

# Lésion de bifurcation et STEMI

Pr Faouzi Addad

Service de cardiologie

CHU Abderrahmen Mami-Ariana

Tunisie

# Introduction



**Lésions de bifurcation:** 15 à 20% des lésions en cardiologie interventionnelle

Véritable challenge:

Taux de succès moindre

**Lésion de bifurcation + Angioplastie  
primaire = hypothèse d'un moins bon  
pronostic**

Angi

Présence

Risque important de no-reflow

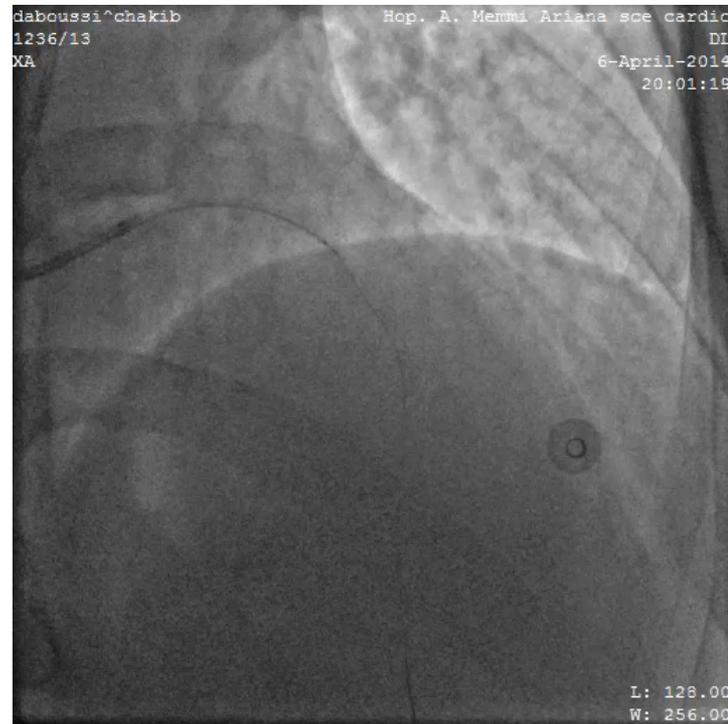
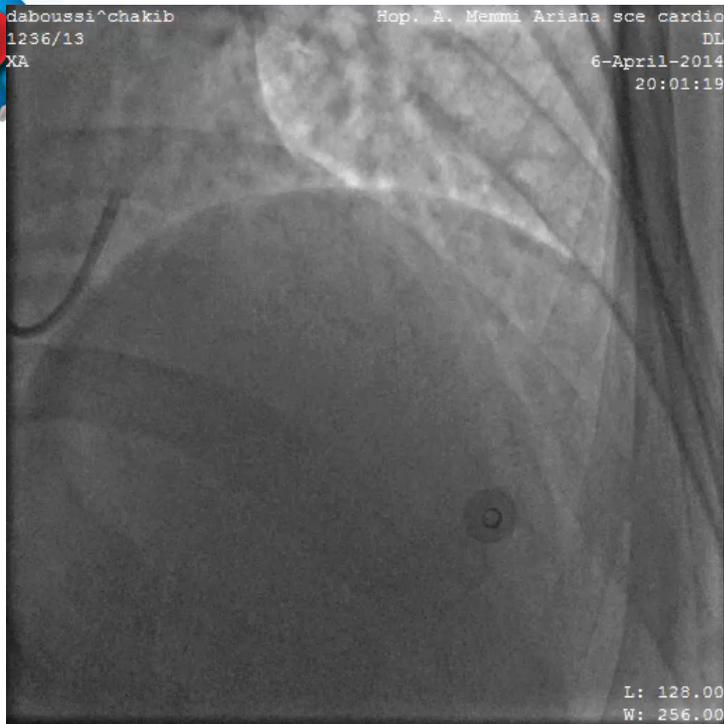
Nécessiter d'une reperfusion rapide et efficace

# Cas clinique N°1



- Patient âgé de 47 ans
- Tabagique
- Consulte pour un SCA ST+ dans le territoire antérieur à H2
- Indication à une angioplastie primaire dès son arrivée dans le service

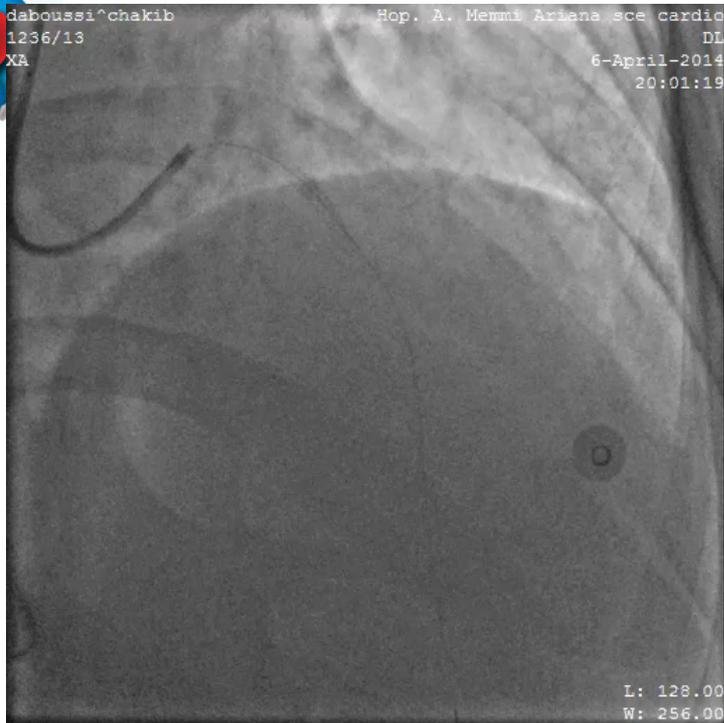
# Angioplastie primaire voie radiale droite





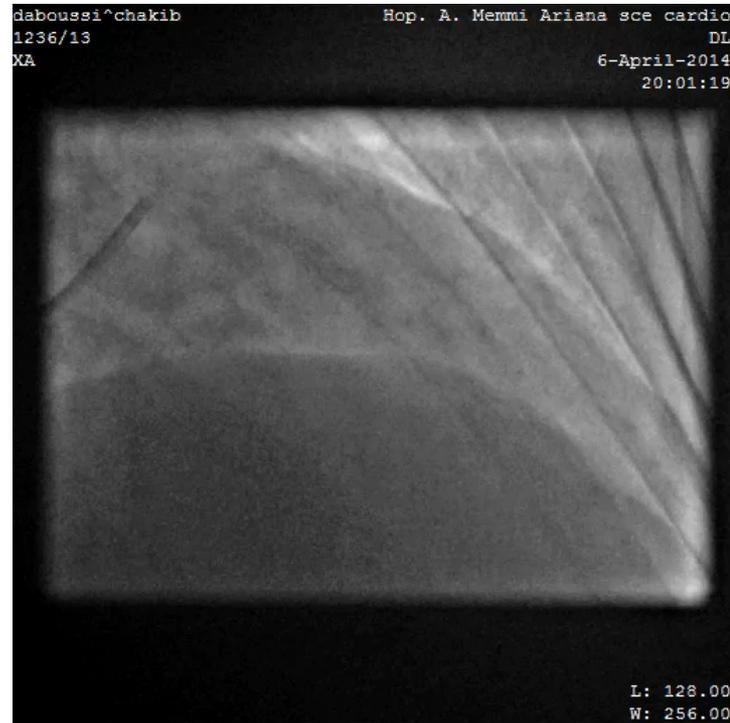
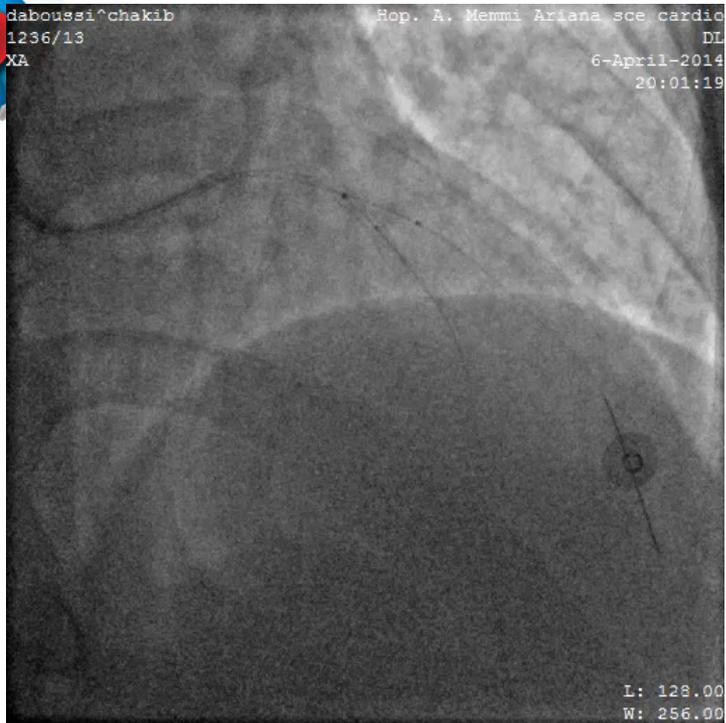


daboussi^chakib Hop. A. Memmi Ariana sce cardio  
1236/13 DL  
XA 6-April-2014  
20:01:19



daboussi^chakib Hop. A. Memmi Ariana sce cardio  
1236/13 DL  
XA 6-April-2014  
20:01:19





# Évolution clinique



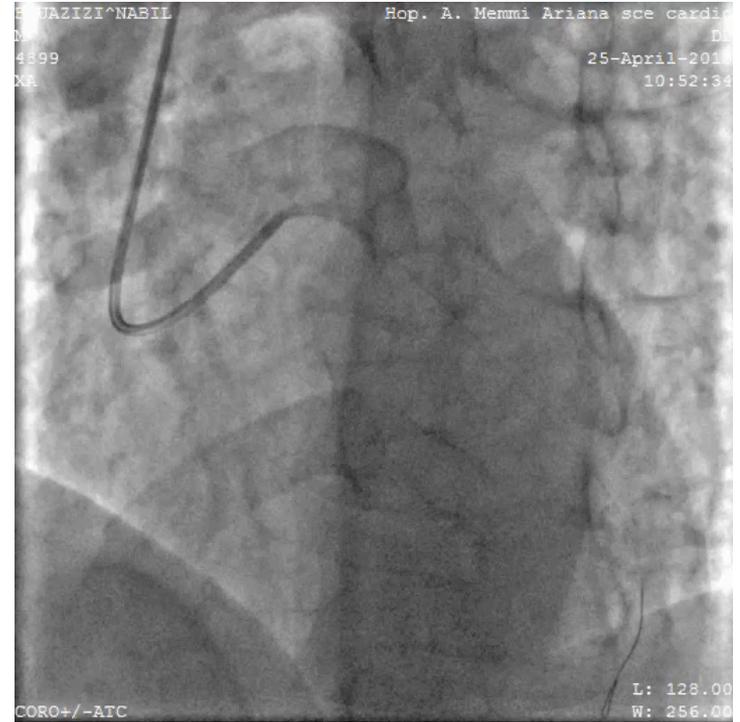
- Patient totalement asymptomatique à 2 ans
- ETT: VG non dilaté, cinétique normale, FEVG 55%
- Scintigraphie à 1 an négative

# Cas clinique N°2



- Patient âgé de 42 ans
- Diabétique type 2 sous insuline
- Consulte pour un IDM latéral à H2
- Décision d'une angioplastie primaire

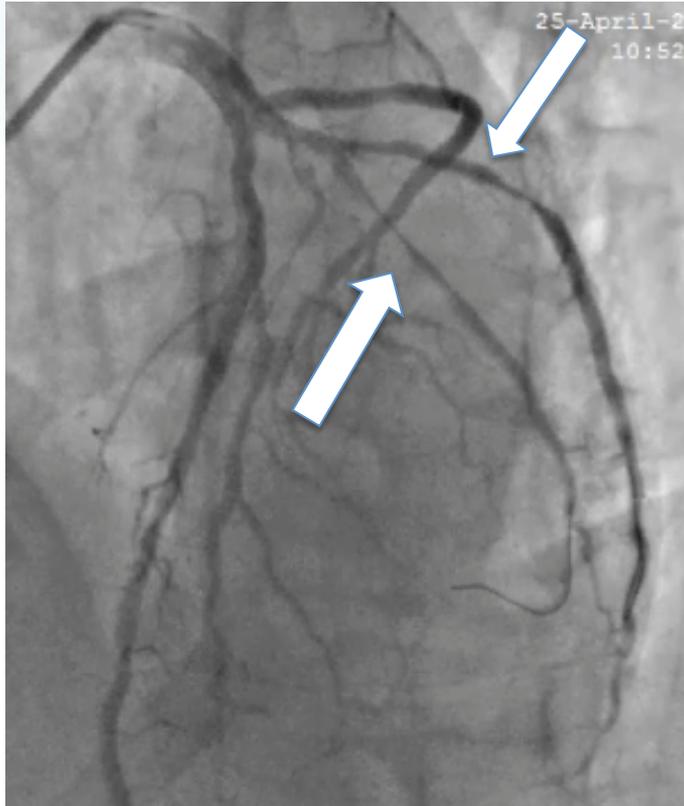
# Angioplastie primaire voie radiale droite



# Réouverture de l'artère

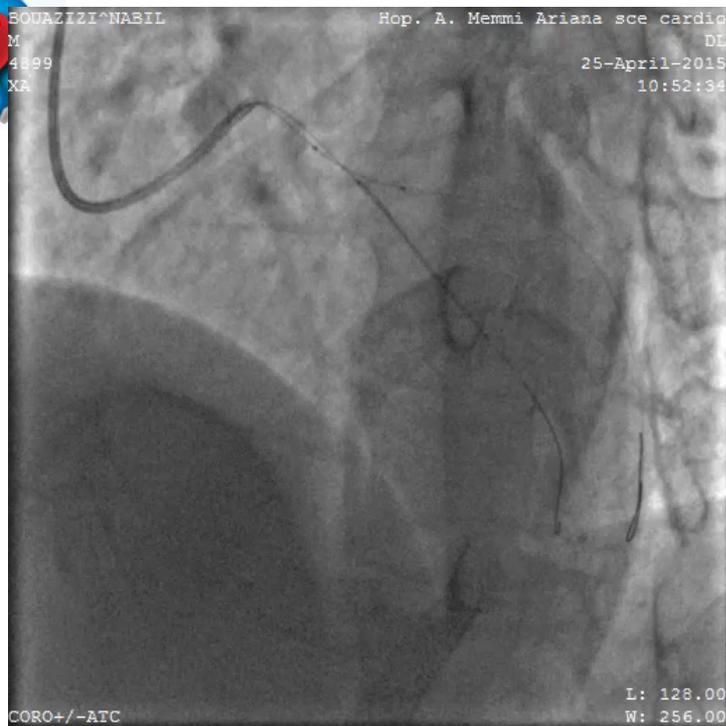


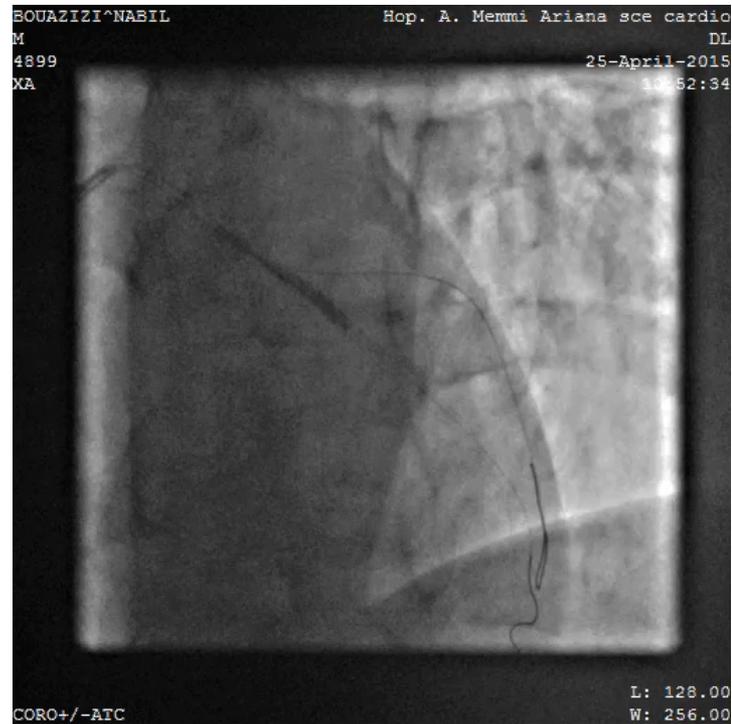
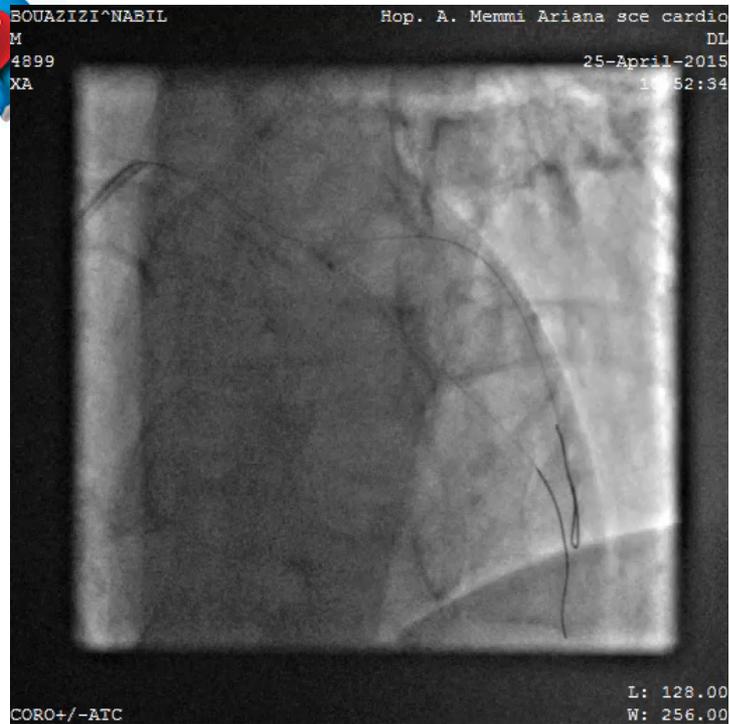
# Quelle technique?

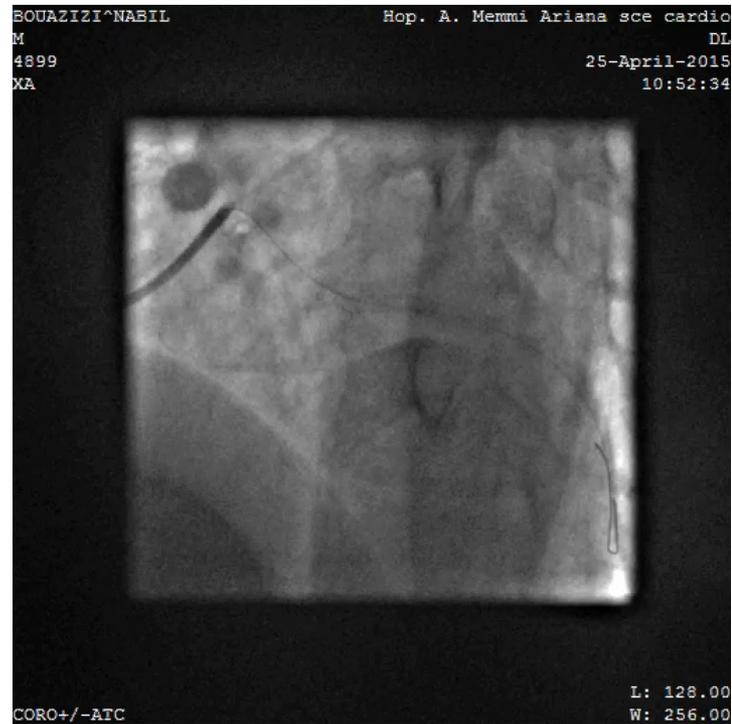
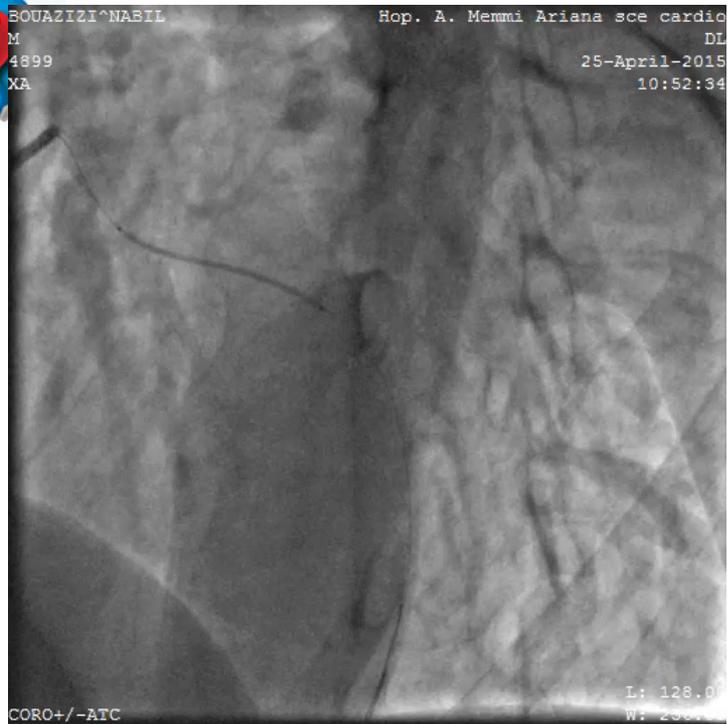


- Lésion de bifurcation vraie 0,1,1
- Angle B: 40°
- Lésion complexe et risque élevé d'occlusion de l'artère coupable (SB)
- Technique à 2 stents
- TAP, culotte, minicrush, DK-crush?

# DK-crush (simplifié)

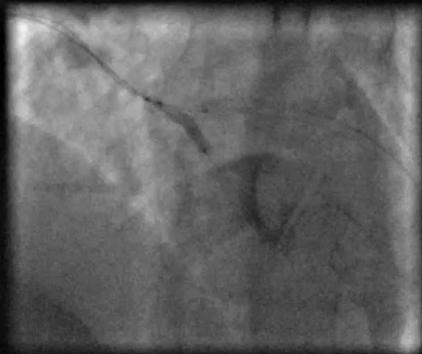






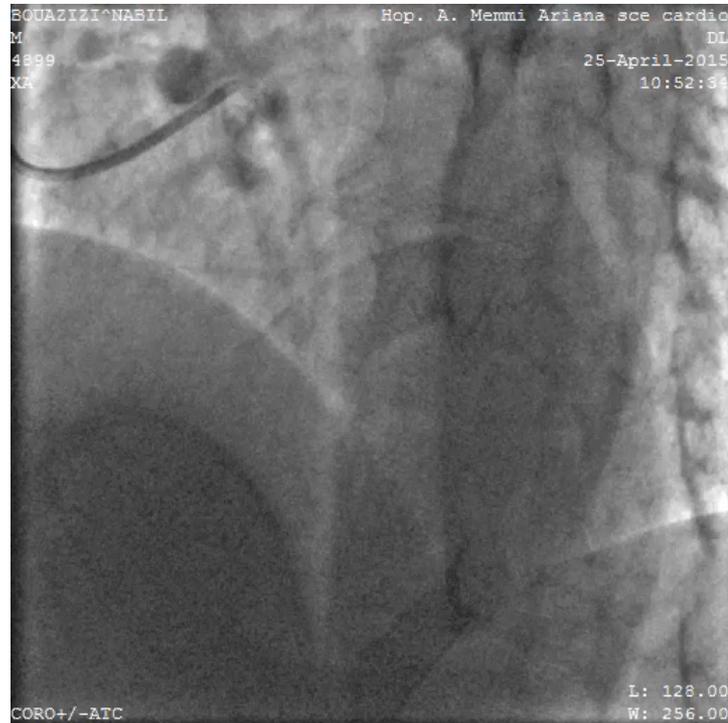


BOUAZIZI^NABIL Hop. A. Memmi Ariana sce cardio  
M DL  
4899 25-April-2015  
XA 10:52:34



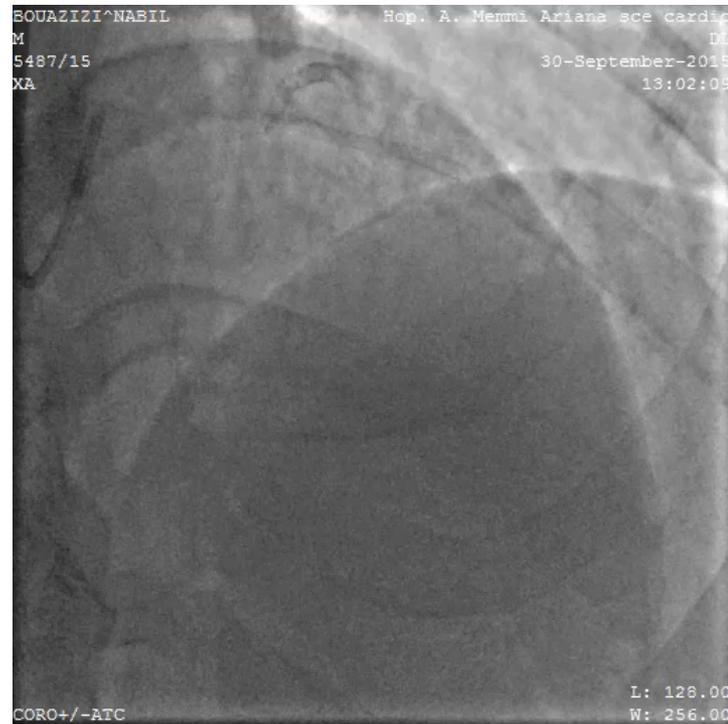
CORO+/-AIC L: 128.00  
W: 256.00

BOUAZIZI^NABIL Hop. A. Memmi Ariana sce cardio  
M DL  
4899 25-April-2015  
XA 10:52:34



CORO+/-AIC L: 128.00  
W: 256.00

# Contrôle angiographique à 6 mois



# Evolution clinique



- Patient asymptomatique à 15 mois
- Bonne fonction VG



# PRÉVALENCE ET CARACTÉRISTIQUES DE LA LÉSION DE BIFURCATION EN ANGIOPLASTIE PRIMAIRE?

# Impact of bifurcation lesions on clinical outcome and prognosis of primary angioplasty in acute myocardial infarction

Diaa-Eldin Abdel Hakim<sup>1,4</sup>, MD; Philippe Garot<sup>2</sup>, MD; Stéphane Champagne<sup>3</sup>, MD; Fathi Maklady<sup>4</sup>, MD; Ahmed El Hawary<sup>4</sup>, MD, PhD; Jean-Luc Dubois-Randé<sup>3</sup>, MD, PhD; Pierre-François Lesault<sup>3</sup>, MD; Emmanuel Teiger<sup>3\*</sup>, MD, PhD

1. University Hospital Henri Mondor, Créteil, France; 2. University Hospital Henri Mondor, Claude Galien-ICPS Hospital, Quincy-sous-Sénart, France; 3. University Hospital Henri Mondor, Assistance Publique des Hôpitaux de Paris, Créteil, France; 4. Cardiology Department, Suez Canal University Hospital, Ismailia, Egypt



Prévalence de 23%

**Table 1. Characteristics of the study patients.**

	Bifurcation (n=150)	Non-bifurcation (n=496)	P value
Age, years	59±14	59±13	0.41
Male, % (n)	86 (129)	82.25 (408)	0.29
Diabetes mellitus, % (n)	24 (36)	22.1 (110)	0.46
Hypertension, % (n)	32.7 (49)	30.2 (150)	0.46
Current smoking, % (n)	38.7 (58)	36.3 (180)	0.24
Hypercholesterolaemia, % (n)	35.3 (53)	33.1 (164)	0.39
Previous MI, % (n)	13 (20)	12 (60)	0.47
Previous revascularisation	8 (12)	6.1 (30)	0.42
Use of glycoprotein IIb/IIIa inhibitor, % (n)	30 (45)	26 (129)	0.28
LVEF, %	53±12	56±10	0.35
Time from pain onset to PCI, min	180±25	195±30	0.52

MI: myocardial infarction; LVEF: left ventricular ejection fraction;  
 PCI: percutaneous intervention

**Table 2. Characteristics of the bifurcation lesions.**

**Infarct related artery**

LM	2.6%
LAD/Diag	65.4%
LCX/Mg	16.5%
RCA/PDA-RVB	15.5%

**IVA/Diagonale dans 65% des Cas**

*(Types of bifurcation lesions according to the Medina classification)*

Type (1,1,1)	58%
Type (1,0,1)	10%
Type (1,1,0)	16.7%
Type (1,0,0)	8%
Type (0,1,1)	2%
Type (0,1,0)	3%
Type (0,0,1)	2.3%

**Vraie bifurcation dans 70% des Cas**

LM: Left Main; LAD: Left Anterior Descending; Diag: Diagonal; LCX: Left Circumflex; Mg: Marginal; RCA: Right Coronary Artery; PDA: Posterior Descending Branch; RVG: Retro-Ventricular Branch





# Impact of bifurcation lesions on angiographic characteristics and procedural success in primary percutaneous coronary intervention for ST-segment elevation myocardial infarction

Impact des lésions de bifurcation sur les caractéristiques angiographiques et le succès procédural dans l'angioplastie primaire pour infarctus du myocarde avec surélévation du segment ST

Caroline Frangos<sup>1</sup>, Stéphane Noble<sup>1,\*</sup>, Nicolo Piazza,  
Anita Asgar, Annik Fortier, Quoc Hung Ly,  
Raoul Bonan

*Department of Medicine, Montreal Heart Institute, Interventional Cardiology Division,  
H1T 1C8, Université de Montréal, Belanger Street East, Montreal, 5000 Quebec, Canada*

Sur 1070 angioplasties primaires réalisées entre novembre 2006 et décembre 2008, **114 patients (10,7 %)** avec une lésion de bifurcation (branche fille  $\geq 2,0$  mm) ont été identifiées

Archives of Cardiovascular Disease (2011) 104, 234—241

**Table 1** Baseline characteristics.

	BFL group (n = 114)	Non-BFL group (n = 114)	p
Mean age (years)	57.7 ± 11.1 (32–87)	57.7 ± 11.0 (34–89)	0.995
Men	92 (80.7)	92 (80.7)	1.0
Diabetes mellitus	17 (14.9)	11 (9.7)	0.23
Hypertension	41 (36.0)	39 (34.2)	0.78
Hypercholesterolaemia	62 (54.4)	58 (50.9)	0.60
Smoking history	59 (51.8)	63 (55.3)	0.60
Previous	10 (8.8)	16 (14.0)	0.21
Current	49 (43.0)	47 (41.2)	0.79
Obesity <sup>a</sup>	29 (27.9)	36 (33.0)	0.42
Previous MI	1 (0.9)	2 (1.8)	0.56
Previous PCI	6 (5.3)	2 (1.8)	0.15
CAD			0.012
One VD	67 (58.8)	88 (77.2)	
Two VD	33 (29.0)	18 (15.8)	
Three VD	14 (12.3)	8 (7.0)	

BFL: bifurcation lesion; CAD: coronary artery disease; MI: myocardial infarction; PCI: percutaneous coronary intervention; VD: vessel disease. Data are mean ± standard deviation (range) or number (%).

<sup>a</sup> Body mass index greater or equal to 30 kg/m<sup>2</sup>.



**Table 2** Infarct-related artery and bifurcation lesion subtypes.

Infarct-related artery/BFL subtype	Number of patients (%)
LAD/diagonal branch	72 (65.0)
LCX/OM	20 (17.5)
RCA/PDA-PL	20 (17.5)
<i>Types of BFL according to the Medina classification</i>	
Type (1,1,1)	33 (29.0)
Type (1,1,0)	6 (5.3)
Type (1,0,1)	8 (7.0)
Type (0,1,1)	12 (10.5)
Type (1,0,0)	21 (18.4)
Type (0,1,0)	26 (22.8)
Type (0,0,1)	8 (7.0)
True BFLs (1,1,1; 1,0,1; 0,1,1)	53 (46.5)
False BFLs (1,1,0; 1,0,0; 0,1,0; 0,0,1)	61 (53.5)

BFL: bifurcation lesion; LAD: left anterior descending artery; LCX: left circumflex artery; OM: obtuse marginal branch; PDA: posterior descending artery; PL: posterolateral artery; RCA: right coronary artery.

**IVA/Diagonale dans 65% des Cas**

**Vraie bifurcation dans 46% des cas**



# The Importance of Bifurcation Lesions in Patients Undergoing Percutaneous Coronary Interventions in ST-segment Elevation Myocardial Infarction ☆

Yumiko Kanei \*, Navin C. Nakra, Michael Liou, Jagdeep Singh, John T. Fox, Tak W. Kwan

*Division of Cardiology, Department of Medicine, Beth Israel Medical Center, New York, NY, USA*

**Prévalence des lésions de bifurcation de 14% (54/391 pts)**



**Table 1**  
 Patient characteristics.

	Bifurcation N = 54	No Bifurcation N = 337	P
Age	59 ± 12	60 ± 14	0.620
Men	45 (83%)	270 (80%)	0.837
Hypertension	30 (56%)	193 (57%)	0.930
Diabetes Mellitus	19 (35%)	105 (31%)	0.665
Dyslipidemia	25 (46%)	157 (47%)	0.915
Smoking	19 (35%)	119 (35%)	0.892
h/o myocardial infarction	4 (3%)	35 (10%)	0.629
Previous PCI	8 (15%)	55 (16%)	1.000
Previous CABG	0	13 (4%)	0.230
Primary PCI	53 (98%)	323 (96%)	0.764
Culprit artery			
LAD	44 (81%)	112 (33%)	<0.001*
Diagonal branch	1	5	
RCA	4	172	
LCx	5	40	
SVG	0	8	
3 vessel disease	12 (22%)	96 (28%)	0.428
Stent thrombosis	6 (11%)	22 (7%)	0.251
TIMI 0 flow	31 (57%)	238 (70%)	0.074
Thrombus grade			
0	0	1	
1	5	18	
2	7	23	
3	6	22	
4	5	35	
5	31	238	
Successful PCI	54 (100%)	329 (98%)	0.606
Stent	53 (98%)	315 (93%)	0.226
Drug-eluting stent	44 (81%)	187 (55%)	0.0005
Stent diameter (mm)	3.3 ± 0.4	3.3 ± 0.5	1.000
Stent length (mm)	24.1 ± 11.2	22.7 ± 11.3	0.405
Stent #	1.4 ± 0.6	1.3 ± 0.6	0.263
Thrombectomy use	23 (43%)	125 (37%)	0.534
GP IIb/IIIa use	20 (37%)	122 (36%)	0.973
IABP use	11 (20%)	59 (18%)	0.750
Contrast use (ml)	249 ± 75	222 ± 72	0.017
TIMI 3 flow	44 (81%)	269 (80%)	0.920
LVEF (%)	37 ± 11	44 ± 13	0.0002

**IVA/Diagonale dans 81% des Cas**



# QUEL IMPACT SUR LE PRONOSTIC?

# Impact of bifurcation lesions on angiographic characteristics and procedural success in primary percutaneous coronary intervention for ST-segment elevation myocardial infarction

Impact des lésions de bifurcation sur les caractéristiques angiographiques et le succès procédural dans l'angioplastie primaire pour infarctus du myocarde avec surélévation du segment ST

Caroline Frangos<sup>1</sup>, Stéphane Noble<sup>1,\*</sup>, Nicolo Piazza,  
Anita Asgar, Annik Fortier, Quoc Hung Ly,  
Raoul Bonan

**Table 6A** Mean fluoroscopy time, mean contrast volume and mean procedural time.

	BFL group (n = 114)	Non-BFL group (n = 114)	p	True BFL group (n = 53)	False BFL group (n = 61)	p
Fluoroscopy time (min)	16.2 ± 11.2	9.8 ± 5.1	<0.0001	21.2 ± 12.9	11.9 ± 7.1	<0.0001
Contrast volume (mL)	265 ± 91	207 ± 68	<0.0001	298 ± 90	236 ± 83	0.0003
Procedural time (min)	51.0 ± 26.6	35.3 ± 11.5	<0.0001	58.7 ± 29.5	44.4 ± 22.2	0.0050

BFL: bifurcation lesion. Data are mean ± standard deviation.

# Impact of bifurcation lesions on clinical outcome and prognosis of primary angioplasty in acute myocardial infarction

Diaa-Eldin Abdel Hakim<sup>1,4</sup>, MD; Philippe Garot<sup>2</sup>, MD; Stéphane Champagne<sup>3</sup>, MD; Fathi Maklady<sup>4</sup>, MD; Ahmed El Hawary<sup>4</sup>, MD, PhD; Jean-Luc Dubois-Randé<sup>3</sup>, MD, PhD; Pierre-François Lesault<sup>3</sup>, MD; Emmanuel Teiger<sup>3\*</sup>, MD, PhD

1. University Hospital Henri Mondor, Créteil, France; 2. University Hospital Henri Mondor, Claude Galien-ICPS Hospital, Quincy-sous-Sénart, France; 3. University Hospital Henri Mondor, Assistance Publique des Hôpitaux de Paris, Créteil, France; 4. Cardiology Department, Suez Canal University Hospital, Ismlia, Egypt

Table 5. Immediate and mid-term outcomes.

Endpoints	Bifurcation (n= 150)	Non-bifurcation (n= 496)	P value
Angiographic success %(n)	92% (138)	93% (462)	0.65
In-hospital, % (n)			
Death	3,3 (5)	2 (10)	0.35
AMI	4 (6)	4.4 (22)	0.81
Acute and sub-acute stent thrombosis	3.3 (5)	2 (10)	0.41
Revascularisation	6 (9)	5 (25)	0.96
CABG	3.3 (5)	2.2 (11)	0.95
PCI	2.7 (4)	2.8 (14)	0.88
MACE	13.3 (20)	11.4 (57)	0.72
1-year outcomes % (n)			
Death	4.6 (7)	3 (15)	0.15
AMI	6.6 (10)	6 (30)	0.91
Revascularisation	11.3 (17)	10.5 (52)	0.74
CABG	4 (6)	3.8 (19)	0.81
PCI	7.3 (11)	6.7 (33)	0.76
MACE	23.6 (36)	19.5 (97)	0.56



# Is bifurcation angioplasty during primary PCI associated with adverse procedural and clinical outcomes?

*Dr Leslie Tay\*, Dr Wally Ahmar, Dr Yuvaraj Malaiapan,  
Dr Anthony White, Prof Ian Meredith*

MonashHeart, Monash Medical Centre,  
Melbourne, Australia

## Results – MACE

MACE OUTCOME	BIFURCATION	NON-BIFURCATION	P-Value
12 MONTH MACE	25 (19%)	9 (7%)	0.0029
12 MONTH TLR	13 (10%)	5 (4%)	0.0481
12 MONTH MORTALITY	13 (10%)	4 (3%)	0.0238
12 MONTH AMI	7 (5%)	4 (3%)	0.3467

	BIFURCATION	NON-BIFURCATION	P-Value
TOTAL STENT THROMBOSES	8 (6%)	1 (0.7%)	0.02
ACUTE STENT THROMBOSIS	1 (0.8%)	0	0.317
SUBACUTE STENT THROMBOSIS	5 (3.9%)	1 (0.7%)	0.102
LATE STENT THROMBOSIS	2 (1.6%)	0	0.157



# What about DES in AMI with BF ?

- **One year outcome after implantation of drug-eluting stents in bifurcation lesions in STEMI patients undergoing primary PCI**

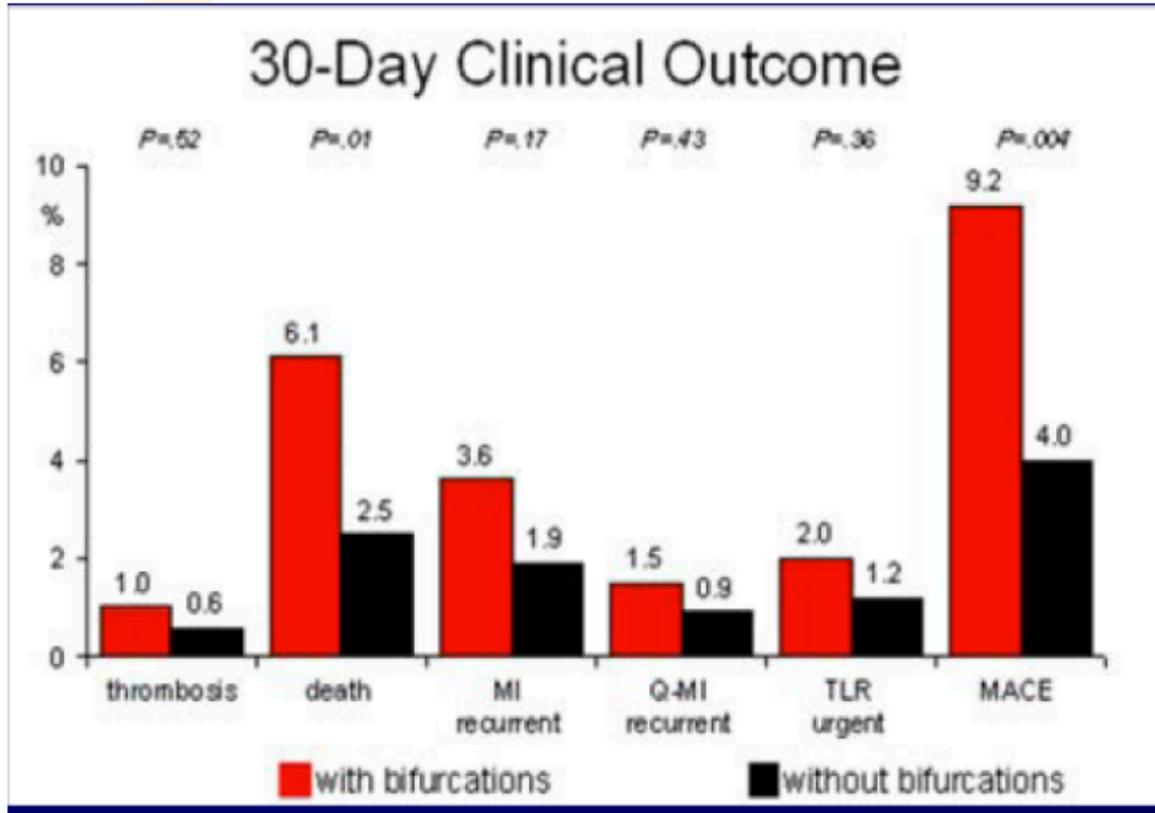
J. Mehilli; S. Schulz; S. Kufner; M. Seyfarth; S. Maßberg; J. Dirschinger, A. Schömig, A. Kastrati

Deutsches Herzzentrum, Technische Universität , Munich,  
Germany



Poster presented at ESC 2010

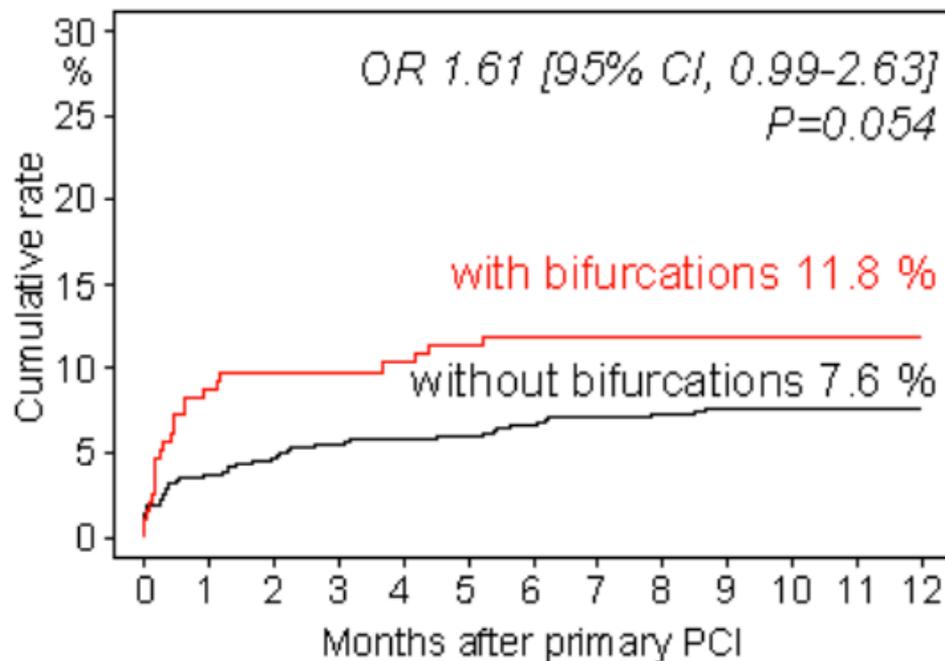
# One year outcome after implantation of drug-eluting Stents in bifurcation lesions in STEMI patients undergoing primary PCI



# One year outcome after implantation of drug-eluting Stents in bifurcation lesions in STEMI patients undergoing primary PCI



## Death or Recurrent MI - at 1-year follow-up -





# QUELLE STRATÉGIE? QUELLE TECHNIQUE?

# Objectifs



- **Objectifs primaires**

  - Rétablir le flux sur l'artère coupable (Blush grade 3)

  - Garder un flux TIMI 3 sur la branche secondaire

  - Réduire le temps d'ischémie

- **Objectifs secondaires**

  - Réduire le risque de resténose et de thrombose

# Percutaneous coronary intervention for coronary bifurcation disease: 11<sup>th</sup> consensus document from the European Bifurcation Club



Jens Flensted Lassen  
Francesco Burzotta  
David Hildick-Smith

**Aucune Mention sur la stratégie  
d'une lésion de bifurcation en  
cas d'angioplastie primaire**

PhD;



## Impact of bifurcation lesion on long term clinical outcome in patient with acute myocardial infarction undergoing primary percutaneous coronary intervention

### Authors:

M. Zivkovic<sup>1</sup>, D. Milasinovic<sup>1</sup>, A. Novakovic<sup>1</sup>, Z. Mehmedbegovic<sup>1</sup>, V. Dedovic<sup>1</sup>, M. Tesic<sup>1</sup>, O. Ninkovic<sup>1</sup>, D. Orlic<sup>1</sup>, V. Vukcevic<sup>1</sup>, G. Stankovic<sup>1</sup>, <sup>1</sup>Clinical Center of Serbia, Clinic for Cardiology - Belgrade - Serbia,

### Topic(s):

PCI: primary PCI, patient subsets, other

230pts/755 pts

Provisional T Stenting dans 100% des cas

KBF dans 7,4%

### Citation:

European Heart Journal ( 2014 ) 35 ( Abstract Supplement ), 132

**Aim:** Bifurcation as culprit lesion is frequent in patients with ST-elevation acute myocardial infarction (STEMI). Purpose of this study was to evaluate the impact of bifurcation culprit lesion on long-term clinical outcome in patients with STEMI undergoing primary percutaneous coronary intervention (PCI).

**Methods and results:** We retrospectively analyze 755 patients with STEMI who underwent primary PCI during the 2009. 230 (30.5%) of those patients had bifurcation as a target lesion (BL) compared with 525 (69.5%) pts. with no bifurcation as infarction lesion (NBL). Treatment goal was to stent the main branch and provide TIMI 3 flow without flow limiting dissection in the side branch (SB). There were no significant differences in baseline characteristics between the two groups, except for higher rate of left anterior descending as infarct artery in the BL group (73.9% vs 22.9%,  $p=0.0001$ ). Provisional SB stenting strategy was used in all patients, with side-branch wire protection in 40% of patients and SB dilatation with final kissing balloon inflation was necessary in 7.4% of lesions.

Although maximal (pick) CK value was higher in the BL group (3023.51 vs 2363.82 IU/L;  $p=0.001$ ), there were no differences in left ventricular ejection fraction on discharge in both groups (55.8% vs 53.4%,  $p=0.8$ )

At 4 years follow up, mortality rates were similar in the BL and the NBL groups (21.5% vs. 20.7%,  $p=0.8$ ).

**Conclusion:** In patients with bifurcation as a culprit lesion, a simple strategy with TIMI flow-guided provisional SB-PCI results in comparable four-year mortality rate as in patients without bifurcation lesions.

# Impact of bifurcation lesions on angiographic characteristics and procedural success in primary percutaneous coronary intervention for ST-segment elevation myocardial infarction

Impact des lésions de bifurcation sur les caractéristiques angiographiques et le succès procédural dans l'angioplastie primaire pour infarctus du myocarde avec surélévation du segment ST

Caroline Frangos<sup>1</sup>, Stéphane Noble<sup>1,\*</sup>, Nicolo Piazza,  
 a Asgar, Annik Fortier, Quoc Hung Ly,  
 ul Bonan

ment of Medicine, Montreal Heart Institute, Interventional Cardiology Division,  
 8, Université de Montréal, Belanger Street East, Montreal, 5000 Quebec, Canada

Table 5 Procedural data for patients with bifurcation lesions.

Double guidewire	57 (50.0)
<i>Pre-dilatation</i>	
MB only	69 (60.5)
SB only	12 (10.5)
Sequential	26 (22.8)
Kissing balloon	1 (0.9)
None	6 (5.3)
Provisional SB stenting	106 (93)
Stenting of both branches <sup>a</sup>	10 (8.8)
Stenting only in MB	96 (84.2)
Stenting only in SB	8 (7.0)
Stent length, MB (mm)	20.8 ± 6.2
Stent diameter, MB (mm)	3.14 ± 0.4
Stent length, SB (mm)	17.5 ± 6.2
Stent diameter, SB (mm)	2.80 ± 0.4
Final kissing balloon inflation	50 (43.9)
Angiographic success, MB	110 (96.5)
Angiographic success, SB	103 (90.4)

MB: main branch; SB: side branch. Data are mean ± standard deviation or number (%).

<sup>a</sup> All but two were T-stenting.

Provisional T stenting 93%  
 FKB 44%  
 Technique à 2 stents TAP 7%



 **Coronary interventions**

Euro15A-0P009

## Primary angioplasty in bifurcations lesions: comparison of a complex versus simple strategy and its impact on myocardial reperfusion

Valdebenito M., Veas N., Lindefjeld D., Winter J., Mendez M., Perez O., Guarda E., Martinez A.

*PUC, Santiago, Chile*

**Aims:** It is not uncommon to find bifurcation lesions during primary angioplasty (AP) in patients presenting with an acute myocardial infarction with ST-segment elevation (STEMI). Although the literature supports a simple strategy in patients with stable coronary heart disease and bifurcations, there is little evidence which is the best strategy for interventional treatment in bifurcation lesions during the AP. We evaluate the effectiveness and safety of AP in patients with bifurcation lesions in STEMI, comparing a simple strategy (one stent, 1 guide) vs. a complex strategy (provisional stent (SP) and/ or 2 stents technique).

**Methods and results:** An observational retrospective cohort analytical study. We selected patients with bifurcation lesions in the culprit vessel. We reviewed the clinical characteristics, peri- and post-procedural angiographic data, and the presence of major adverse cardiac events (MACE; mortality, stroke, reinfarction, revascularisation of the culprit vessel) and follow-up mortality. Final angiographic results were compared using a simple strategy (controls) vs. complex (cases). Of a total of 853 patients with STEMI in the period analysed, 125 (14.6%) had bifurcation lesions in the culprit vessel. groups (32 cases, 93 controls) were comparable for baseline clinical and angiographic characteristics with a group of cases which used more contrast (213 mL vs. 269 mL,  $p=0.01$ ) and radiation (2,432 vs. 4,342 mGy;  $p=0.005$ ). A better final microvascular flow in the main epicardial vessel measured by TIMI frame count (cTFC) in certain cases vs. controls was obtained (20.8 vs. 26.8,  $p<0.001$ , cTFC  $<23$  84% vs. 49%,  $p=0.001$ ). When analysing subgroups of complex strategy according to the technique of bifurcation (SP and 2 stents) vs. the control group (CG), better cTFC was observed in both groups vs. the CG (21±5.8 vs. 26.8±11.5;  $p=0.004$ ; 2 stents: 20.1±5GC vs. 26.8±11.5  $p=0.03$ ), finding no differences between subgroups of patients (SP stents vs. 2 vs. 21±5.8±20.1 5;  $p=0.97$ ). There were no differences in MACE (31.2% vs. 28.7%;  $p=0.83$ ) or overall mortality (6.25 vs. 6%;  $p=0.2$ ), with a mean of 2.4 years (13-44 months).

**Conclusions:** AP in bifurcation using a complex strategy vs. a simple one allows for better myocardial reperfusion in the main vessel, although there is more radiation exposure and a slight increase in use of contrast without deterioration of renal function. No differences in the presentation of MACE or follow-up mortality were observed.

# Serial DKCRUSH studies

Finished already

Still ongoing

DKCRUSH-I

DKCRUSH-II

DKCRUSH-III

DKCRUSH-V: DK/PT for LMd

DKCRUSH-VI: FFR-/Angio-SB

DKCRUSH-VII: registry, Post-DES  
FFR predicts MACE

DKCRUSH-IV: dynamic change of FFR after DK/PT

# A Randomized Clinical Study Comparing Double Kissing Crush With Provisional Stenting for Treatment of Coronary Bifurcation Lesions

Results From the DKCRUSH-II (Double Kissing Crush versus Provisional Stenting Technique for Treatment of Coronary Bifurcation Lesions) Trial

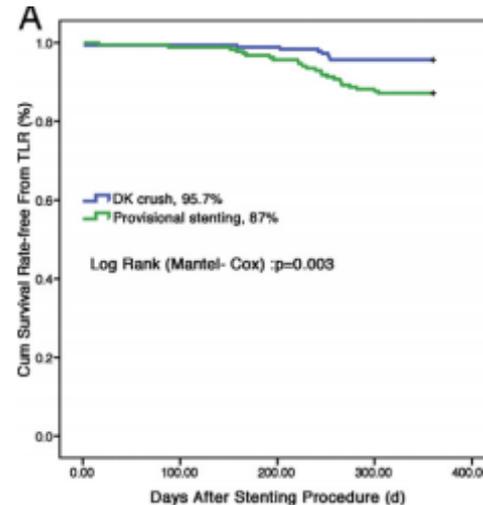
Shao-Liang Chen, MD,\* Teguh Santoso, MD,¶ Jun-Jie Zhang, MD,\* Fei Ye, MD,\* Ya-Wei Xu, MD,† Qiang Fu, MD,‡ Jing Kan, MBBS,\* Chitrapai Paiboon, MD,# Yong Zhou, MD,§ Shi-Qing Ding, MD,|| Tak W. Kwan, MD\*\*

Nanjing, Shanghai, Xuzhou, Zhangjiagang, and Huainan, China; Jakarta, Indonesia; Bangkok, Thailand; and New York, New York



**Table 1** Baseline Clinical Characteristics

	DK Group (n = 185)	PS Group (n = 185)	p Value
Age, yrs	63.9 ± 11.1	64.6 ± 9.9	0.542
Male	146 (78.9)	141 (76.2)	0.618
Diabetes	36 (19.5)	44 (23.8)	0.377
Hypertension	121 (65.4)	112 (60.5)	0.403
Hyperlipidemia	63 (34.1)	53 (28.6)	0.336
Current smoking	57 (30.8)	44 (23.8)	0.315
Serum creatinine >2.5 mg/dl	10 (5.4)	17 (9.19)	0.360
Previous MI	32 (17.3)	26 (14.1)	0.475
Previous PCI	39 (21.1)	38 (20.5)	1.000
Previous CABG	5 (2.7)	2 (1.1)	0.888
Acute MI	30 (16.2)	31 (16.8)	1.000
ST-segment elevation MI	25 (13.5)	22 (11.9)	0.755
Non-ST-segment elevation MI	5 (2.7)	9 (4.9)	0.415
Unstable angina	123 (66.5)	126 (68.1)	0.557
Stable angina	29 (15.7)	21 (11.4)	0.287
Silent ischemia	3 (0.8)	7 (1.9)	0.296
LVEF <40%	28 (15.1)	21 (11.4)	0.333



## CORONARY ARTERY DISEASE

### Original Studies

# Bifurcation Stenting in Patients with ST-Segment Elevation Myocardial Infarction: An Analysis from DKCRUSH II Randomized Study

Tak W. Kwan,<sup>1\*</sup> MD, FSCAI, Karthik Gujja,<sup>1</sup> MD, Michael C. Liou,<sup>1</sup> MD, FSCAI, Yili Huang,<sup>1</sup> DO, Sally Wong,<sup>2</sup> PhD, John Coppola,<sup>2</sup> MD, FSCAI, and Shao-Liang Chen,<sup>3</sup> MD, FSCAI

**Objective:** We sought to study the clinical outcomes of bifurcation stenting in patients who presented with stent thrombosis segment elevation myocardial infarction (STEMI).

**Background:** Patients with STEMI are usually excluded from randomized bifurcation studies. There is limited information for bifurcation stenting in this population.

**Methods:** All STEMI patients who were randomized were retrospectively reviewed from DKCRUSH II (double kissing, double crush) database. DKCRUSH II is a multicenter, randomized study of provisional stenting (PS) versus the DK crush stenting techniques.

A total of 370 patients with bifurcation lesions were randomized and of this group a total of 63 patients with STEMI were found. This group of STEMI included 30 patients

both groups. Cumulative 12-month major adverse cardiac event (MACE) was 22% in the whole STEMI group, whereas PS and DK crush groups were 23% versus 21%, respectively ( $P = NS$ ). There were no differences in in-hospital, 6-month, and 12-month MACE in these two groups. At 6 and 12 months, there were two cardiac deaths in the PS group but without statistical significance when compared with the DK crush stenting group (7% vs. 0%,  $P = NS$ ). **Conclusion:** Bifurcation stenting in patients with STEMI is safe and feasible. The immediate and midterm clinical outcomes were comparable between PS and DK crush stenting.

# Conclusion



- Une lésion de bifurcation en cas de PAMI n'est pas une situation rare (10 à 23%)
- Le plus souvent il s'agit d'une lésion de IVA/diagonale
- Il faut essayer d'être le plus simple possible: un stent actif dans la branche principale sans Kissing
- Une technique à 2 stents peut aussi être réaliser si nécessaire avec un bon résultat