

SCA ST+ et atteinte pluritronculaire : comment gérer en phase aiguë ?

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DÉCLARATION DE LIENS D'INTÉRÊT AVEC LA PRÉSENTATION

Intervenant : Charlotte TROUILLET, Strasbourg

Je n'ai pas de lien d'intérêt à déclarer

ST+ pluritronculaire

- 40 à 65 % des SCA ST+
- facteur pronostic :

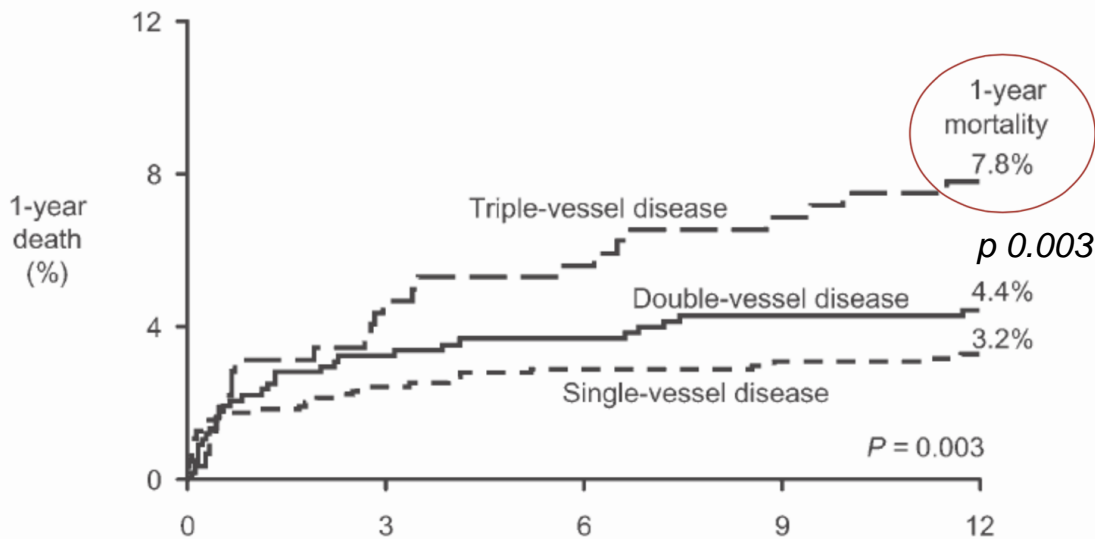


Table 4 Multivariable predictors of 1-year clinical endpoints

	Hazard ratio	95% confidence interval	P-value
Death			
Triple-vessel disease	2.60	1.27, 5.31	0.009
Anterior myocardial infarction	2.36	1.22, 4.59	0.01
Age	1.05	1.03, 1.08	0.0001
Decreased left ventricular ejection fraction	1.05	1.03, 1.09	<0.0001
Female gender	1.79	0.97, 3.30	0.06
Hypertlipidaemia	0.37	0.17, 0.80	0.01

Sorajja et al. Eur Heart J, 2007

Un consensus : la culprit lesion !

CONSENSUS : « The MISSION IS TO OPEN THE CULPRIT »

Procedural aspects of the primary percutaneous coronary intervention strategy



Recommendations	Class	Level
IRA strategy		
Primary PCI of the IRA is indicated.	I	A
New coronary angiography with PCI if indicated is recommended in patients with symptoms or signs of recurrent or remaining ischaemia after primary PCI.	I	C
IRA technique		
Stenting is recommended (over balloon angioplasty) for primary PCI.	I	A
Stenting with new-generation DES is recommended over BMS for primary PCI.	I	A
Radial access is recommended over femoral access if performed by an experienced radial operator.	I	A

2017 ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation

es for the Management of AMI-STEMI (European Heart Journal 2017 - doi:10.1093/eurh eartj/ehx095)

Les questions :

- ✦ quelle est la culprit ?
- ✦ quid des autres lésions ?
 - ✦ quelle(s) lésion(s) traiter? quand ?
 - ✦ cas particuliers ?
 - ✦ état de choc
 - ✦ lésions intermédiaires
 - ✦ lésions en série sur l'artère coupable?
 - ✦ autres lésions de type A
 - ✦ abords vasculaires limités
 - ✦ patient très âgé
 - ✦ ST+ hors délai

Quelle est la culprit lesion?

- ✦ le plus souvent évident :
 - ✦ ECG +++ : territoire
 - ✦ ETT rapide avant ATC primaire : troubles cinétique segmentaire
 - ✦ coro : TIMI 0. Occlusion aigue Vs CTO:
 - ✦ charge thrombotique
 - ✦ stagnation de contraste
 - ✦ cap proximal arrêt net
 - ✦ en défaveur: bridging, cap proximale effilée,+/- calcifications

Atypical ECG presentations

Bundle branch block

Criteria that can be used to improve the diagnostic accuracy of STEMI in LBBB⁵⁰:

- Concordant ST-segment elevation ≥ 1 mm in leads with a positive QRS complex
- Concordant ST-segment depression ≥ 1 mm in V_1-V_3
- Discordant ST-segment elevation ≥ 5 mm in leads with a negative QRS complex

The presence of RBBB may confound the diagnosis of STEMI

Ventricular paced rhythm

During RV pacing, the ECG also shows LBBB and the above rules also apply for the diagnosis of myocardial infarction during pacing; however, they are less specific

Isolated posterior myocardial infarction

Isolated ST depression ≥ 0.5 mm in leads V_1-V_3 and ST-segment elevation (≥ 0.5 mm) in posterior chest wall leads V_7-V_9

Ischaemia due to left main coronary artery occlusion or multivessel disease

ST depression ≥ 1 mm in eight or more surface leads, coupled with ST-segment elevation in aVR and/or V_1 , suggests left main-, or left main equivalent- coronary obstruction, or severe three vessel ischaemia

Quid des autres lésions ?

traitement médical "conservateur" ?

CULPRIT LESION ALONE



dans un second temps ?

STAGED PCI

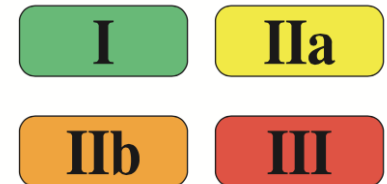
toutes dans le même temps ?

MULTIPLE PCI

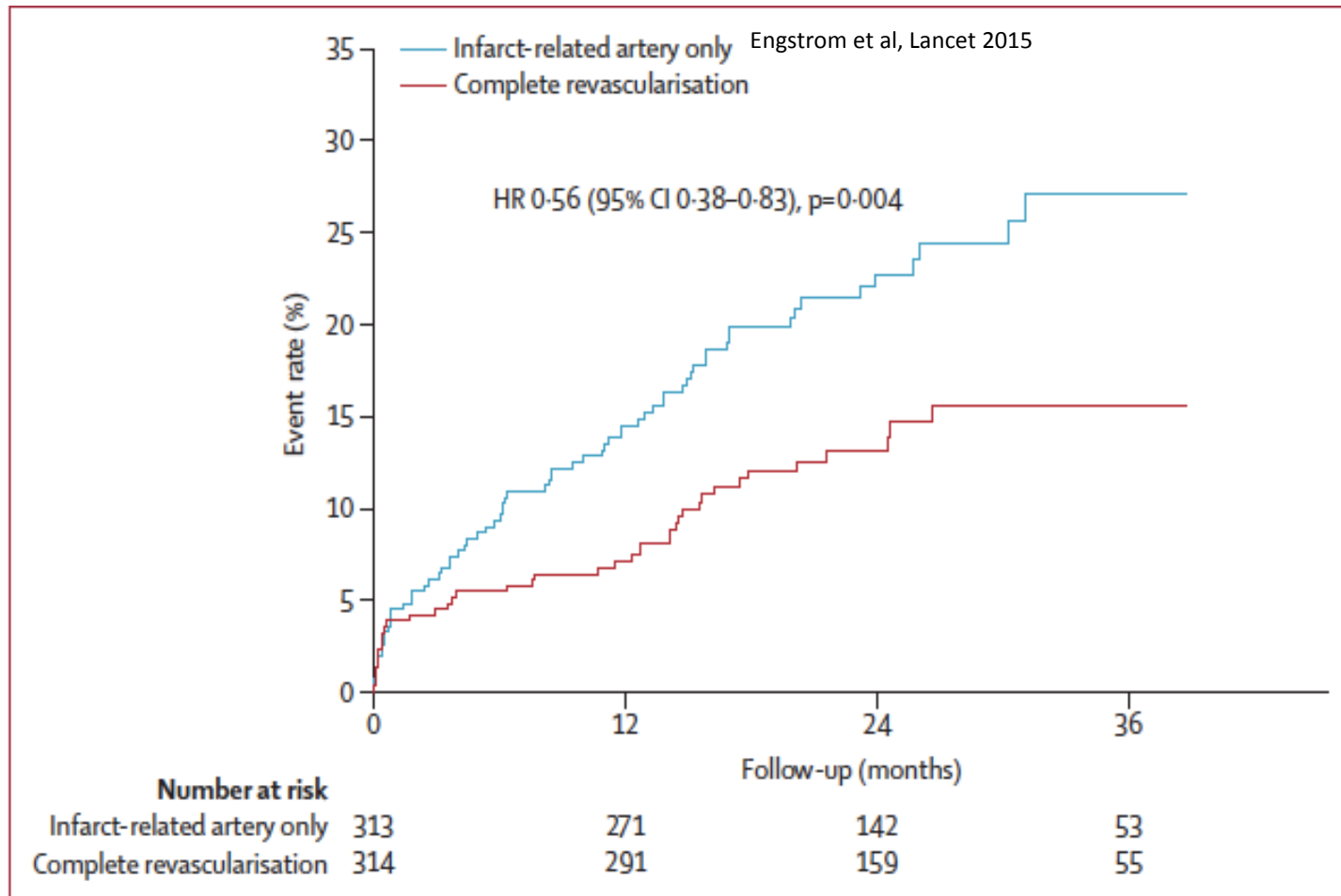
2017 ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation

European Heart Journal (2017) **00**, 1–66
doi:10.1093/eurheartj/ehx393

CHANGE IN RECOMMENDATIONS	
2012	2017
	Radial access^a MATRIX ¹⁴³
	DES over BMS EXAMINATION ^{150, 151} COMFORTABLE-AMI ¹⁴⁹ , NORSTENT ¹⁵²
	Complete Revascularization^b PRAMI ¹⁶⁸ , DANAMI-3-PRIMULTI ¹⁷⁰ , CVLPRIT ¹⁶⁹ , Compare-Acute ¹⁷¹
	Thrombus Aspiration^c TOTAL ¹⁵⁹ , TASTE ¹⁵⁷
	Bivalirudin MATRIX ²⁰⁹ , HEAT-PPCI ²⁰⁵
	Enoxaparin ATOLL ^{200, 201} , Meta-analysis ²⁰²
	Early Hospital Discharge^d Small trials & observational data ^{259–262}
Oxygen when SaO ₂ <95%	AVOID ⁶⁴ , DETOX ⁶⁶
	Oxygen when SaO ₂ <90%
Dose i.V. TNK-tPA same in all patients	STREAM ¹²¹
	Dose i.V. TNK-tPA half in Pts ≥75 years



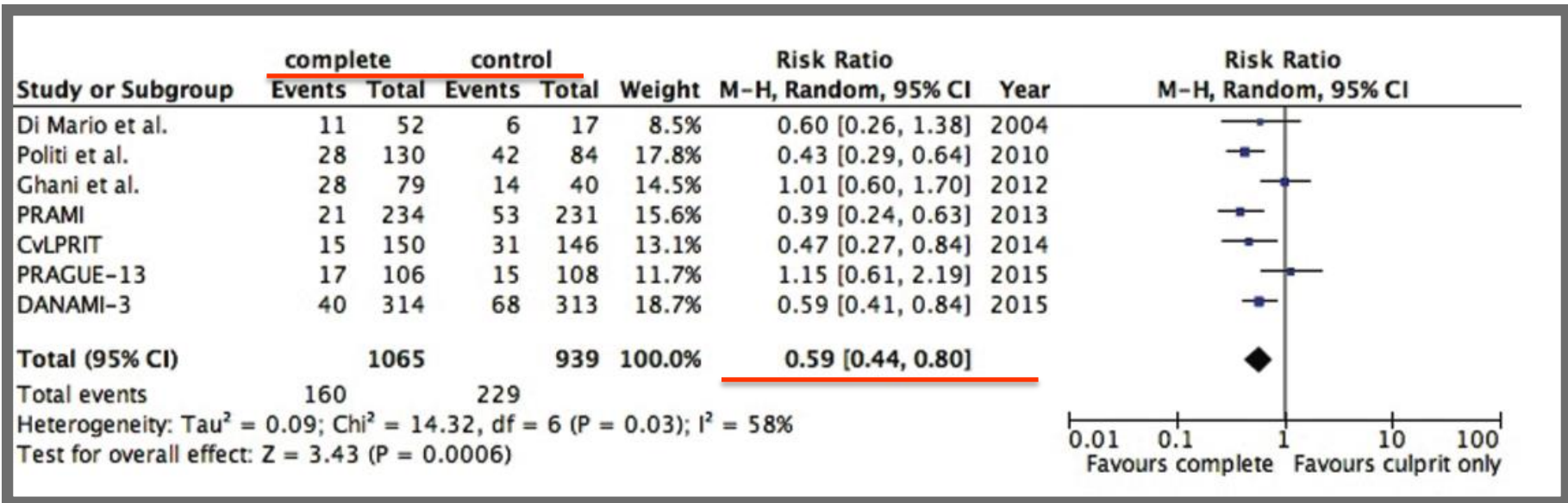
Culprit lesion alone ?



Jae-Sik Jang & al.



COMPLETE VERSUS CULPRIT-ONLY REVASCLARIZATION IN PATIENTS WITH ST-ELEVATION MYOCARDIAL INFARCTION AND MULTIVESSEL DISEASE: A META-ANALYSIS OF RANDOMIZED TRIALS



~~traitement médical "conservateur" ?~~

CULPRIT LESION ALONE



dans un second temps ?

STAGED PCI

même hospitalisation ?

à distance ?

guidée par test ischémie ?

toutes dans le même temps ?

MULTIPLE PCI

2013. PRAMI N Eng J Med.

Wald & al.

Grande Bretagne

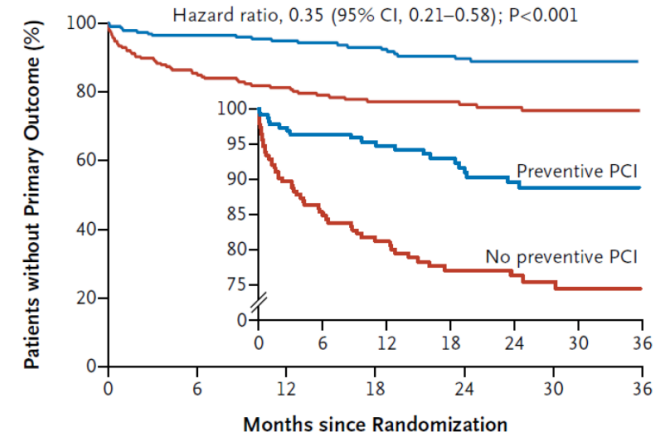
n = 465 Culprit Only vs Multiple PCI

- Etude nationale, randomisée
- 5 centres
- Objectif :
Evaluer si le traitement systématique des lésions non-coupables à la phase aigue réduit les évènements cardiovasculaires majeurs (ECM) à 2 ans

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Randomized Trial of Preventive Angioplasty in Myocardial Infarction



2428 patients avec STEMI

1922 non éligibles
206 refus
39 chocs
1112 mono-lésion
96 échecs d'angioplastie
.....etc

465 patients randomisés

234 patients
Angioplastie préventive

231 patients
Pas d'angioplastie préventive

nombreuses limites méthodologiques

arrêt prématuré de l'étude

2014. Métaanalyse Am Heart Journal.

Bainey & al.

Complete vs culprit-only revascularization for patients with multivessel disease undergoing primary percutaneous coronary intervention for ST-segment elevation myocardial infarction: A systematic review and meta-analysis

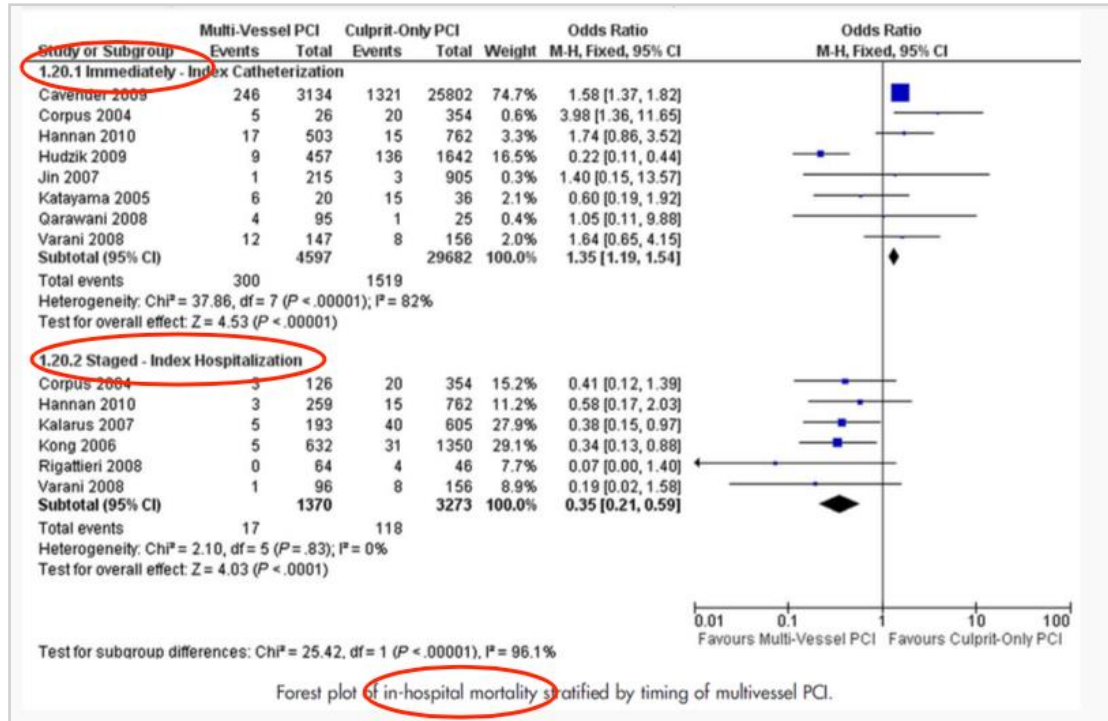
Kevin R. Bainey, MD, MSC,^a Shamir R. Mehta, MD, MSC,^b Tony Lai, MBBS,^b and Robert C. Welsh, MD^a Alberta, and Ontario, Canada

3 études randomisées

1.15.1 Randomized
Dambrink 2010
Di Mario 2004
Politi 2009

19 registres

1.15.2 Non-Randomized
Barringhaus 2010
Chen 2010
Corpus 2004
Dziewierz 2010
Esteves-Loureiro 2010
Han 2008
Hannan 2010
Hudzik 2009
Jin 2007
Kalarus 2007
Khattab 2008
Mohamad 2009
Qarawani 2008
Rahman 2010
Rigattieri 2008
Roe 2001
Seo 2009
Telayna 2002
Toma 2010

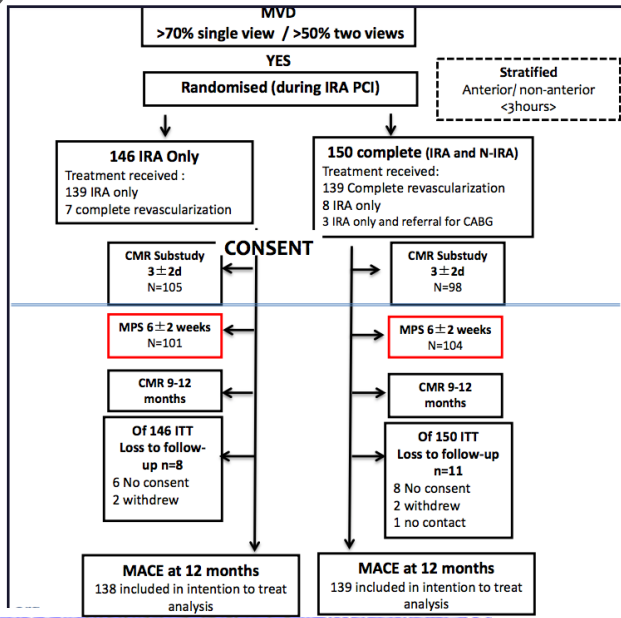
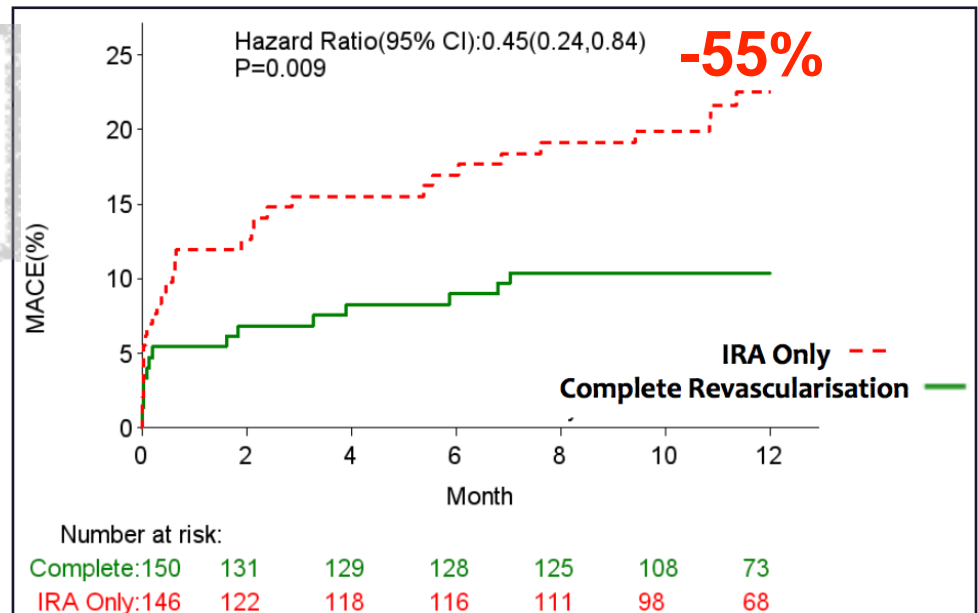


2015. CvLPRIT JACC

Gershlick A

Grande Bretagne
n = 296

- total mortality
- recurrent MI
- heart failure
- ischaemia-driven revascularisation



Culprit Only vs
Complete index
admission

*même temps
ou
même hospitalisation*

*pas + de :
AVC
saignements majeurs
néphrotoxicité au produit de contraste*

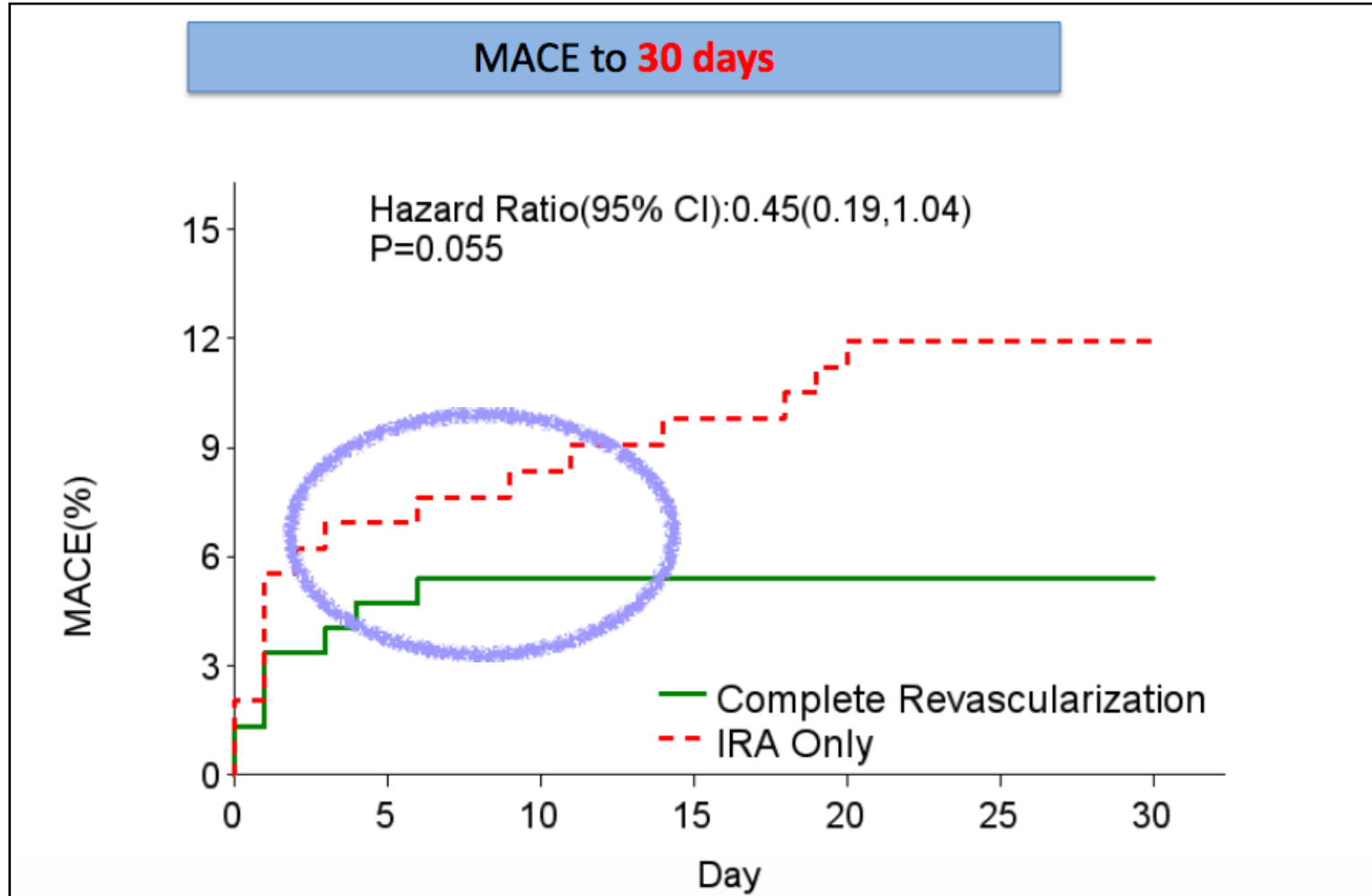
*revascularisation
complète
CvLPRIT*

- revascularisation complète en 1 temps : 59% des patients
- le bras "culprit only" a bénéficié d'un traitement optimal

2015. CvLPRIT JACC

significative dès 30J

Gershlick A



divergence précoce des courbes de MACE

2015. DANAMI-3-PRIMULTI

Lancet

Engstrom T
Danemark

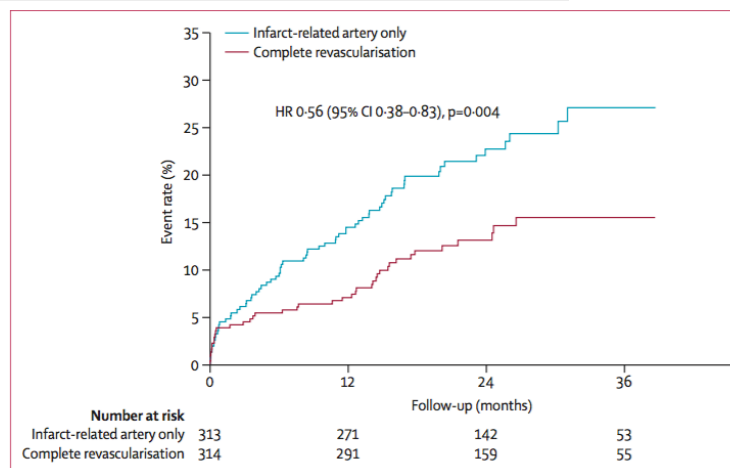
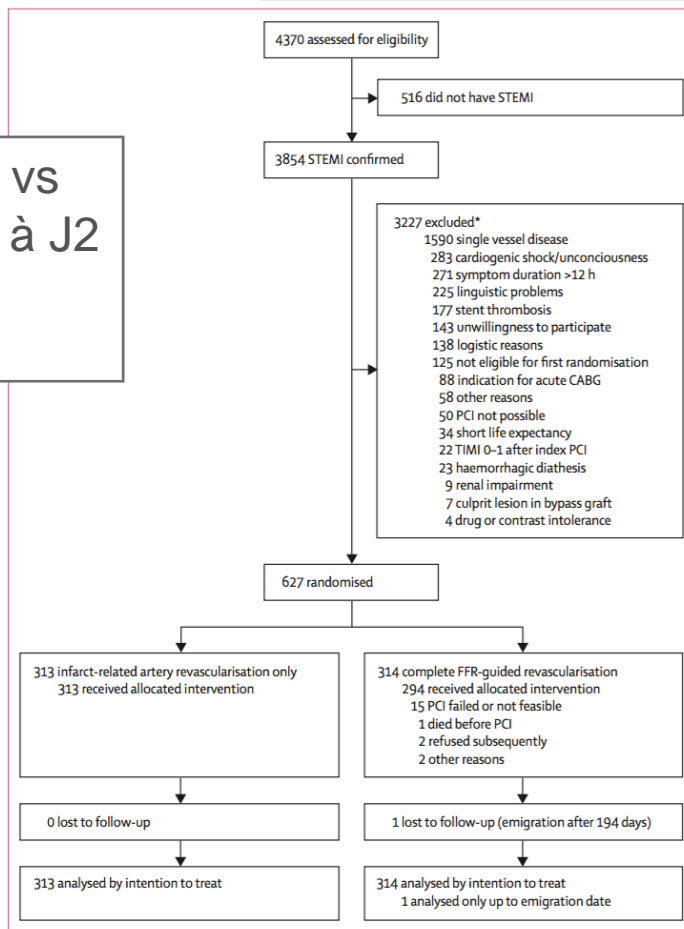
Complete revascularisation versus treatment of the culprit lesion only in patients with ST-segment elevation myocardial infarction and multivessel disease (DANAMI-3—PRIMULTI): an open-label, randomised controlled trial

Thomas Engstrøm, Henning Kelbæk, Steffen Helqvist, Dan Eik Højsten, Lene Kløvgaard, Lene Holmvang, Erik Jørgensen, Frants Pedersen, Kari Saunamäki, Peter Clemmensen, Ole De Backer, Jan Ravkilde, Hans-Henrik Tilsted, Anton Boel Villadsen, Jens Aarøe, Svend Eggert Jensen, Bent Raungaard, Lars Køber, for the DANAMI-3—PRIMULTI Investigators*

n = 627

Culprit Only vs
Staged-PCI à J2

FFR guidée



For patients randomly allocated FFR-guided complete revascularisation, we did additional PCI procedures—preferably with everolimus-eluting stents because they are proven safe and efficient—2 days after the initial PCI procedure before discharge, according to local routines.

In conclusion, taken together with the findings of similar trials, the main implication of our results for daily practice is that complete revascularisation during the index admission of STEMI patients with multivessel disease reduces the risk of future events without increasing the risk of serious adverse events.

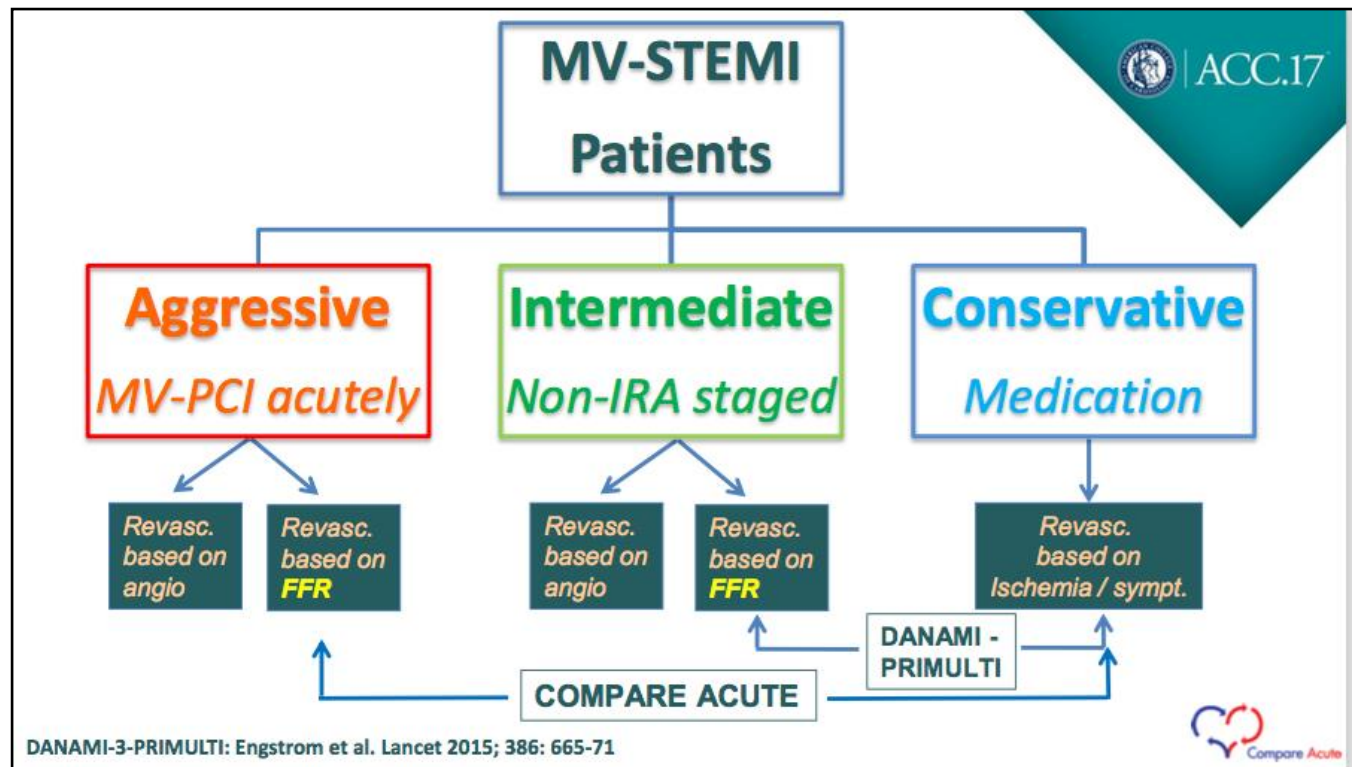
2017. COMPARE ACUTE

NEJM

P Smits

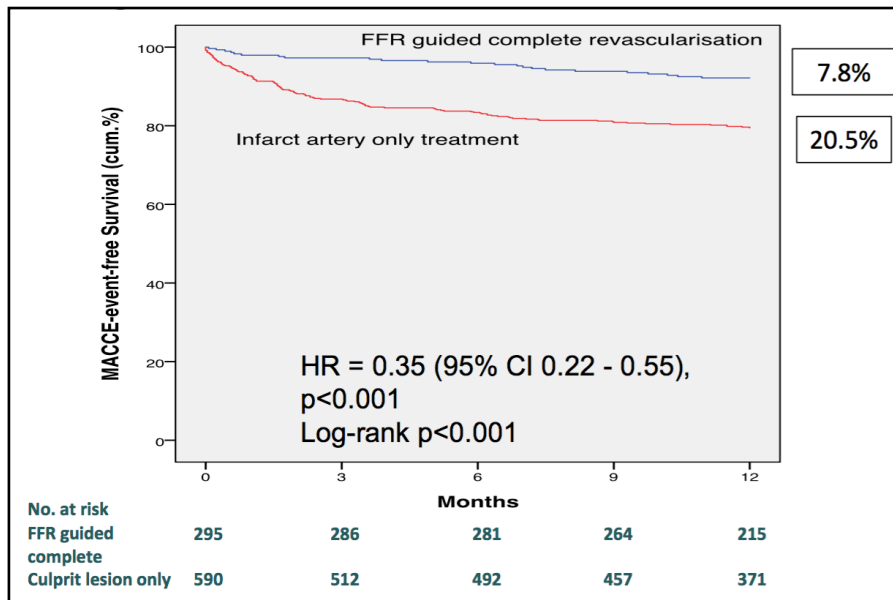
Randomised trial of
FFR-guided complete revascularization
versus
infarct artery only treatment
in
multivessel STEMI patients

Multiple PCI FFR guidée



2017. COMPARE ACUTE

NEJM
P Smits

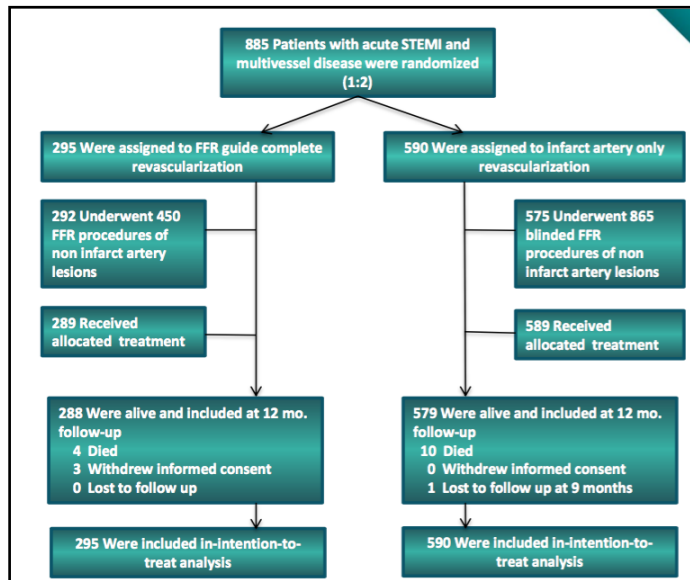


Primary outcome and its components



* MACCE = the composite of all-cause mortality, non-fatal myocardial infarction, any revascularization and cerebrovascular events.

	FFR guided Complete Revascularization (n=295)	Infarct Artery Only treatment (n=590)	HR	95% CI	P value
Primary endpoint	Number of events (%)				
MACCE* (any first event)	23 (7.8%)	121 (20.5%)	0.35	0.22 – 0.55	<0.001
Death, all cause	4 (1.3%)	10 (1.7%)	0.80	0.25 – 2.56	0.70
Cardiac	3 (1.0%)	6 (1.0%)			
Myocardial infarction (MI)	7 (2.4%)	28 (4.7%)	0.50	0.22 – 1.13	0.10
Spontaneous	5 (1.6%)	17 (2.9%)	0.59	0.22 – 1.59	0.29
Peri-procedural	2 (0.6%)	11 (1.9%)	0.36	0.08 – 1.64	0.19
Revascularization	18 (6.1%)	103 (17.5%)	0.32	0.20 – 0.54	<0.001
PCI	15 (5.1%)	98 (16.6%)	0.37	0.24 – 0.57	<0.001
CABG	3 (1.0%)	5 (0.8%)	1.20	0.29 – 5.02	0.80
Cerebrovascular event	0 (0.0%)	4 (0.7%)	NA	NA	NA



FFR outcome

	FFR-guided Complete n=295 pts (450 lesions)	IRA-only n=590 pts (856 lesions)	P value
FFR measurements	292 (99.0%)	575 (97.5%)	0.13
Min. FFR (mean ± SD)	0.78 ± 0.12	0.79 ± 0.12	0.42
Positive FFR value (≤ 0.80)	158/292 (54.1%)	275/575 (47.9%)	0.08
Negative FFR value (>0.80)	134/292 (45.9%)	300/575 (52.1%)	



- Approximately half of the lesions in non infarct-related arteries considered significant on coronary

angiograms had an FFR value >0.8 and were therefore not physiologically significant

- Deferring treatment of angiographically significant coronary lesions in non-infarct related arteries

with an FFR > 0.8 is safe and efficient

2016. Métaanalyse Heart

Kowalewski

**7 essais randomisés
n = 1303**

Complete revascularisation in ST-elevation myocardial infarction and multivessel disease: meta-analysis of randomised controlled trials

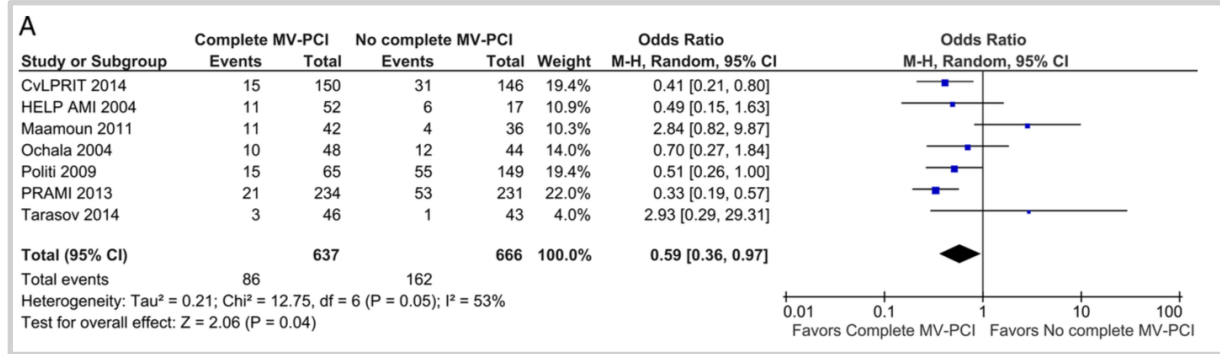
Mariusz Kowalewski,^{1,2} Volker Schulze,^{2,3} Sergio Berti,^{2,4} Ron Waksman,⁵ Jacek Kubica,^{2,6} Michalina Kołodziejczak,^{2,6} Antonino Buffon,⁷ Harry Suryapranata,⁸ Paul Alfred Gurbel,⁹ Malte Kelm,^{2,3} Wojciech Pawliszak,¹ Lech Anisimowicz,¹ Eliano Pio Navarese^{2,3}

Complete MV-PCI : revascularisation to non-infarct-related artery lesions during index procedure

vs

non-complete MV- PCI:- culprit- only revascularisation (COR) and staged approaches

- death
- recurrent MI
- repeat revascularisation



In STEMI and MV disease, complete MV-PCI as compared with non-complete strategy yields higher benefits on clinical events driven by a significant reduction of MI and repeat revascularisation rates. These findings herald the need for reconsidering appropriateness of current guidelines regarding primary PCI in STEMI and MV disease.



ESC

European Society
of Cardiology

**2017 ESC Guidelines
for the management of acute myocardial
infarction in patients presenting with ST-
segment elevation**

Non-IRA strategy

Routine revascularization of non-IRA lesions should be considered in STEMI patients with multivessel disease before hospital discharge.

Ila

A

non-IRA : non infarcted related artery

ST+ pluritronculaire et choc cardiogénique?

Primary PCI should be limited to the culprit vessel with the exception of cardiogenic shock and persistent ischaemia after PCI of the supposed culprit lesion.	IIa	B	234,264-266
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2012



2017 NEW RECOMMENDATIONS

- Additional lipid lowering therapy if LDL >1.8 mmol/L (70 mg/dL) despite on maximum tolerated statins
IMPROVE-IT³⁷⁶, FOURIER³⁸²
- Complete revascularization during index primary PCI in STEMI patients in shock
Expert opinion
- Cangrelor if P2Y₁₂ inhibitors have not been given
CHAMPION¹⁹³
- Switch to potent P2Y₁₂ inhibitors 48 hours after fibrinolysis
Expert opinion
- Extend Ticagrelor up to 36 months in high-risk patients
PEGASUS-TIMI 54³³³
- Use of polypill to increase adherence
FOCUS³²³
- Routine use of deferred stenting
DANAMI 3-DEFER¹⁵⁵

Non-IRA PCI during the index procedure should be considered in patients with cardiogenic shock.

IIa
C

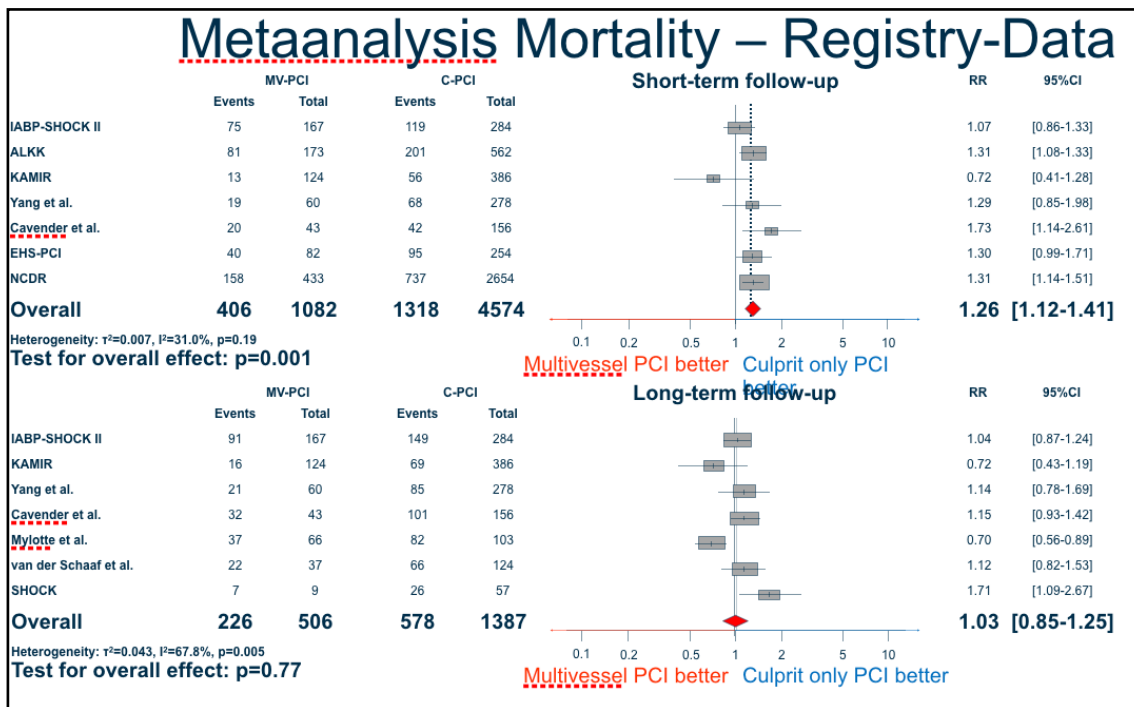
A	Data derived from multiple randomized clinical trials or meta-analyses.
B	Data derived from a single randomized clinical trial or large non-randomized studies.
C	Consensus of opinion of the experts and/or small studies, retrospective studies, registries.

Level of evidence

Randomized Trials Cardiogenic Shock

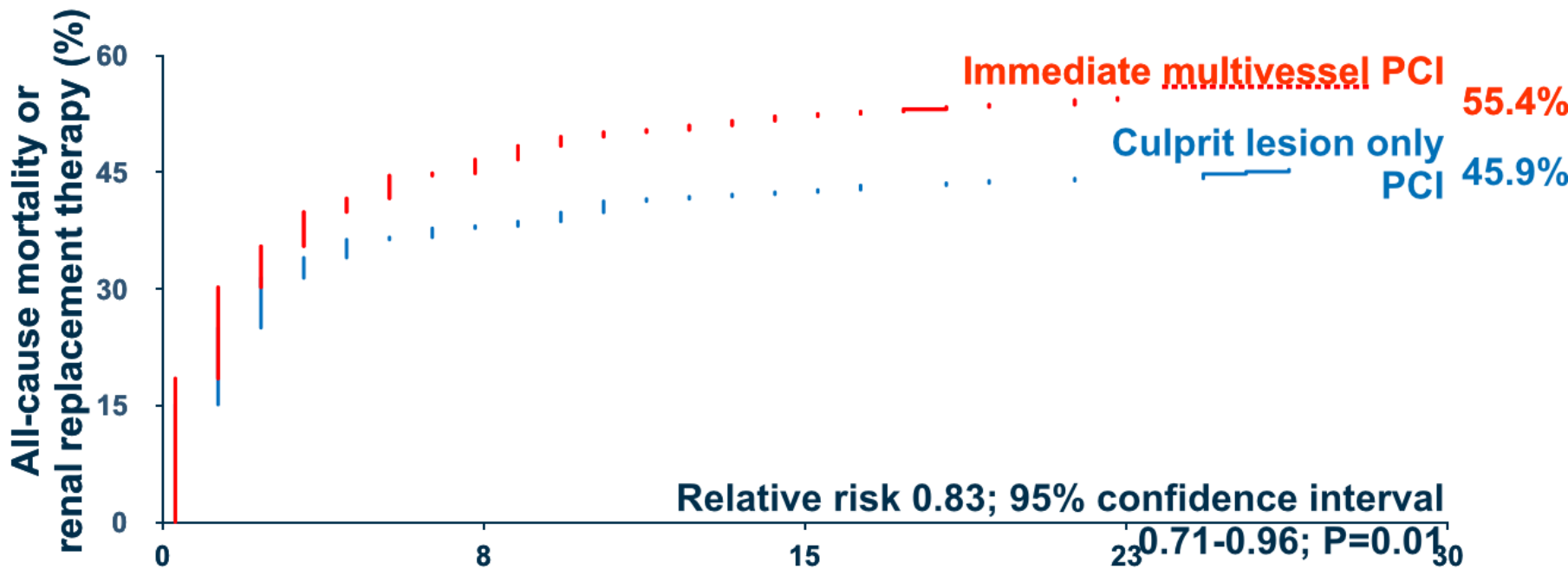
Trial	Follow-up	n/N	n/N	Relative Risk Mortality 95% CI	Relative Risk 95% CI
Revascularization					
SHOCK	1 year	81/152	100/150		0.82 (0.69;0.97)
SMASH	30 days	22/32	18/23		
Total		103/184	118/173		

multiple PCI
in cardiogenic shock?





Primary Study Endpoint All-Cause Mortality or Renal Replacement Therapy

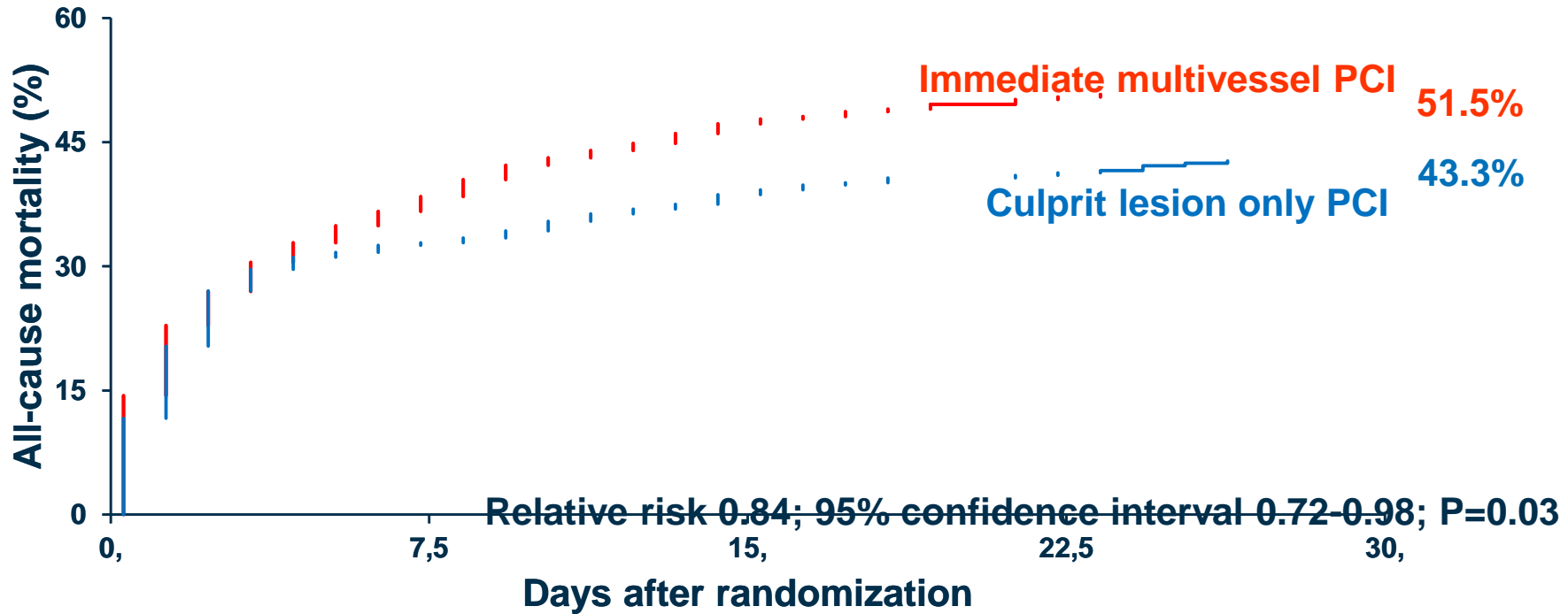


Number at risk:
 Culprit lesion only PCI 344
 Immediate multivessel PCI 341

Days after randomization	0	8	15	23	30		
Culprit lesion only PCI	344	219	207	198	192	189	184
Immediate multivessel PCI	341	199	172	162	156	153	152



All-Cause Mortality

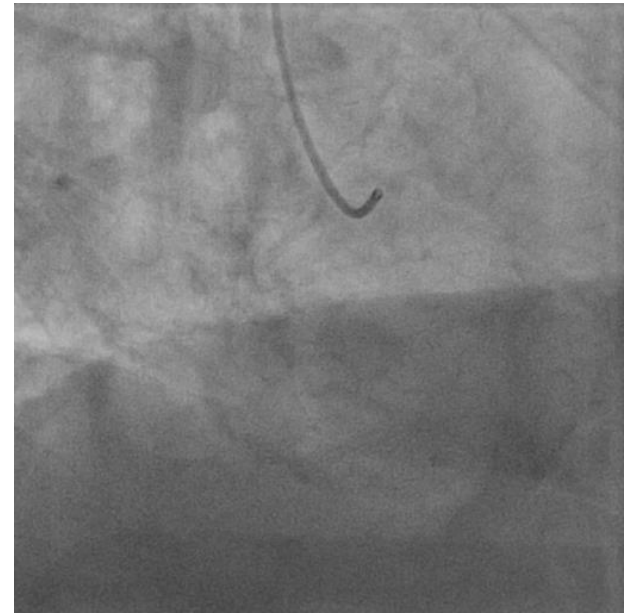
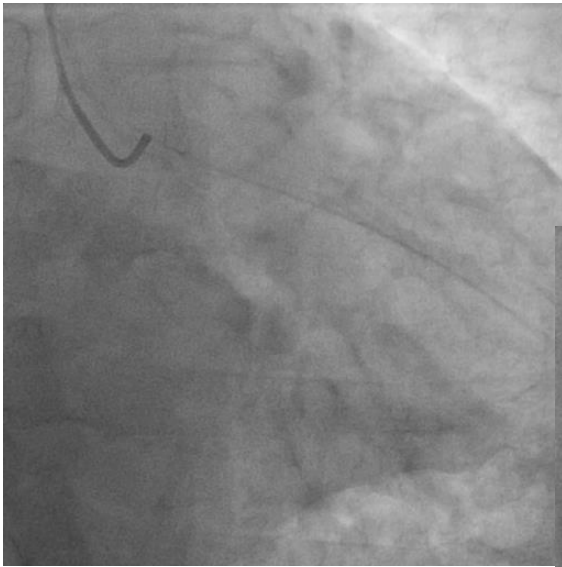


Number at risk:

Culprit lesion only PCI	344	237	226	211	203	198	193
Immediate multivessel PCI	341	229	197	179	170	166	165

... au cas par cas

lésion non culprit simple, de type A ?

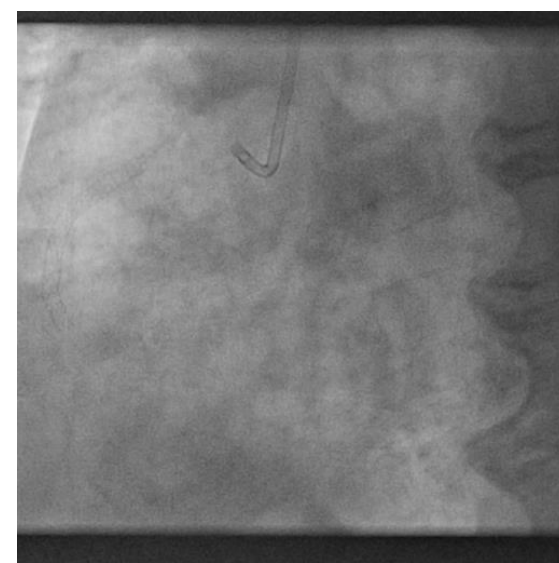
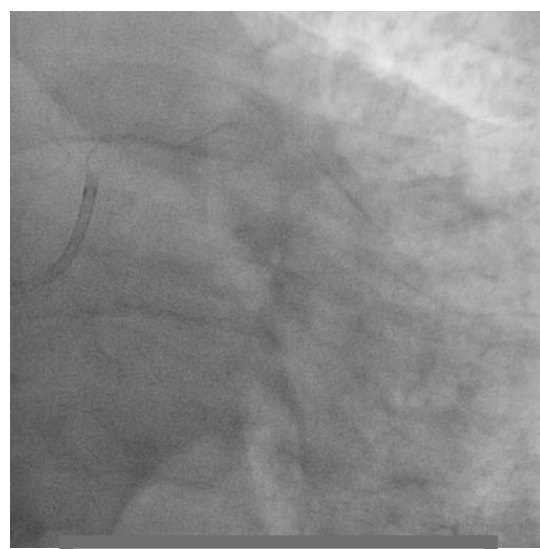
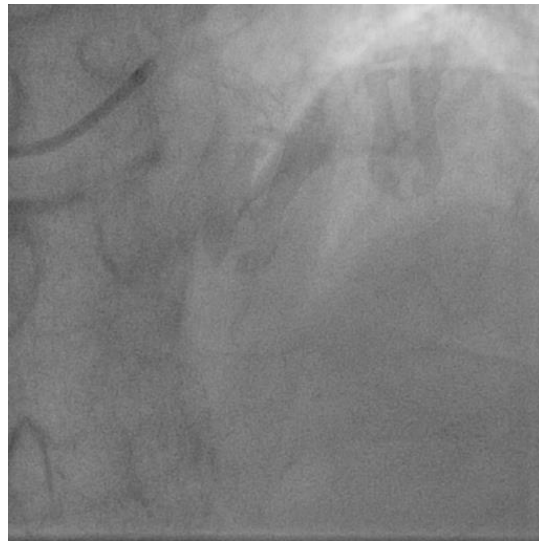
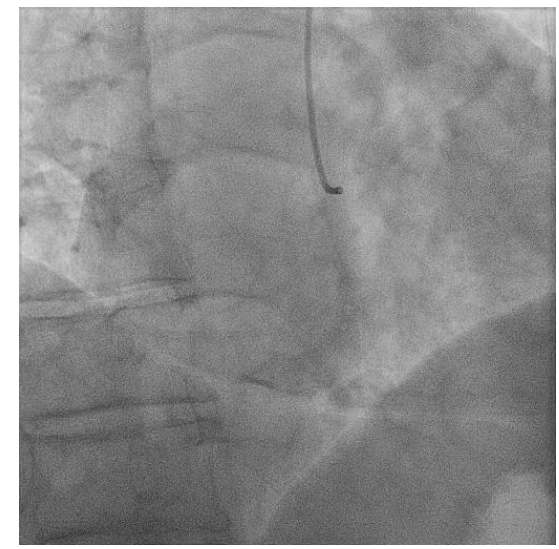
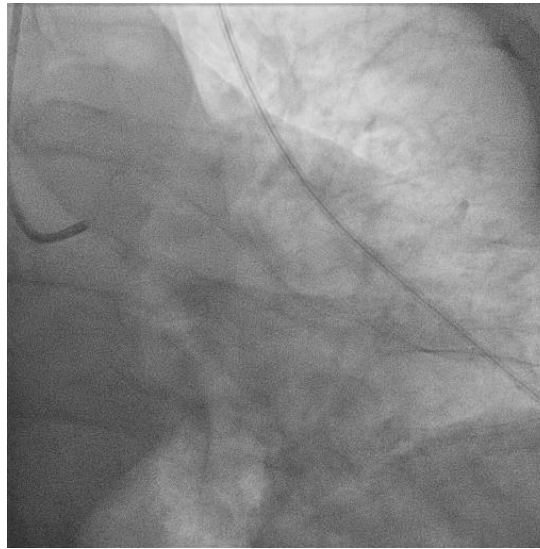
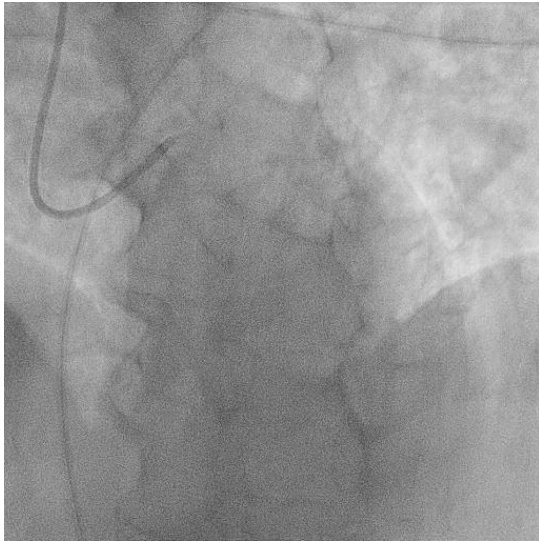


culprit : procédure courte,
contraste < 100cc

MULTIPLE PCI

patient jeune
revascularisation complète
avant rééducation

lésions non culprit multiples, bifurcation ?

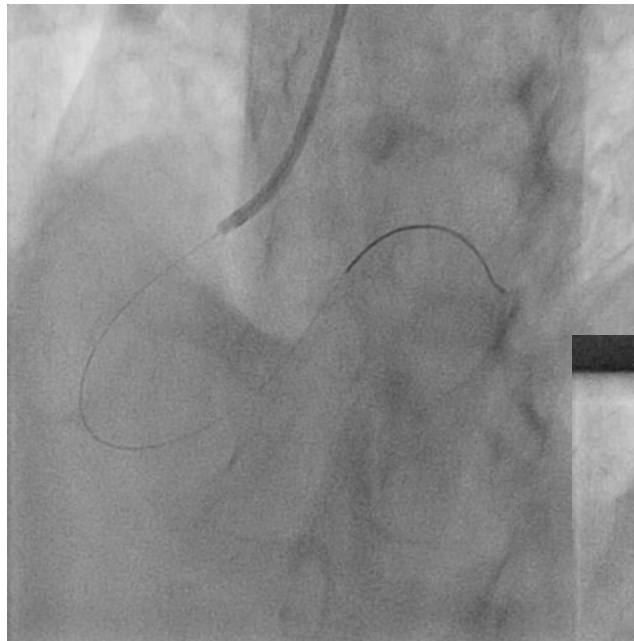
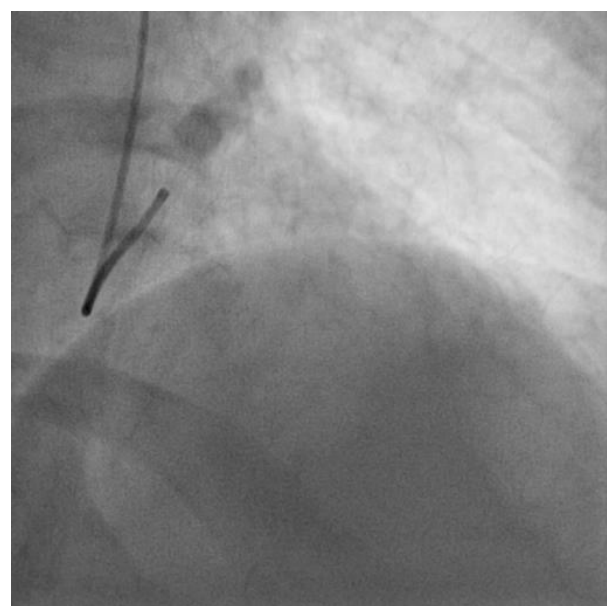
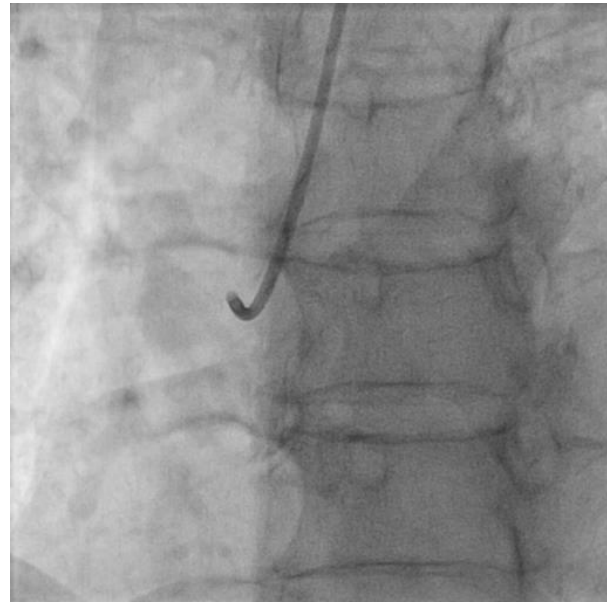


J0

STAGED PCI *J4*

**lésions en série :
artère coupable > lésion coupable**

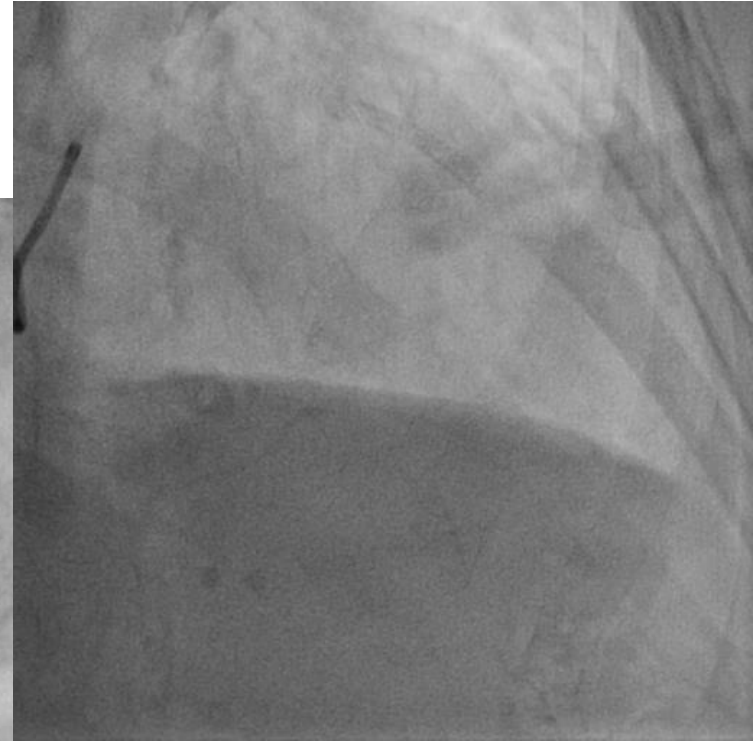
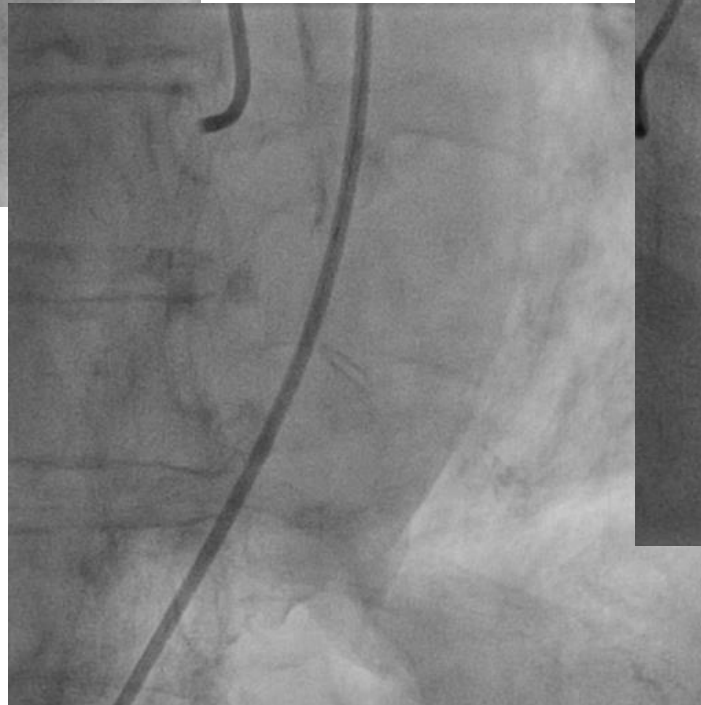
***”IRA :infarcted related artery”
lésions en amont ou en aval de la Culprit***



MULTIPLE PCI

sujet très âgé ? culprit lesion alone ?

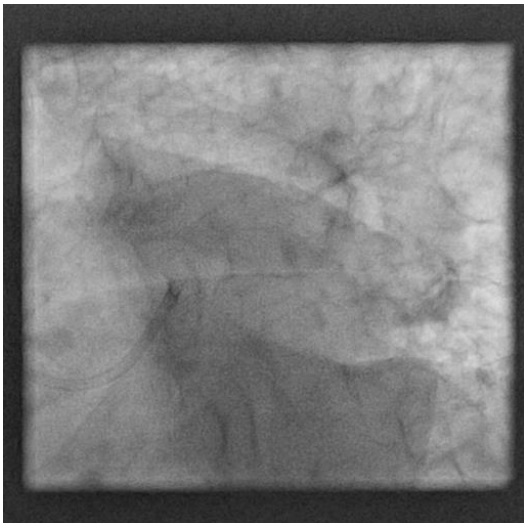
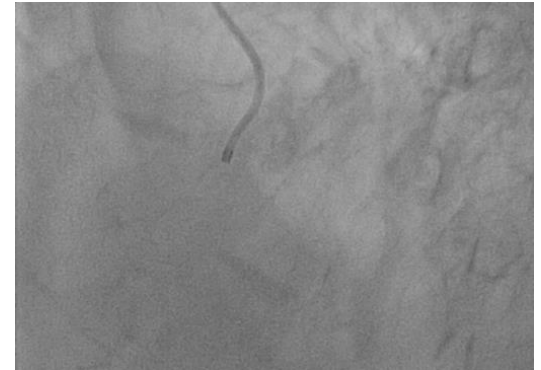
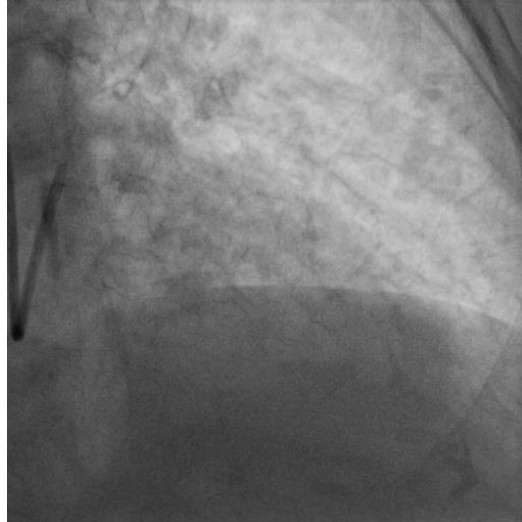
95 ans, ST+ inférieur
culprit seule,
lésions intermédiaires IVA médicales



lésions intermédiaires

FFR, tests non invasifs ?

85 ans, ST+ latéral



J3

FFR IVA + 0,72

STAGED PCI

J0



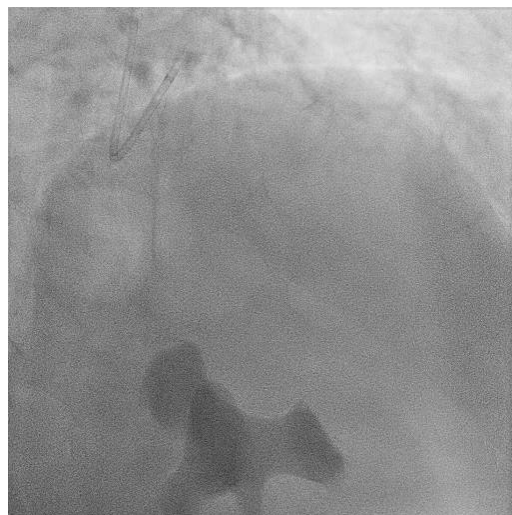
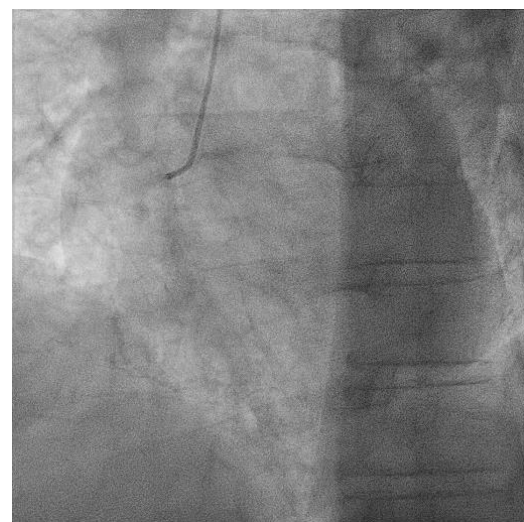
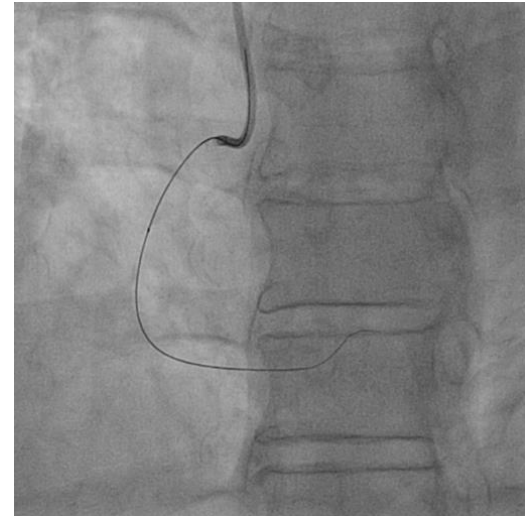
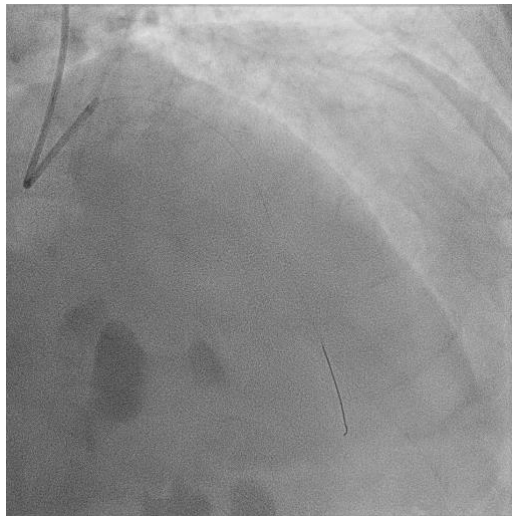
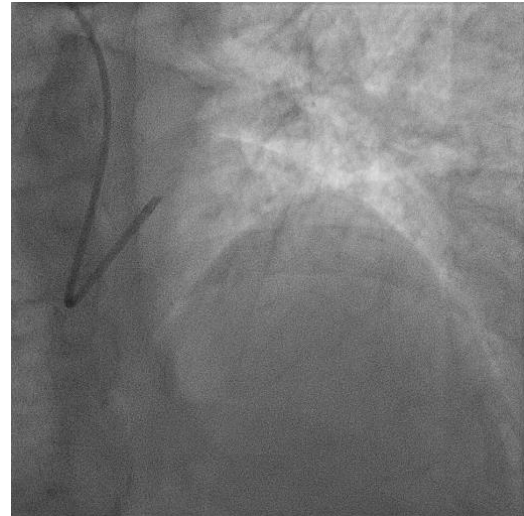
lésions complexes

CTO, lésions calcifiées, bifurcations complexes

STAGED-PCI, différée

J0

J20



Conclusion

Consensus:

Open the Culprit
avec stent - actif - par voie radiale

Prise en charge des autres lésions :

Revascularisation complète rapide préconisée :

staged-PCI index admission

multiple PCI

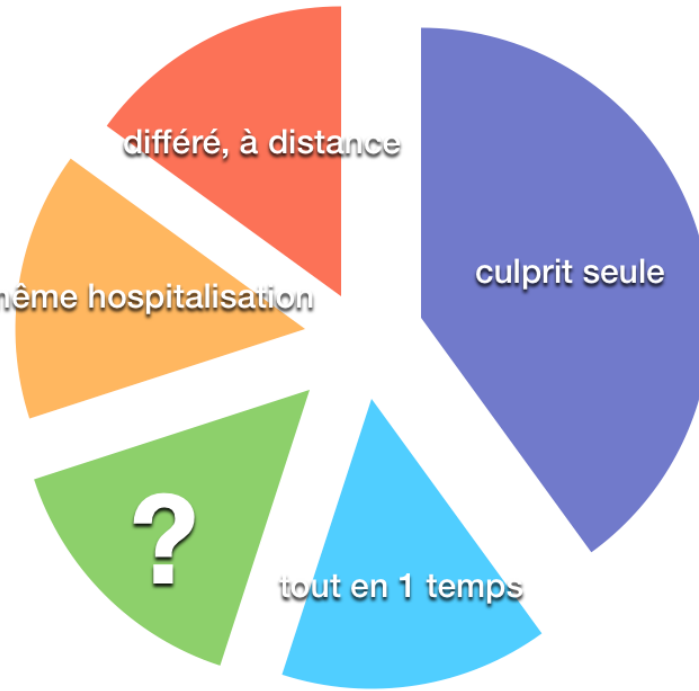
durée hospitalisation identique

pas de risque majoré

bon sens clinique / angiographique :

stratégie de revascularisation personnalisée

revascularisation STEMI



lésions non culprit complexes,
non menaçantes :
CTO
rotablator
bifurcations complexes

risque néphrotoxicité

irradiation patient

spasme à la phase aiguë

risque perdu de vue

sujet jeune : durée arrêt travail

éloignement géographique
touriste, hôpital périphérique

raisons économiques

revascularisation complète avant rééducation

lésions serrées & pronostiques : TCG, IVA proximale

lésions intermédiaires : FFR, test non invasif

habitudes opérateur

IDM hors délai et viabilité IRM

staff / Heart team

monotronculaire

autres lésions médicales
sujet (très) âgé
comorbidités
avals pathologiques

stratégie hybride /
pontages

lésions instables multifocales?

instabilité hémodynamique

lésion en amont
ou en aval de la Culprit

non-culprit simple type A

difficulté abord vasculaire

confort du patient