



*Morphological **P**arameters **E**xplaining
Stent **T**hrombosis assessed by **O**CT*



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Characteristics of stent thrombosis in bifurcation lesions analyzed by optical coherence tomography: insights from the national PESTO French registry

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On the behalf of the PESTO investigators

**European Bifurcation Club XIII
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Conflicts of interest

- **Consulting fees : Abbott Vascular, Biosensors, Boston Scientific, B Braun, St Jude Medical, Astra Zeneca**

AIMS

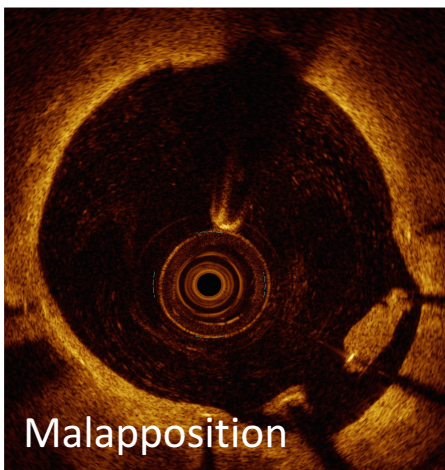
The present work aimed to investigate the characteristics, mechanisms and relative incidences of bifurcation lesions ST among a large cohort of patients explored by OCT.

METHODS (1)

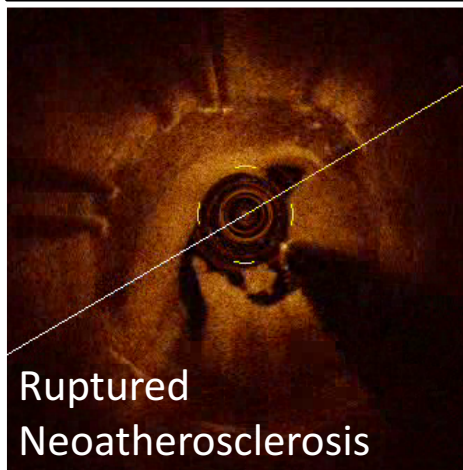
- The PESTO study was a prospective national multicenter registry involving 29 French catheterization labs.
- Patients who were referred with acute coronary syndromes (ACS) were prospectively screened for presence of definite ST and explored by OCT after culprit lesion deocclusion if needed.
- ST was classified as acute (AST), sub-acute (SAST), late (LST) and very late (VLST), according to the Academic Research Consortium (ARC) criteria.
- Three independent operators unaware of patients' characteristics reviewed OCT data to identify the ST etiologies.

METHODS (2)

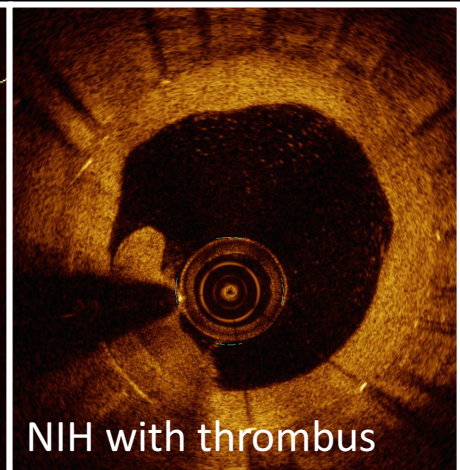
- The bifurcations lesions were defined and divided in PMB (proximal main branch), SB (side branch) & DMB (distal main branch) according to the EBC consensus.
- Thrombus & mechanical abnormality were located within PMB / DMB & SB.
- We retrospectively obtained from the local catheterization facilities the specifications of the initial PCI procedure in the bifurcation lesion, including the use of POT & KBI.



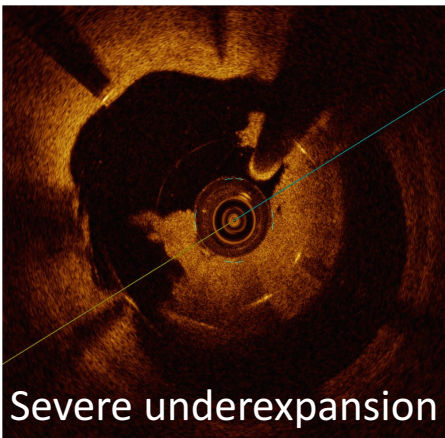
Malapposition



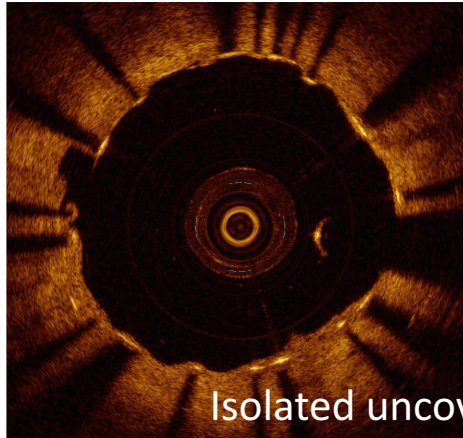
Ruptured
Neoatherosclerosis



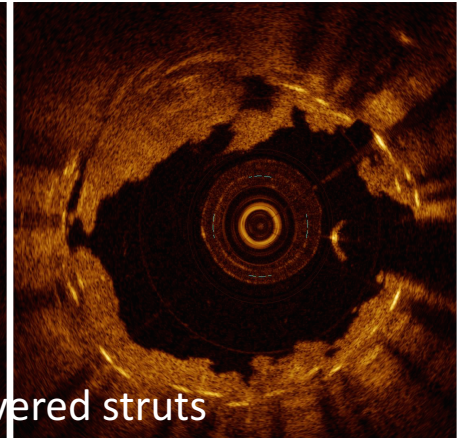
NIH with thrombus



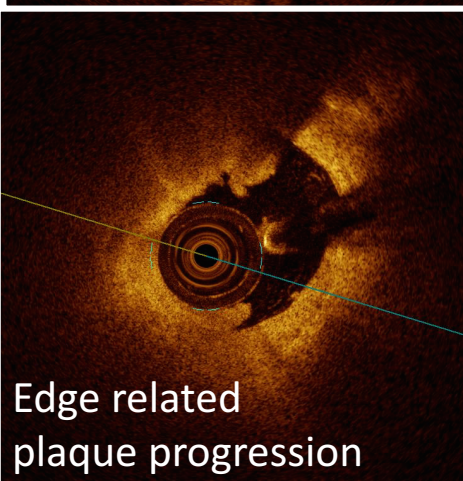
Severe underexpansion



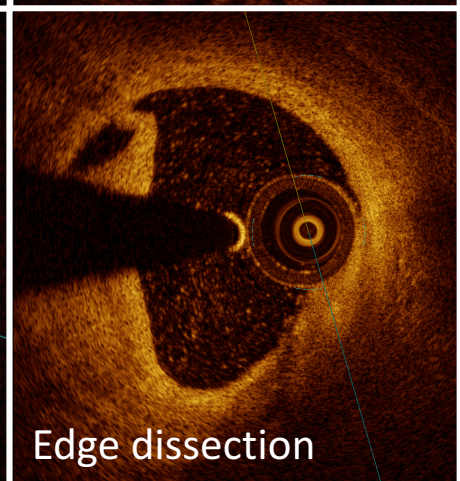
Isolated uncovered struts



Coronary evaginations



Edge related
plaque progression



Edge dissection



N=229 patients with suspected ST



N=134 patients screened for inclusion



*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 characteristics



N=3 patients excluded for inadequate OCT quality

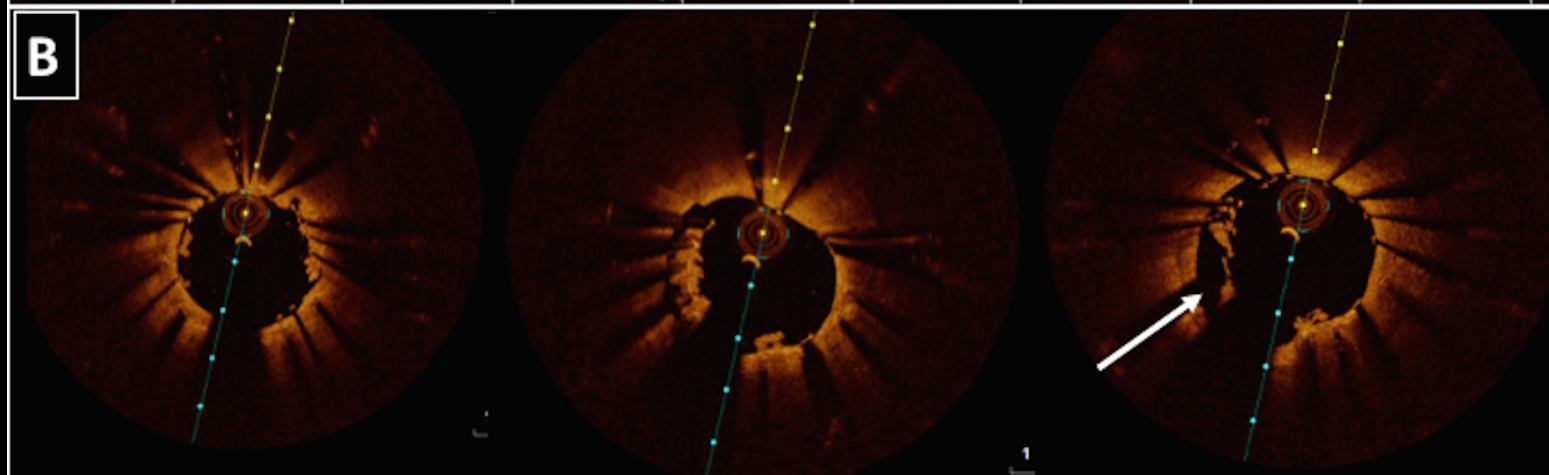
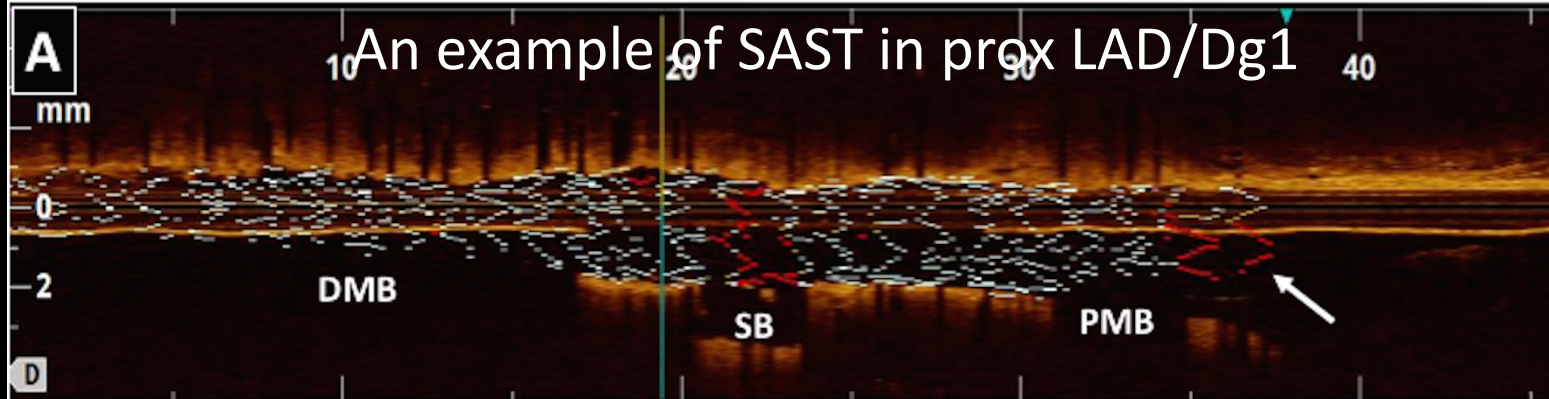
17.5 %

N=120 patients included in final analysis

N=21 patients with bifurcation

N=99 patients with no bifurcation

An example of SAST in prox LAD/Dg1



BIFURCATION CHARACTERISTICS AT INITIAL PCI

	Bifurcation group N=21
Initial Medina Classification	
1.1.0 , n (%)	9 (43)
1.1.1 , n (%)	6 (29)
1.0.0 , n (%)	2 (9)
0.1.1 , n (%)	2 (9)
0.1.0 , n (%)	1 (5)
0.0.1 , n (%)	1 (5)

BIFURCATION LESIONS CHARACTERISTICS AT INITIAL PCI

	Bifurcation group N=21
One Stent Strategy , n (%)	17 (81)
Two Stent Strategy , n (%)	4 (19)
POT technique , n (%)	2 (9)
FKI, n (%)	10 (48)

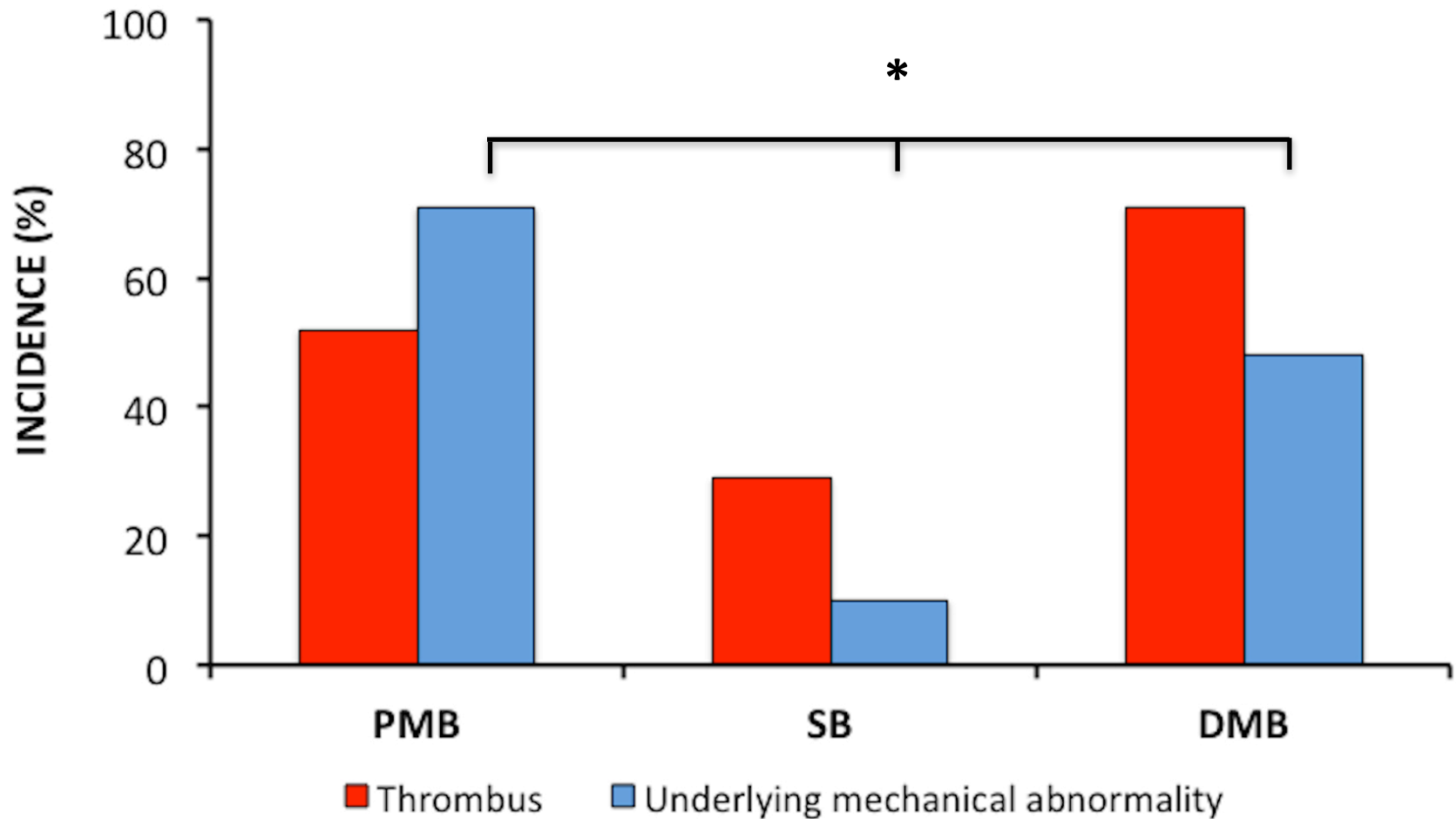
BASELINE CHARACTERISTICS (1)

	Bifurcation (n=21)	No Bifurcation (n=99)	p
Age (years)	62.6 (49.5-73.3)	61.5 (51.4-67.7)	0.67
Male sex, n (%)	16 (76)	91 (92)	0.05
Presentation mode at event:			
STEMI, n (%)	15 (72)	85 (85)	0.11
NSTEMI, n (%)	6 (28)	14 (14)	0.09
Clinical presentation at index PCI:			
Acute coronary syndrome, n (%)	16 (76)	71 (70)	0.67
Stable angina, n (%)	5 (24)	28 (30)	0.67
Index PCI to ST delay (months)	1.9 (0.04-3.4)	3.0 (1.1-7.3)	0.11
Acute ST, n (%)	1 (5)	3 (3)	0.54
Subacute ST, n (%)	6 (29)	13 (13)	0.08
Late ST, n (%)	1 (5)	6 (6)	0.65
Very late ST, n (%)	13 (62)	77 (78)	0.13

BASELINE CHARACTERISTICS (1)

	Bifurcation (n=21)	No Bifurcation (n=99)	p
Culprit vessel			
LAD localization, n (%)	13 (62)	43 (43)	0.12
Circumflex localization, n (%)	6 (28)	18 (18)	0.21
RCA localization, n (%)	2 (10)	38 (38)	0.01
Stent type:			
Drug eluting stents / DES, n (%)	15 (72)	56 (56)	0.21
Bare metal stents/BMS, n (%)	6 (28)	41 (41)	0.27
Bioresorbable vascular scaffolds/ BVS, n (%)	0	2 (2)	0.68
Stenting & initial lesion characteristics:			
Initial lesion length, mm	20 (14-25)	16 (12-20)	0.051
Initial lesion diameter, mm	3.0 (2.3-3.5)	3.0 (3.0-4.0)	0.24
Stent length, mm	23 (18-28)	20 (16-24)	0.21
Stent diameter, mm	3 (2.8-3)	3.0 (3.0-3.5)	0.24
Direct stenting, n (%)	11 (52)	49 (49)	0.62

ABNORMALITIES / THROMBUS LOCALIZATION WITHIN STENT IDENTIFIED BY OCT



MECHANICAL ABNORMALITIES IDENTIFIED BY OCT

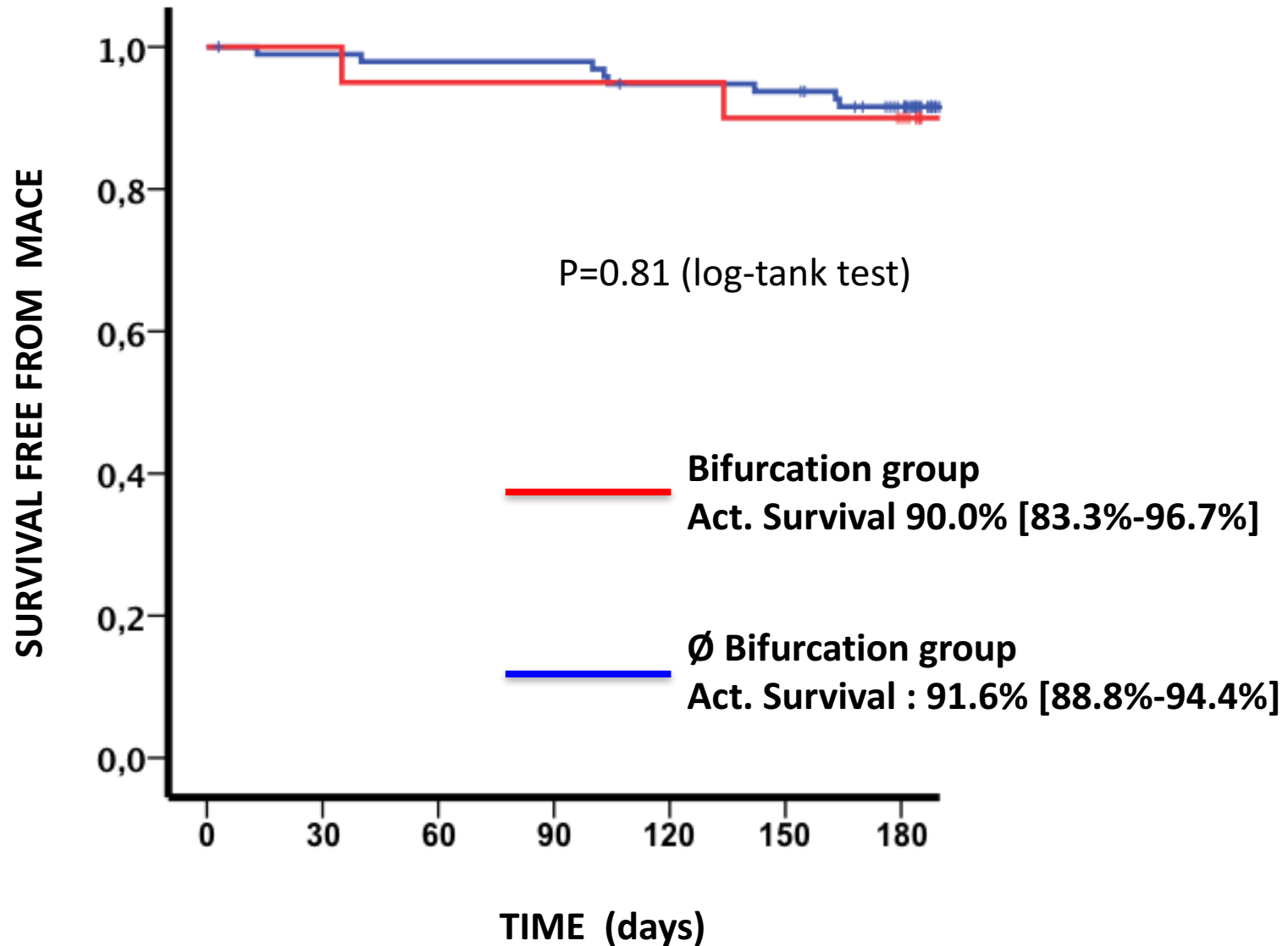


Underlying mechanical abnormalities	Bifurcation (n=21)	No Bifurcation (n=99)	p
Malapposition, n (%)	7 (33)	32 (32)	0.93
Ruptured Neoatherosclerosis, n (%)	1 (5)	26 (26)	0.02
Underexpansion, n (%)	4 (19)	9 (9)	0.17
Coronary Evagination, n (%)	1 (5)	9 (9)	0.44
Edge related disease progression, n (%)	0	9 (9)	0.16
Isolated uncovered struts, n (%)	4 (19)	6 (6)	0.07
Neointimal hyperplasia, n (%)	2 (10)	4 (4)	0.28
Edge dissection, n (%)	1 (5)	1 (1)	0.32
No cause identified, n (%)	1 (5)	3 (3)	0.54

IMPACT OF POT/ FKI DURING INITIAL PCI

Underlying mechanical abnormalities	POT and/or FKI (n=11)	Others (n=10)	p
Malapposition, n (%)	4 (36)	3 (30)	0.56
Ruptured Neoatherosclerosis, n (%)	1 (9)	0	0.52
Underexpansion, n (%)	0	4 (40)	0.04
Coronary Evagination, n (%)	1 (9)	0	0.52
Edge related disease progression, n (%)	0	0	1
Isolated uncovered struts, n (%)	3 (27)	1 (10)	0.33
Neointimal hyperplasia, n (%)	0	2 (20)	0.21
Edge dissection, n (%)	1 (9)	0	0.52
No cause identified, n (%)	1 (9)	0	0.52

6 MONTHS CLINICAL FOLLOW-UP



- In this prospective ST registry, bifurcation lesions were involved in 17.5% of the cases.
- An underlying mechanical abnormality was identified in 91% of the cases that mostly involved PMB.
- There was no significant difference between underlying mechanical abnormalities in bifurcated vs. non-bifurcated lesions ST, except for neoatherosclerosis.
- Malapposition was the leading potential cause for ST.
- Stent underexpansion was less frequently observed in case POT and/or final KBI was applied during index PCI.

