



1·2·3 FÉVRIER 2023

MARSEILLE·PALAIS DU PHARO



# Thrombose Aigue de stent

**Géraud SOUTEYRAND**  
**CHU Clermont-Ferrand**

# Conflits intérêts



**Consultant : Medtronic, B Braun, Terumo,  
Edwards, Abbott**

# Thrombose aiguë de stent

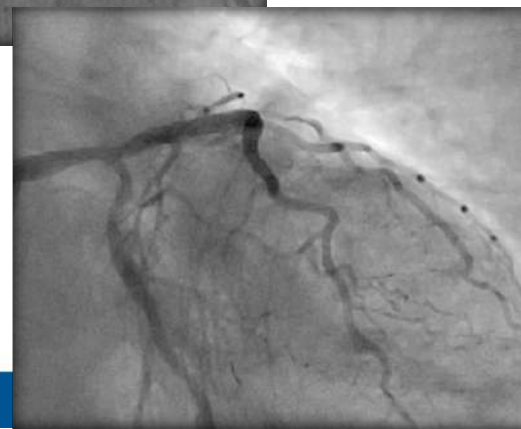
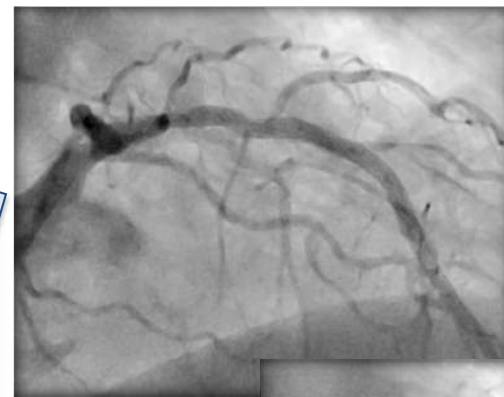
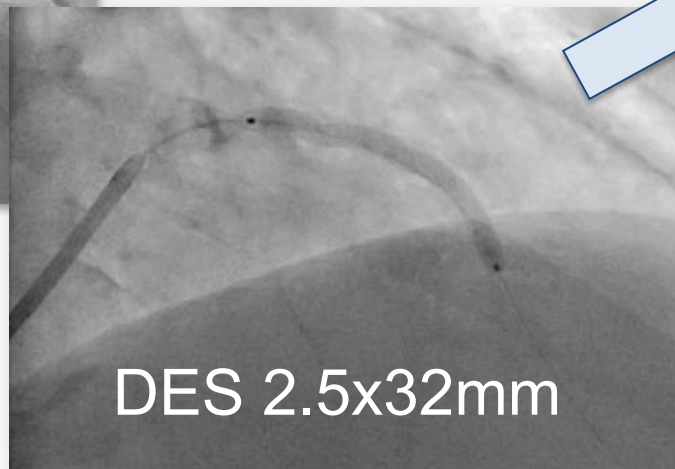
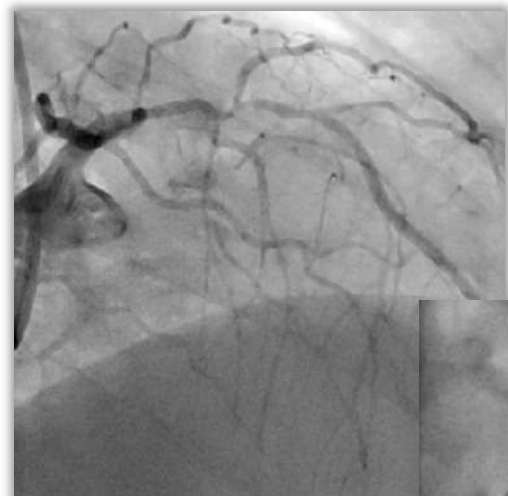
**Ça existe toujours  
en 2023 ?**

**Comment les traiter**

**Peut on les  
diminuer?**

**Me E. 67 ans**

**Diabétique  
Angor d'effort  
Echographie de stress +++**



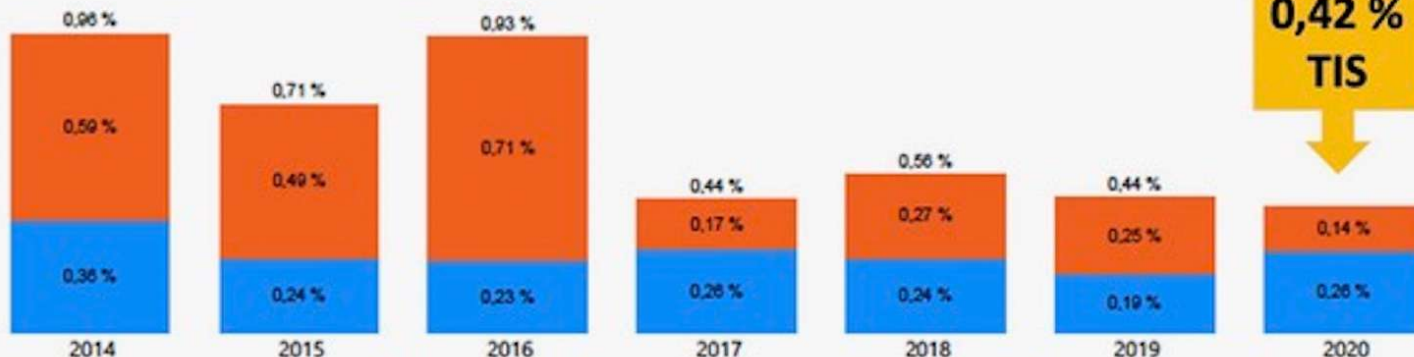
# Thrombose aiguë de stent

## Thrombose de stent



54 576 angioplasties

- à 1 an (en baisse)
- Hospitalières (stable)



# Suivi à long terme thrombose de stent

## The OCVC Long ST registry: Long-Term Outcomes after Stent Thrombosis

<b>10-year mortality</b> <b>33.8%</b>	Independent predictors of mortality				<b>10-year cardiac death</b> <b>14.7%</b>
	Hemodialysis	Lesions in left main trunk (right coronary artery reference)	Lesions in left coronary artery (right coronary artery reference)	Peak creatine kinase (100 U/L increase)	
	HR 7.80	HR 8.14	HR 2.77	HR 1.017	<b>10-year nonfatal myocardial infarction</b> <b>7.3%</b>
<b>10-year major adverse cardiac event (MACE)</b> <b>41.9%</b>	Quantitative coronary angiography analysis				<b>10-year target vessel revascularization</b> <b>35.1%</b>
	<b>Post-PCI in-segment diameter stenosis at the time of stent thrombosis</b> was significantly higher in patients with than without MACE (38.6% versus 31.0%, $P=0.017$ ).				
<b>10-year target lesion revascularization (TLR)</b> <b>31.0%</b>	Intravascular imaging evaluation by intravascular ultrasound				<b>10-year recurrent stent thrombosis</b> <b>7.5%</b>
	<b>Stent underexpansion</b> was more frequently observed in patients with than without TLR before (66.7% vs 25.5%, $P=0.014$ ) and immediately after PCI (53.8% vs 22.4%, $P=0.038$ ) at the time of stent thrombosis.				

# Thrombose aiguë de stent

Timing and predictors of definite stent thrombosis in comatose survivors of out-of-hospital cardiac arrest undergoing percutaneous coronary intervention and therapeutic hypothermia (ST-OHCA study)



Inclusions 2016 à  
2021

Etude prospective

362 patients avec ACR

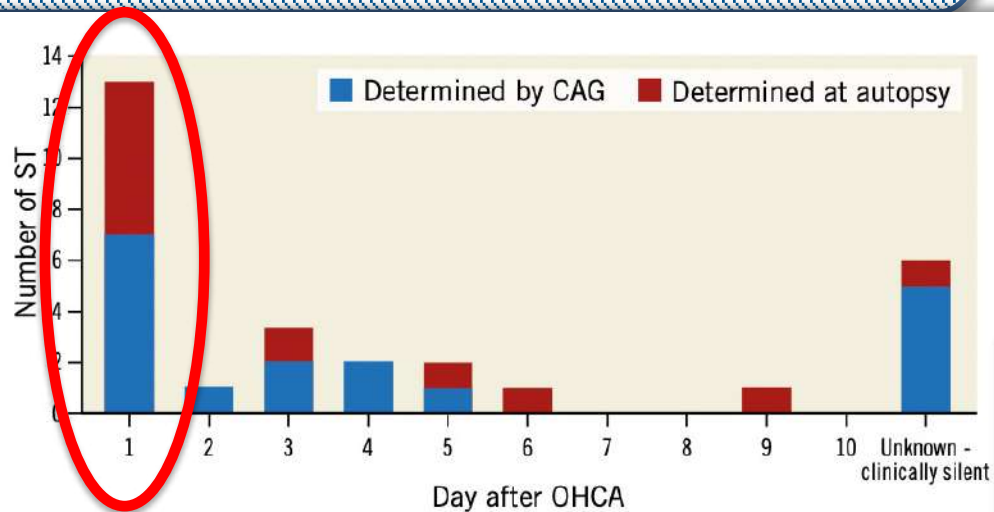
47% d'angioplastie : 169 patients

Contrôle coro si suspicion ST+ ou à J8



19.2%

# Thrombose aiguë de stent



## Signes cliniques

	All (n=29)	Confirmed by CAG (n=18)	Confirmed at autopsy (n=11)
New ECG changes	5 (17%)	3 (21%)	2 (18%)
Malignant arrhythmias	4 (14%)	4 (29%)	0
Haemodynamic deterioration	10 (34%)	4 (29%)	6 (55%)
Significant cTnl rise	4 (14%)	3 (21%)	1 (9%)
No obvious clinical sign	6 (21%)	4 (29%)	2 (18%)

86 et 83% ticagrelor



# Thrombose aiguë de stent

Temporal patterns, characteristics, and predictors of clinical outcomes in patients undergoing percutaneous coronary intervention for stent thrombosis



Inclusions 2014-2020

ATL au pays de Galles et Angleterre  
7923 (1.4%) thromboses de stents  
1.7% en 2014 → 1.4% en 2020



1.4% of all PCI  
(2014: 1.7% → 2020: 1.4%)

Early ST (0-30 days) - **52.6%**

Late ST (31-365 days) - **35.4%**

Very late ST (>365 days) - **12.0%**

# Thrombose aiguë de stent

Temporal patterns, characteristics, and predictors of clinical outcomes in patients undergoing percutaneous coronary intervention for stent thrombosis



**Utilisation OCT 21% thrombose aiguë  
44% anti GP IIb/IIIa- 28% thrombo-aspiration  
38% voies fémorales vs 17% (NST)  
6% IOT vs 3% (NST)**

## Predictors of mortality in ST PCI

### ↓ Odds of mortality

- ⊖ Prasugrel ↓ **46%**
- ⊖ Ticagrelor ↓ **31%**
- ⊖ Intravascular imaging (IVUS/OCT) ↓ **34%**

### ↑ Odds of mortality

- ⊕ STEMI presentation (vs NSTEMI) ↑ **207%**
- ⊕ Renal failure ↑ **249%**
- ⊕ Moderate-poor LV function ↑ **56-298%**
  - ⊕ OHCA ↑ **78%**
  - ⊕ prox. LAD PCI ↑ **62%**

# Thrombose aiguë de stent

Temporal patterns, characteristics, and predictors of clinical outcomes in patients undergoing percutaneous coronary intervention for stent thrombosis



	No stent thrombosis (n=343,812)	Early ST (n=4,171)	Late ST (n=951)	Very late ST (n=2,801)	p-value
MACCE*, %	3.5	8.1	4.8	4.0	<0.001
All-cause mortality, %	3.0	7.2	4.6	3.7	<0.001
Acute stroke/TIA, %	0.5	0.6	0.3	0.4	0.326
BARC 3-5 bleeding, %	0.2	0.4	1.2	0.0	<0.001
Reinfarction, %	0.1	0.5	0.0	0.0	<0.001

**Non-ST PCI** vs **Late ST**  
**Very late ST** } No increase in adverse outcomes

**Early ST:** ↑ odds of MACE (**22%**), all-cause mortality (**21%**) and reinfarction (**148%**)

# Registre PRESTIGE

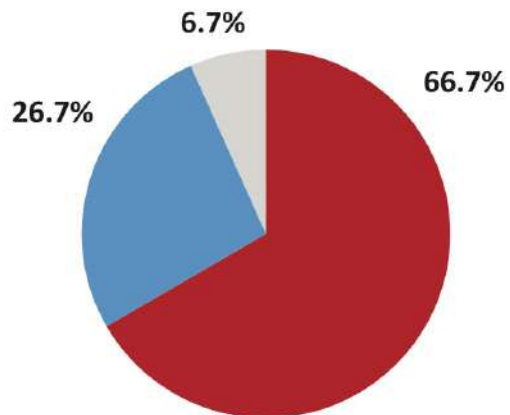
## Optical Coherence Tomography Findings in Patients With Coronary Stent Thrombosis

A Report of the PRESTIGE Consortium (Prevention of Late Stent Thrombosis by an Interdisciplinary Global European Effort)

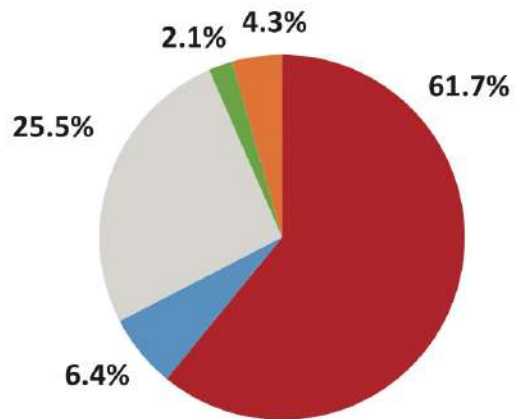
### 231 patients avec OCT et thrombose de stent

### 62 thromboses aiguës & sub-aiguës

**A** Acute (n=15)



**B** Subacute (n=47)



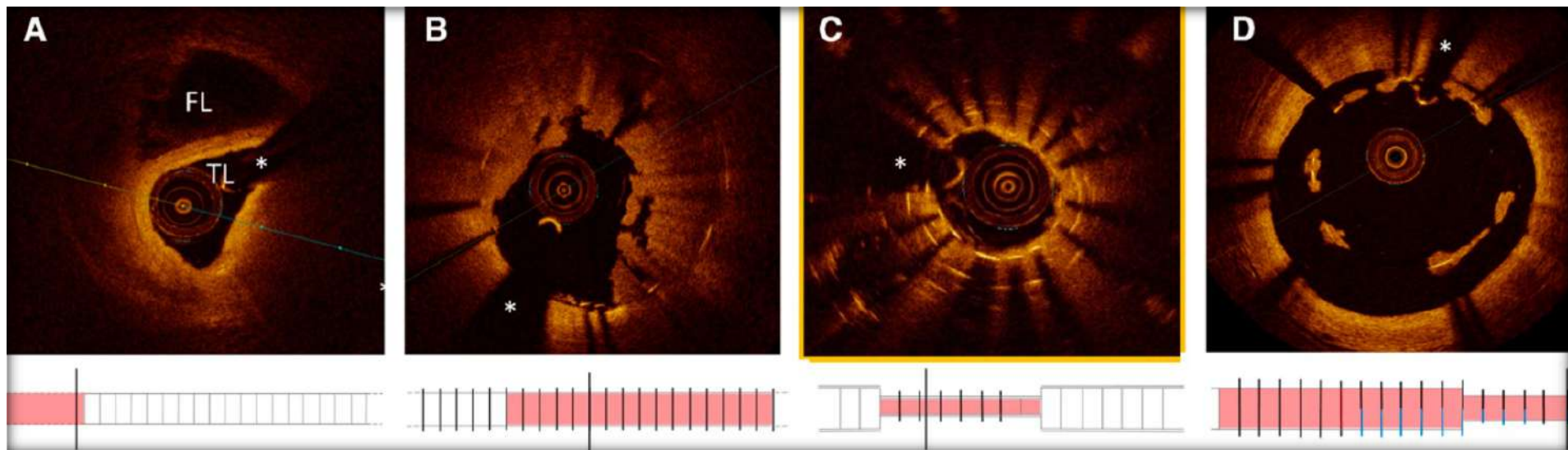
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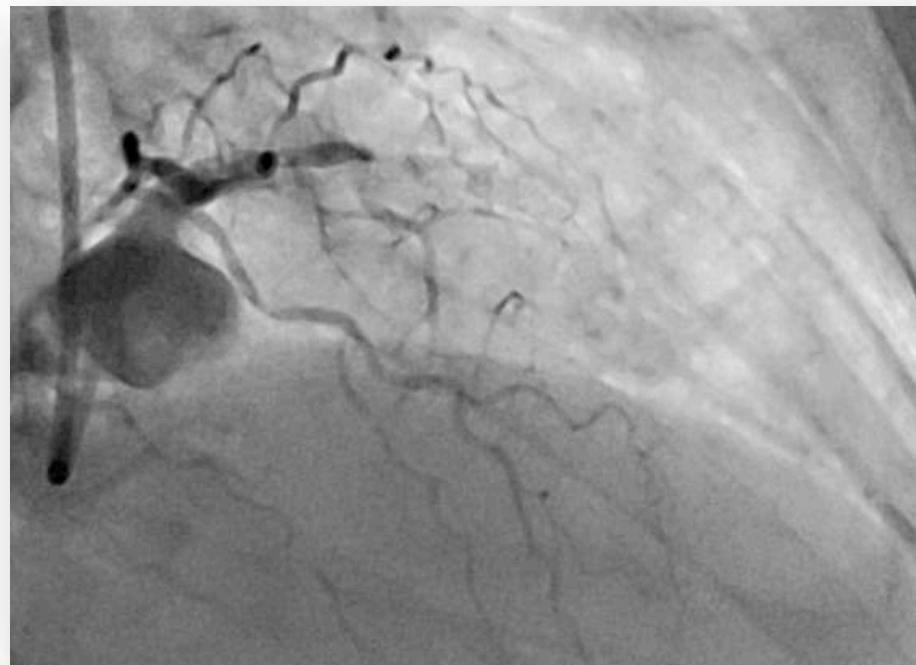


## OCT de thrombose aiguë de stent



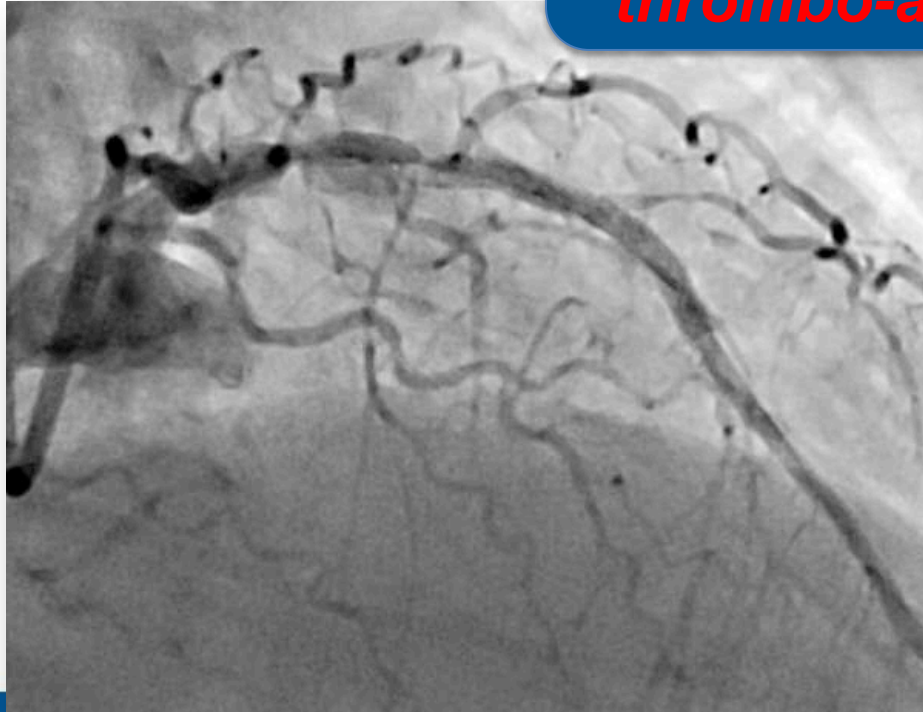
**Me E. 67 ans**

**2 heures + tard  
SCA ST+  
Choc cardiogénique**

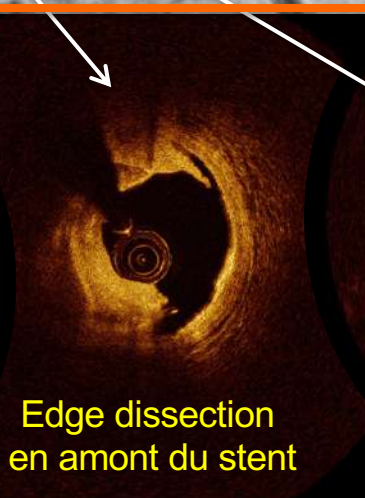
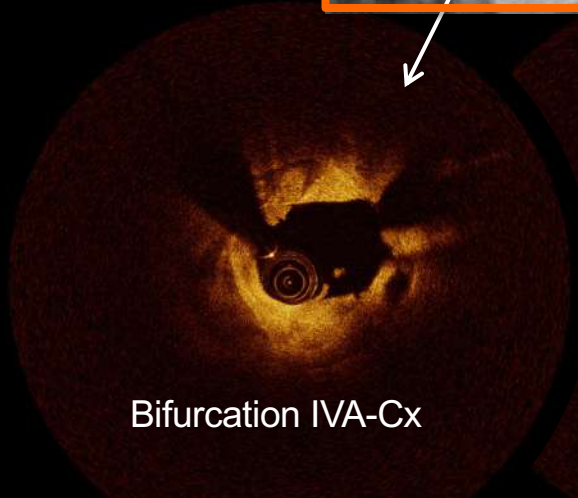
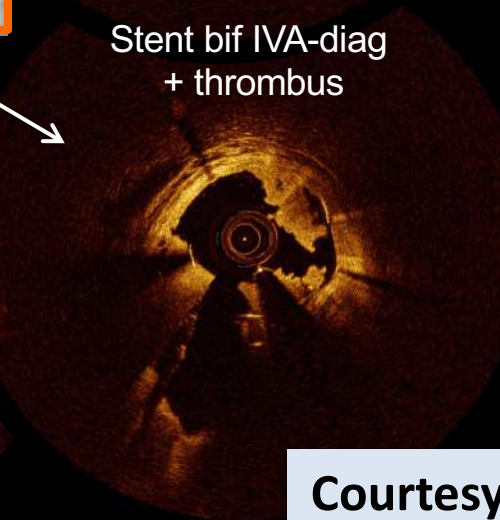
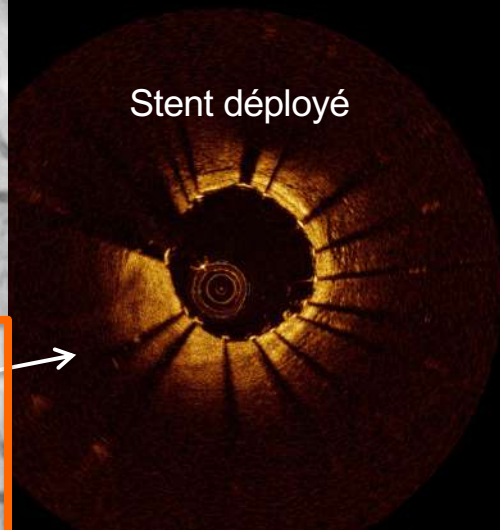
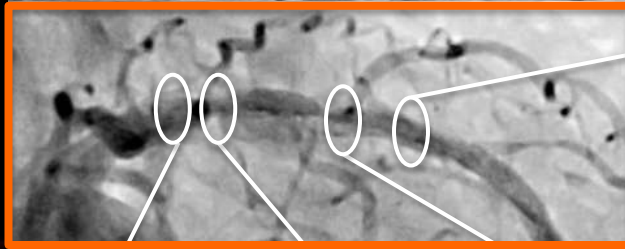
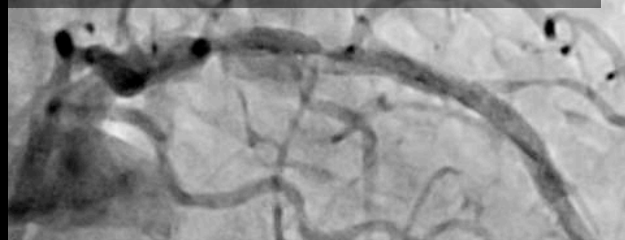


Me E. 67 ans

Thrombose aiguë de stent (H2)  
Choc cardiogénique  
*thrombo-aspiration* → *flux TIMI 3*



# OCT après thrombo-aspiration

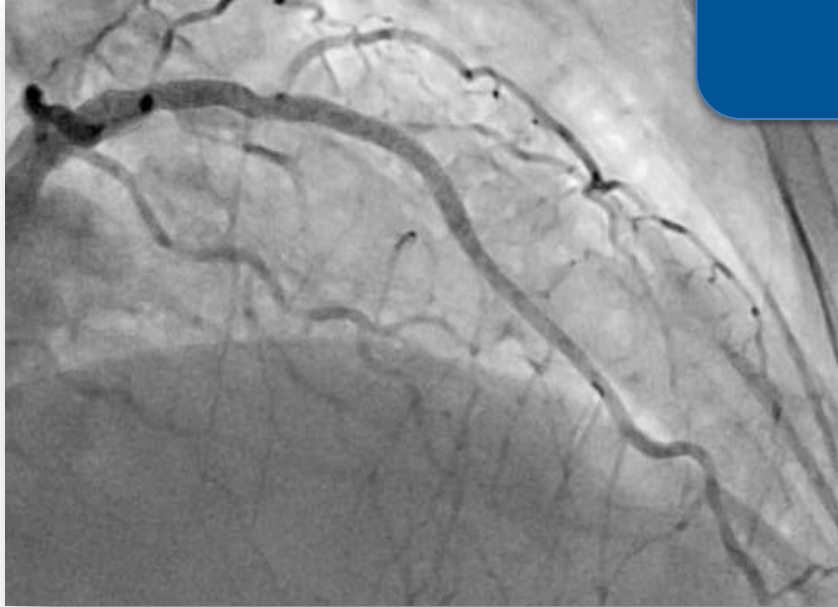


Courtesy P.MOTREFF



Me E. 67 ans

**Stenting du Tronc commun  
Overlapping stent IVA  
Final kissing balloon**



# Thrombose aiguë de stent

2020 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation

The Task Force for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation of the European Society of Cardiology (ESC)



## Comment diminuer le taux de thrombose

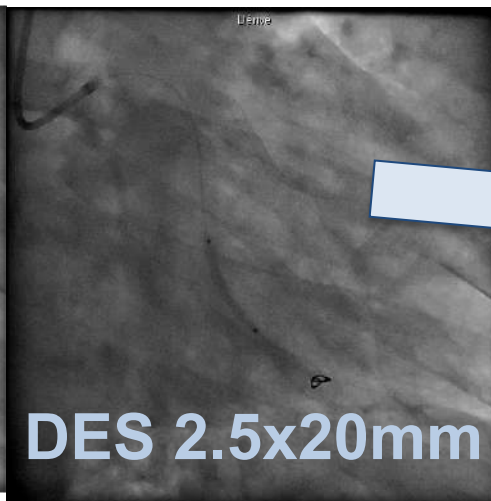
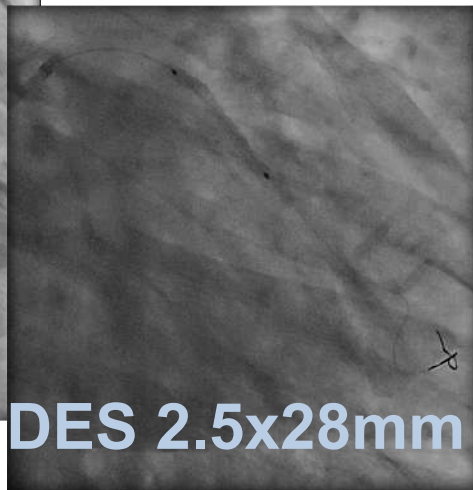
It is **not recommended** to administer routine pre-treatment with a P2Y<sub>12</sub> receptor inhibitor in patients in whom coronary anatomy is not known and an early invasive management is planned.

III

A

**Mr D. 55 ans**

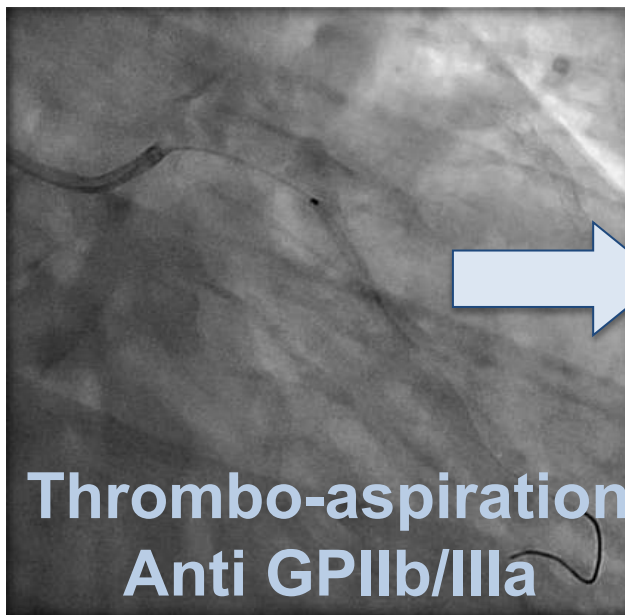
**Diabétique  
Angor d'effort  
∅ pré-traitement**



**600mg Clopidogrel en  
fin de procédure**

**Mr D. 55 ans**

**1heure + tard  
SCA ST+ latéral**



# Thrombose aiguë de stent

2020 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation

The Task Force for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation of the European Society of Cardiology (ESC)



	Oral administration			i.v. administration
	Clopidogrel	Prasugrel	Ticagrelor	Cangrelor
Drug class	Thienopyridine	Thienopyridine	Cyclopentyl-triazolopyrimidine	Adenosine triphosphate analogue
Reversibility	Irreversible	Irreversible	Reversible	Reversible
Bioactivation	Yes (pro-drug, CYP dependent, 2 steps)	Yes (pro-drug, CYP dependent, 1 step)	No <sup>a</sup>	No
(Pretreatment)-Dose	600 mg LD, 75 mg MD	60 mg LD, 10 (5) mg MD	180 mg LD, 2 × 90 (60) mg MD	30 µg/kg i.v. bolus, 4 µg/kg/min i.v. infusion for PCI
Onset of effect	Delayed: 2–6 h	Rapid: 0.5–4 h	Rapid: 0.5–2 h	Immediate: 2 min
Offset of effect	3–10 days	5–10 days	3–4 days	30–60 min
Delay to surgery	5 days	7 days	5 days	No significant delay

# Thrombose aiguë de stent

2020 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation

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## Registre SCAAR

**64857 patients présentant un SCA**

**92.4% patients pré-traités**

**43% clopidogrel, 54% ticagrelor**

## Résultats cohorte

Clinical outcome	Patients, No. (%)		Missing	Adjusted OR (95% CI)	P value
	Pretreated (n = 59 894)	Not pretreated (n = 4963)			
Primary end point					
Death at 30 d <sup>a,b</sup>	846 (1.4)	125 (2.5)	0	1.44 (0.78-2.62)	.36
Secondary end point					
Death at 1 y <sup>a,c</sup>	2324 (4.3)	241 (7.1)	0	1.34 (0.77-2.34)	.30
Definite stent thrombosis at 30 d <sup>a,d</sup>	243 (0.2)	19 (0.2)	0	1.17 (0.64-2.16)	.60
In-hospital bleeding <sup>a,e</sup>	3562 (6.0)	380 (7.5)	11 (0.1)	1.49 (1.06-2.12)	.02

# Thrombose aiguë de stent



## 2016 recommandation $\emptyset$ pré-ttmnt

Outcome	Patients, No. (%)		Adjusted OR (95% CI)	P value
	Routine pretreatment	No routine pretreatment		
PCI, No.	10 065	3655	NA	NA
Death at 30 d <sup>a</sup>	194 (1.9)	81 (2.2)	1.15 (0.83-1.59)	.39
Death at 1 y <sup>a</sup>	545 (5.4)	120 (5.9)	1.01 (0.79-1.27)	.96
Definite stent thrombosis at 30 d <sup>b</sup>	20 (0.2)	5 (0.1)	0.79 (0.42-1.55)	.52
In-hospital bleeding <sup>a,c</sup>	869 (8.5)	314 (8.1)	0.80 (0.69-0.94)	.006
CABG, No.	1106	724	NA	NA
Death at 30 d <sup>d</sup>	30 (2.7)	14 (1.9)	0.79 (0.41-1.51)	.47
Death at 1 y <sup>d</sup>	55 (4.9)	28 (3.8)	0.85 (0.53-2.34)	.52
Reoperation owing to bleeding <sup>d,e</sup>	30 (2.7)	14 (1.9)	0.67 (0.41-0.96)	.04



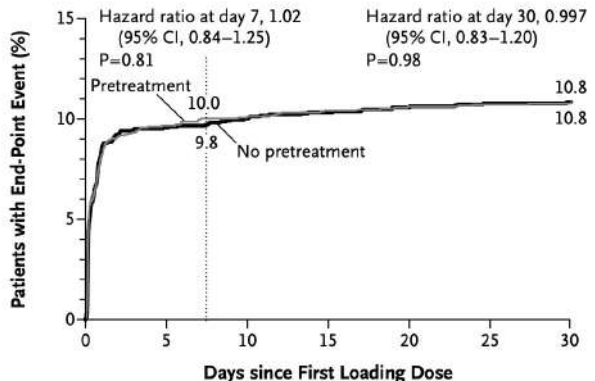
# Thrombose aiguë de stent

## ETUDE ACCOAST

4033 patients présentant un SCA

Randomisation prasugrel avant ATL vs placebo

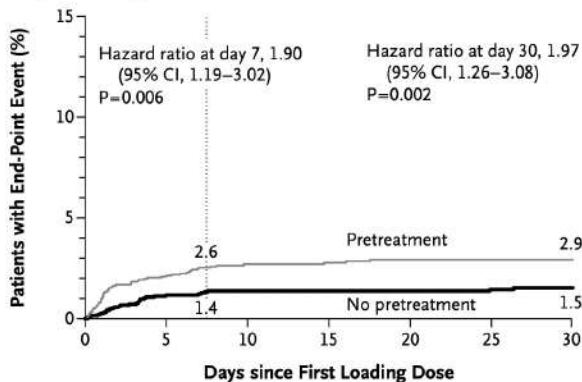
A Primary Efficacy End Point



No. at Risk

No pretreatment	1996	1788	1775	1769	1762	1752	1621
Pretreatment	2037	1821	1809	1802	1797	1791	1616

B All TIMI Major Bleeding



No. at Risk

No pretreatment	1996	1947	1328	1297	1288	1284	1263
Pretreatment	2037	1972	1339	1310	1299	1297	1280

# Conclusions

**Thromboses aiguës de stent toujours présentes**

**Pré-traitement chez certains patients?**

**Intérêt Cangrelor®?**

**Penser à imagerie endocoronaire**