosclérose nouvelle cause thrombose de stent

Dans l'étude PESTO un traitement médical seul était adapté dans 1/3 des cas

CONCLUSION

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Characteristics of stent thrombosis in bifurcation lesions analyzed by optical coherence tomography

EuroIntervention

PESTO :

- **1 papier princeps (EHJ)**
- **3 présentations orales congrès (TCT/euroPCR/ESC)**
- **3 papiers sur études ancillaires**

FrOG

French Optical coronary imaging Group