



13TH EUROPEAN BIFURCATION CLUB MEETING
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Missing studies session



BIFURCATOR-2 study

**A study to compare the Standard Approach
to treat bifurcation lesions vs a Rotational
Atherectomy and Provisional Stenting**

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❑ I have the following potential conflicts of interest to report:

- I am on the speaker bureau and I am also consultant for Abbott, Boston Scientific, Biotronik, Medtronic, Novartis, Bayer, Daichi-Sankyo
- I am proctor for Rotational Atherectomy with a teaching contract by Boston Scientific. Boston Scientific supports this study with a grant. No other relation with industry with regard to the study.



Why this study?

- “The cardinal indication for *plaque modification* is the calcific lesion, which, in the absence of plaque modification, confers an increased likelihood of procedural failure, stent underdeployment, restenosis, and major complications”
- “Preparation and debulking of the lesion with *rotational atherectomy* and *special balloons*, cutting or scoring, may be useful in highly calcified, rigid ostial lesions”
- *Coronary bifurcation* is a challenging setting for performing PCI.

BIFURCATOR

What were the essential results?

ANGIOGRAPHIC AND PCI PROCEDURE DATA II



	BIFUR YES (n = 64)	BIFUR NO (n = 32)	P
Multivessel disease (n; %)	52 (81.2)	24 (71,8)	NS
B2C (n; %)	82 (98.4)	26 (81,2)	NS
L-Euroscore (media; SD)	21.14 (22.15)	13.7 (18.7)	NS
Syntax Score (media; SD)	34.05 (17.9)	31.57 (17.9)	NS

Medina's Classification for Bifurcation lesions (n; %)	BIFUR YES (n = 64)	BIFUR NO (n = 32)	P
1.0.0	42 (48.3)	8 (25)	0.04
0.1.0	16 (18.4)	14 (43.7)	0.03
1.1.0	29 (33.3)	10 (31.3)	NS

What were the essential results?

Bifurcation involved	
LM-LAD	18 (20.6)
LM-LCX	7 (8)
LM-IR	1 (1.1)
pLAD-1 st Dg	44 (50.6)
mLAD-2 nd Dg	8 (9.2)
pLCX-mLCX	5 (5.8)
RCA-IVP	2 (2.2)

ANGIOGRAPHIC AND PCI PROCEDURE DATA III



	BIFUR YES (n = 64)	BIFUR NO (n = 32)	P
Stenting technique			
Provisional stenting	64 (100)	19 (59.3)	0.04
Two-stent initial approach technique	0	13 (40.6)	< 0.001
POT	43 (67.1)	11 (34.3)	< 0.05
Final kissing	1 (1.5)	27 (84.3)	<0.001
Final inflation pressure (atm)	18 (1.9)	14 (2)	0.05
Basal size (Me; IQR) (mm)	2.41 (0.34)	2.89 (0.26)	0.009
Final size (Me. IQR) (mm)	3.1 (1.9)	2.95 (0.37)	NS
Max Length stented (Me;ICA) (mm)	56 (48)	44 (26.1)	0.005
IVUS / OCT technique imaging [n (%)]	6 (9.3)	5 (15.6)	NS



What were the essential results?

OUTCOMES BEFORE DISCHARGE	RA+ (N=64)	RA- (N=32)	P
Clinical success (%)	98.6	98	NS
Cardiovascul death (hosp) [n (%)]	3 (4.5)	1 (3.1)	NS
• Related with procedure	2 (3)	1 (3.1)	
• Related with rotablation	1 (1.5)	0	
Angiographic success (%)	96.5	97.5	NS
Angiographic complications [n (%)]			
• Unable to advance wire/burr	1 (1.5)	1 (3.1)	NS
• Burr entrapment	0	N/A	NS
• Unable to deliver stent	1 (1.1)	1 (2.3)	NS
• Coronary dissection	1 (1.1)	3 (6.9)	0.024
• Side-branch compromise	2 (2.2)	19 (44.1)	< 0.001
• Need for SB treatment	1 (1.1)	14 (32.5)	< 0.001
• Perforation	0	0	NS
• Cardiac tamponade	0	0	NS
• Acute stent thrombosis	0	0	NS

OUTCOME DURING FOLLOW-UP	RA+ (N=64)	RA- (N=32)	P
MACCE (3.08y, IQR: 2.38-3.78)			
• GLOBAL: 27 (28.7%)	16 (25%)	13 (40.6%)	0.03
• Overall death rate	13 (20.3%)	7 (21.8%)	NS
• Hospitalization	3 (3.1%)	1 (3.1%)	NS
• 30 days	3 (3.1%)	2 (6.2%)	NS
• Cardiac Death	5 (7.8%)	3 (9.3%)	NS
• Non-Cardiac Death	8 (12.5%)	3 (9.3%)	NS
• Stroke	1 (1.5%)	3 (9.3%)	0.02
• TLR	2 (2.2%)	6 (13.9%)	0.02
• TVR	2 (2.2%)	4 (9.3%)	0.03



Which is the future? BIFURCATOR-2

Hypothesis: RA+PS vs Standard Treatment for BL



Methods: Inclusion criteria

- Patients referred to Cath Lab for suspected or confirmed coronary ischemic disease.
- Patients with coronary artery disease located in native coronary vessels meeting all the following conditions:
 - 1) A Bifurcation "de novo" Lesion (Medina's classification) should be involved:
1,0,0 / 1,1,0 / 0,1,0 / 1,0,1 / 0,1,1 / 1,1,1
 - 2) Age \geq 18 years
 - 3) life-expectancy \geq 1 year
 - 4) Signed Informed Consent



Which is the future? BIFURCATOR-2

Methods: Exclusion criteria

- 1) Lesions with thrombus or dissection
- 2) Graft lesions
- 3) In the case of a single main vessel with severe left ventricle dysfunction ($EF < 30\%$)
- 4) Contraindication for dual antiplatelet therapy
- 5) Indication for conservative/surgical treatment
- 6) Haemodynamic or electrical instability
- 7) Age < 18 years
- 8) Pregnancy or females of childbearing potential
- 9) An estimated life-expectancy < 1 year
- 10) Patient rejection or inability to provide informed consent



Which is the future? BIFURCATOR-2

Methods: PCI procedure

- As EBC and Expert Consensus recommended* the provisional stenting approach the selected technique suggested. We avoid to pre-treat side-branch (SB) vessels ≥ 2 mm excluding if one or more very high-risk angiographic conditions are present:
 - 1) severe ostial stenosis
 - 2) severe calcification located in the carina
 - 3) flow compromise in SB (defined by a TIMI flow < 3)
- Final decision on which bifurcation lesions technique should be used in each case is at operators' discretion.



Which is the future? BIFURCATOR-2

Methods: PCI procedure

- For avoiding complications related with RA we strongly recommend to perform it following the recently standardized protocol for RA

“European expert consensus on rotational atherectomy”

EuroIntervention 2015;11:30-36

- **OCT/IVUS support is highly recommended.**



Which is the future? BIFURCATOR-2

Primary Endpoint

A. Procedural endpoint: **Need for side-branch treatment**

B. Clinical endpoint: **TLR**

- **“Side-branch compromise”** will be established if any worsening on stenosis percentage or TIMI flow is observed from the baseline angiography after PCI (rotablation or standard approach)
- **“Need for side branch treatment”** will be assessed if “side-branch compromise” is observed and: 1) ostial side-branch stenosis is $>70\%$; 2) flow compromise in SB (defined by a TIMI flow < 3) or 3) Unsuccessful despite an initial decision to treat SB



Which is the future? BIFURCATOR-2

Secondary Endpoint

- A. Patient-oriented endpoint: death of any cause, non-fatal myocardial infarction and any revascularization.

- B. Angiographic outcomes:
 - A. a. Success rate periprocedural and at the 1-y check-up.
 - B. b. Angiographic complications rate: dissection, occlusion, perforation, no-reflow.

- C. As well the incidence of stroke, haemorrhages, need for transfusion, renal insufficiency, vascular complications



Which is the future? BIFURCATOR-2

- **Sample Size** (Based on BIFURCATOR data) (ArcoSinus formula)
- **Primary “procedural” endpoint: Need for SB treatment**
 - Expected in the standard arm: 32.5%
 - Expected in the rotablation arm: 1.1%
 - Estimated sample size = 56 patients
 - Normal with Fleiss' correction / $\alpha=0.05$ / $\beta=0.20$
 - Final sample size (+10% loss at FU) = **62 patients**
- **Primary “clinical” endpoint: TLR**
 - Expected in the standard arm: 13.9%
 - Expected in the rotablation arm: 2.2%
 - Estimated sample size = 202 patients
 - Normal with Fleiss' correction / $\alpha=0.05$ / $\beta=0.20$
 - Final sample size (+10% loss at FU) = **223 patients**



Which is the future? BIFURCATOR-2

"Primary" Endpoint

A. Procedural endpoint: **Need for side-branch treatment**

B. Clinical endpoint: **TLR**

C. Target vessel failure (TVF):


composite of cardiac death, vessel related myocardial infarction, target vessel revascularization.

"Secondary" Endpoint

included the individual components of the primary endpoint, all-cause death, stent thrombosis, target lesion revascularization (TLR), and target bifurcation revascularization (TBR) at follow-up



Which is the future? BIFURCATOR-2

- **Sample Size** (Based on BIFURCATOR data) (ArcoSinus formula)
- **“Standard clinical” endpoint: TVF**
(Target vessel failure: Cardiac death, vessel-related MI, TVR)
 - Expected in the standard arm: 24.8% 
 - Expected in the rotablation arm: 13.1%
 - Estimated sample size = 386 patients
 - Normal with Fleiss' correction / $\alpha=0.05$ / $\beta=0.20$
- Final sample size (+10% loss at FU) = 425 patients



Which is the future? BIFURCATOR-2

Methods: Follow-up

- Clinical follow-up:
 - Before discharge / At the 30th day / At 1-y
- The following clinical variables will be registered:
 - Mortality: All-cause mortality / Cardiac death
 - Non-fatal myocardial infarction:
 - Vessel-related / Non-vessel related
 - (Need for) Revascularisation:
 - Any revascularisation / TVR / TLR (of the treated lesion/s)
- Angiographic follow-up: clinically driven



Which is the future? BIFURCATOR-2

EXPECTED/PROPOSED TIMELINES

- Initial enrolment: 1st QT 2018
- Last enrolment: 1st QT 2019

- Recruitment period: 12 months. Until February 2019

- Analysis period: 2 months. Until May, 2019 ??
- Preliminary results presentation: Euro PCR 2019 ??
- Paper draft: June 2019 ??
- Final results presentation: TCT 2019 ??



Which is the future? BIFURCATOR-2

Involved / Interested Centers (at the moment)

- 1) Hospital U. Central de la Defensa Gómez Ulla, Madrid, ES
- 2) Hospital del Mar, Barcelona, ES
- 3) ICTRA, Berlin, DE
- 4) Medical University Hospital of Wroclaw, PL
- 5) Coimbra University Hospital, Coimbra, PO
- 6) Hospital U. La Paz, Madrid, ES
- 7) Hospital Virgen Arrixaca, Murcia, ES
- 8) ...
- 9) EBC members ??
- 10) Euro-Rota Club members ??



Thank you!!

