EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.

ANGIOPLASY SUMMIT 2010
TCT ASIA PACIFIC

Seoul, Korea: 28-30 April 2010

Session: Left Main & Bifurcation Summit I

Standardized treatment strategies for LM Bifurcation PCI

Speaker – 12'

Antonio Colombo

Centro Cuore Columbus Milan, Italy
S. Raffaele Hospital Milan, Italy

EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.

Conflicts

Minor share holder in Cappella Inc.
producing a dedicate ostial stent

EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.

Interventional Cardiology

Randomized Study of the Crush Technique Versus Provisional Side-Branch Stenting in True Coronary Bifurcations

The CACTUS (Coronary Bifurcations: Application of the Crushing Technique Using Sirolimus-Eluting Stents) Study

Antonio Colombo, MD; Ezio Bramucci, MD; Salvatore Saccà, MD; Roberto Violini, MD; Corrado Lettieri, MD; Roberto Zanini, MD; Imad Sheiban, MD; Leonardo Paloscia, MD; Eberhard Grube, MD; Joachim Schofer, MD; Leonardo Bolognese, MD; Mario Orlandi, MD; Giampaolo Niccoli, MD; Azeem Latib, MD; Flavio Airoldi, MD

Colombo A. et al Circulation 2009;119:71-78.

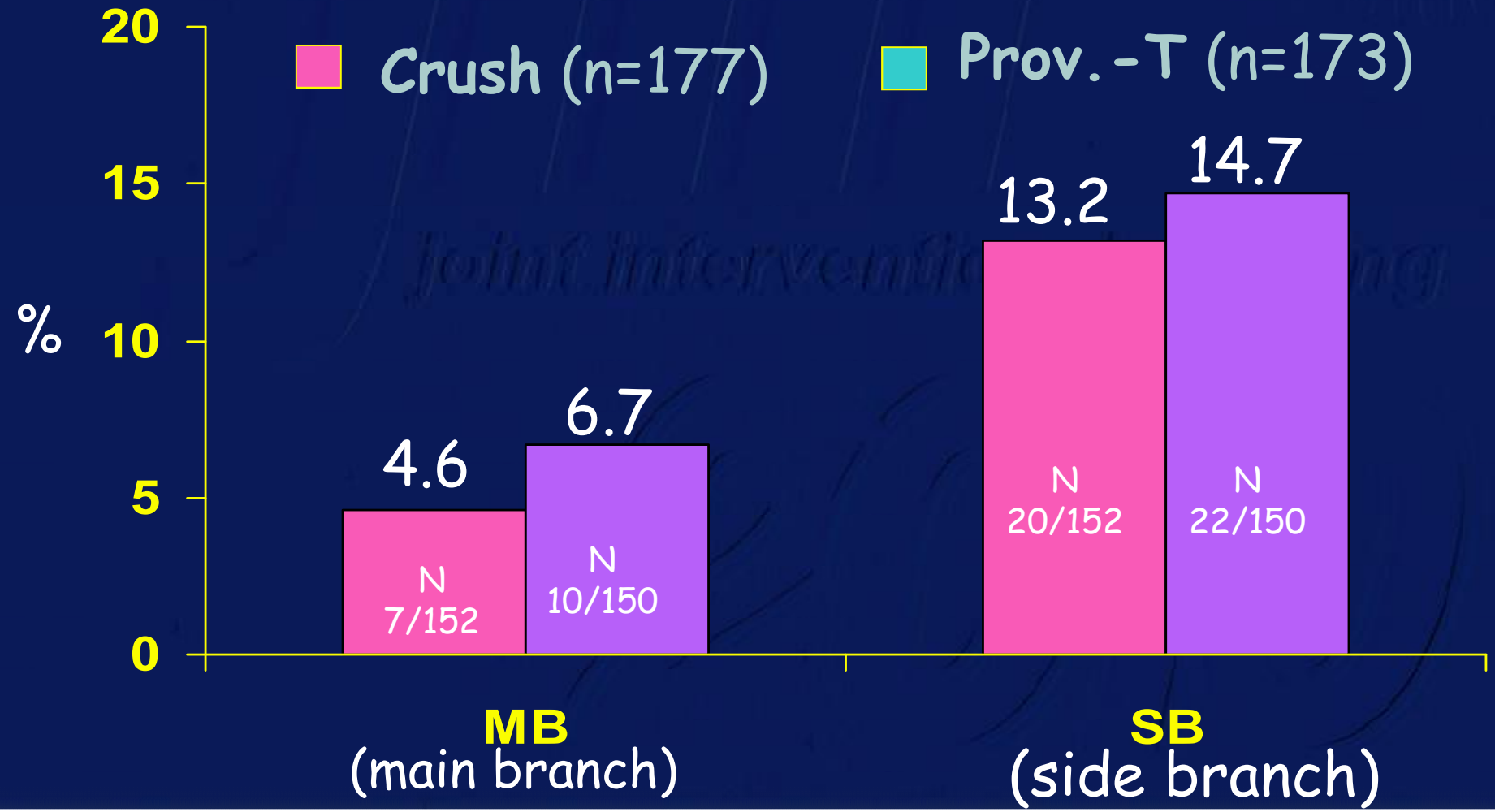
EMO GVM CENTRO CUORE COLUMBUS s.r.l.

CACTUS trial

Coronary **B**ifurcation **A**pplication of the **C**rush **T**echnique **U**sing **S**irolimus-Eluting stents

6-month in-segment binary restenosis

Angiographic F.U. performed in 86% of pts in both groups



EMO GVM CENTRO CUORE COLUMBUS s.r.l.

CACTUS trial

Coronary Bifurcation Application of the Crush Technique Using Sirolimus-Eluting stents

30 d	
Q wav	
Non-Q	
TLR	
TVR (i	
Death	
6-mo	
MI	
TLR	
TVR (i	
Death	

6-month Stent Thrombosis	**Total**
Crush (n=177)	3 (1.7%)
Prov.T (n=173)	2 (1.1%)

*= non cardiac death (ischaemic stroke confirmed by autopsy)

EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.

Interventional Cardiology

Randomized Trial of Simple Versus Complex Drug-Eluting Stenting for Bifurcation Lesions

The British Bifurcation Coronary Study: Old, New, and Evolving Strategies

David Hildick-Smith, MD, FRCP; Adam J. de Belder, MD, FRCP; Nina Cooter, MSc; Nicholas P. Curzen, PhD, FRCP; Tim C. Clayton, MSc; Keith G. Oldroyd, MD, FRCP; Lorraine Bennett, MSc; Steve Holmberg, MD, FRCP; James M. Cotton, MD, FRCP; Peter E. Glennon, PhD, FRCP; Martyn R. Thomas, MD, FRCP; Philip A. MacCarthy, PhD, FRCP; Andreas Baumbach, MD, FRCP; Niall T. Mulvihill, MD; Robert A. Henderson, DM, FRCP; Simon R. Redwood, MD; Ian R. Starkey, BSc, FRCP; Rodney H. Stables, DM, FRCP

Hildick-Smith D. et al Circulation. 2010;121:1235-1243

EMO GVM CENTRO CUORE COLUMBUS s.r.l.

Procedure Characteristics

	Simple (n=249)	Complex (n=248)	*P*
Final kissing balloons			
Attempted, n (%)	76 (31)	223 (90)	ns
Successful, n (%))	72 (29	189 (76)	ns
Success as % of attempted	95	85	0.01

Hildick-Smith D. et al Circulation. 2010;121:1235-1243

EMO GVM CENTRO CUORE COLUMBUS s.r.l.

Trial End Points

	Simple (n=250)	Complex (n=250)	*p*
In-Hospital MACE (%)	5 (2.0)	20 (8.0)	0.002
Death (n)	0	1	
MI (n)	5	18	
CABG (n)	0	3	

Hildick-Smith D. et al Circulation. 2010;121:1235-1243

EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.

Conclusions

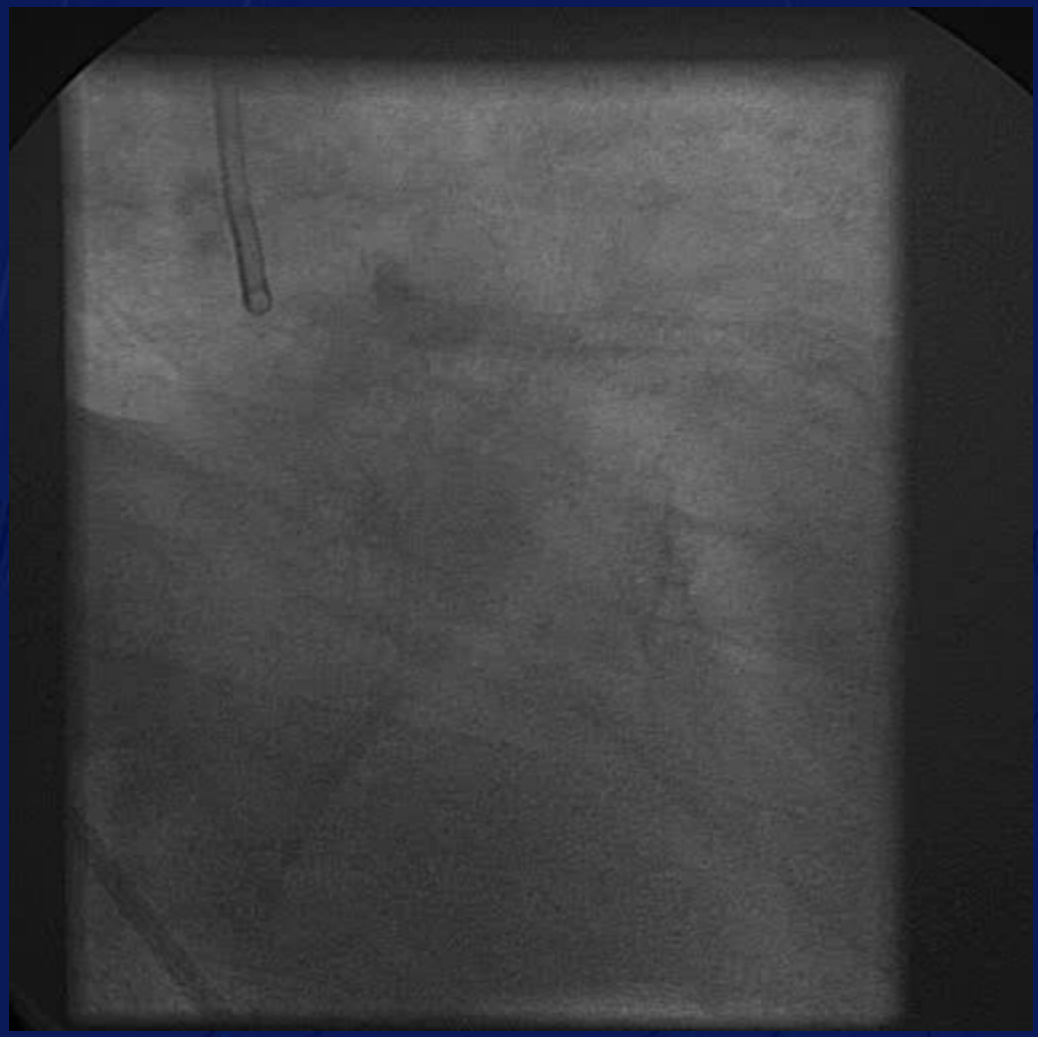
For treatment of coronary bifurcation lesions, a systematic 2-stent technique results in longer procedures, higher x-ray doses, more procedural complications, and a higher rate of in-hospital and 9-month MACE. The provisional T-stent strategy should be the default treatment for most bifurcation lesions; however, there may be subtypes of coronary bifurcation that nonetheless merit a systematic 2-stent strategy.

The provisional T-stent strategy should be the default treatment for most bifurcation lesions; however, there may be subtypes of coronary bifurcation that nonetheless merit a systematic 2-stent strategy.

Hildick-Smith D. et al Circulation. 2010;121:1235-1243

EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.

Two-stent approach



Baseline

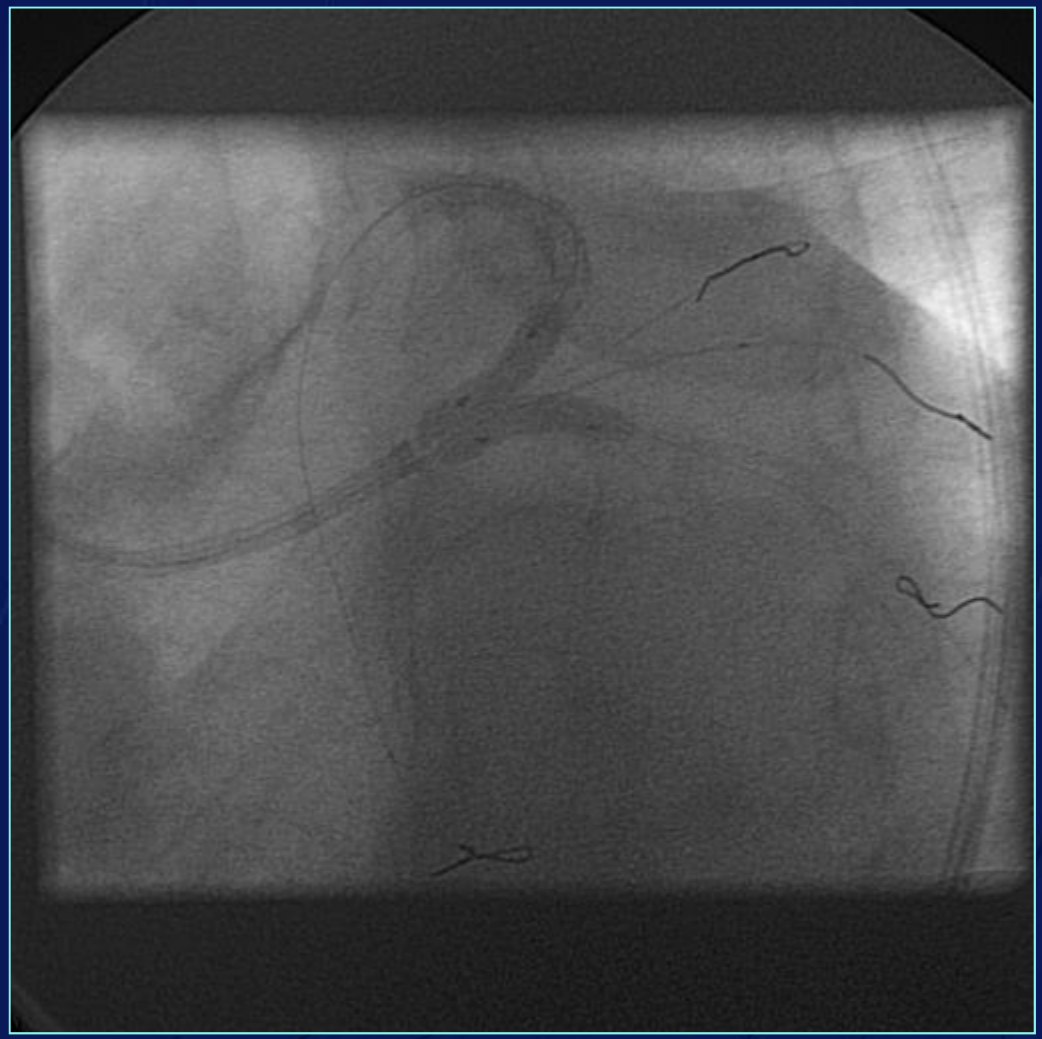
EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.

Two-stent approach: V

Baseline

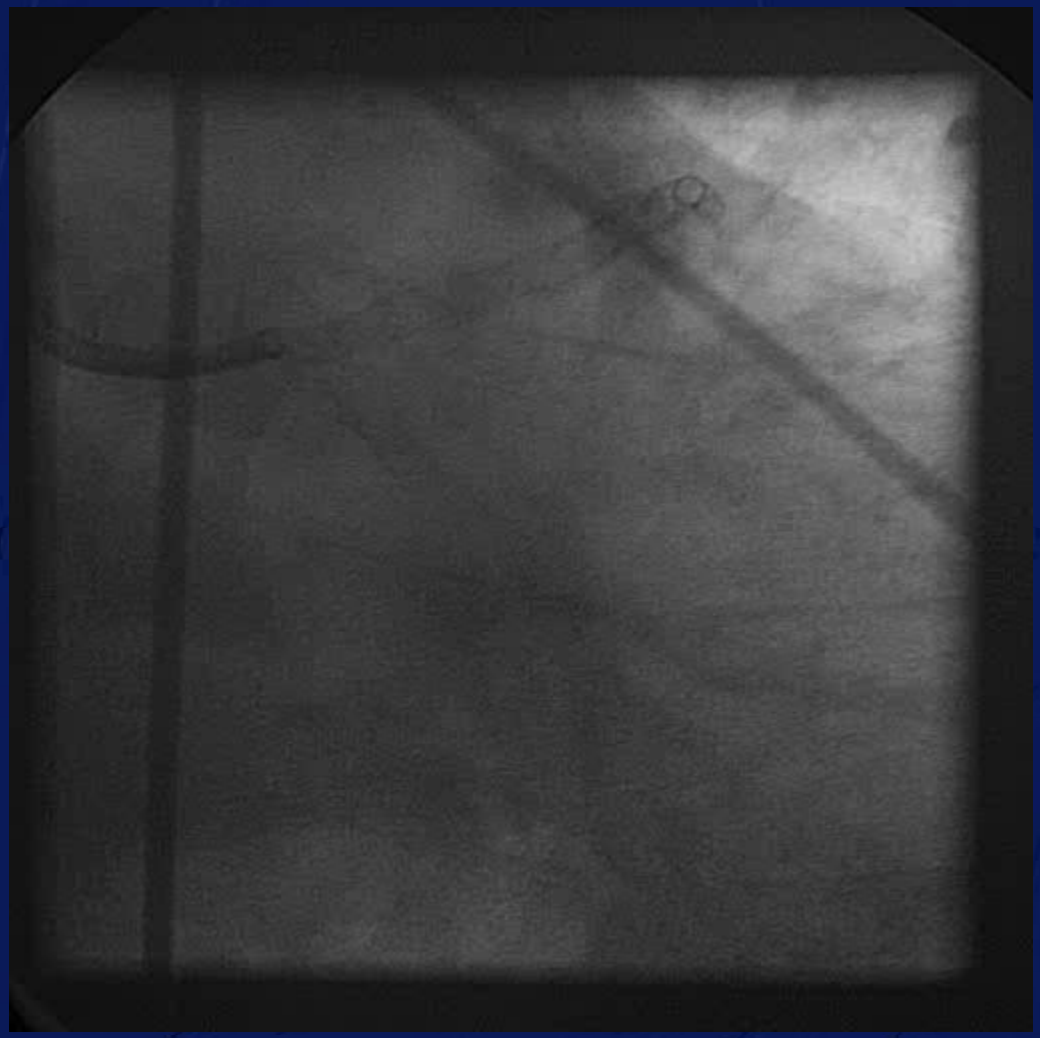
EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.

Two-stent approach



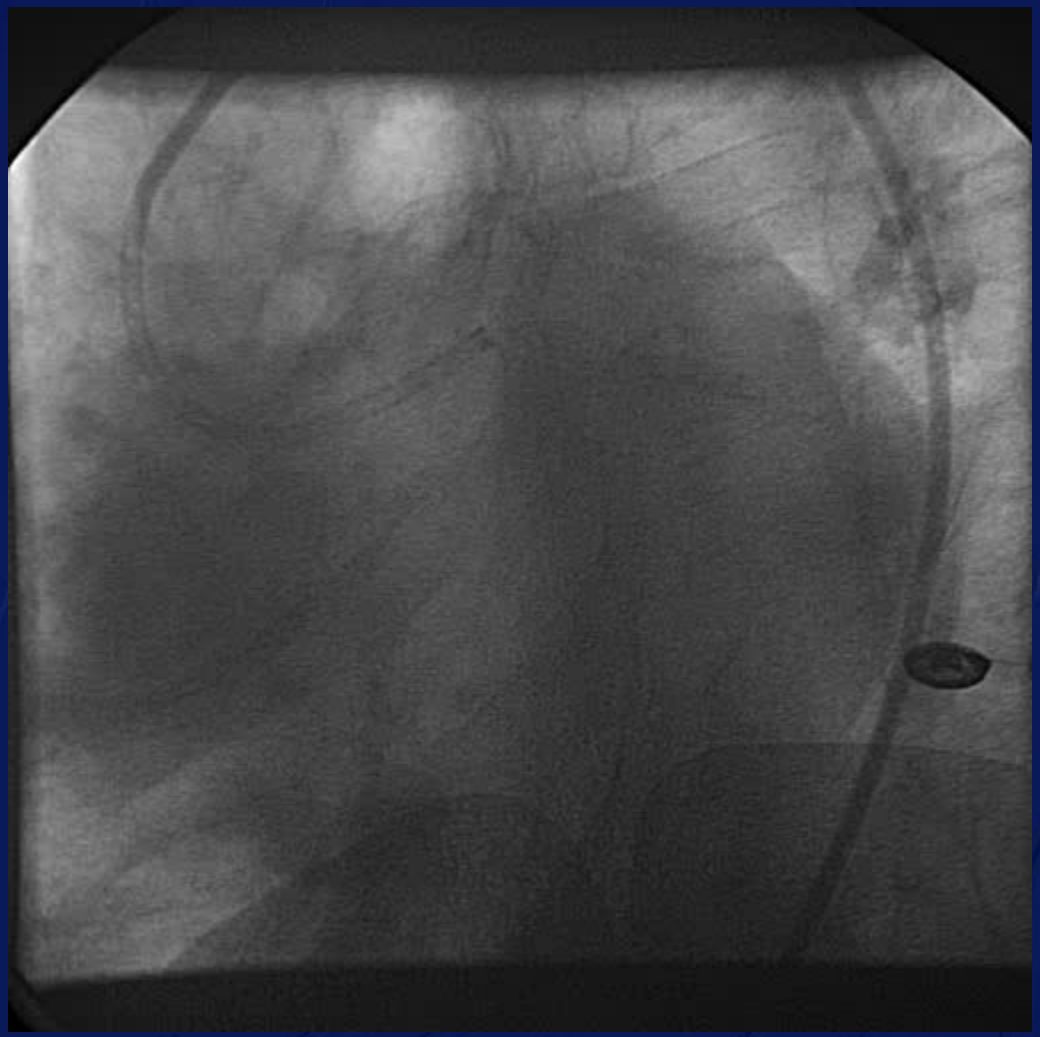
Technique

EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.



Final result

EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.



Final result

EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.

Provisional:
Not always the best option !

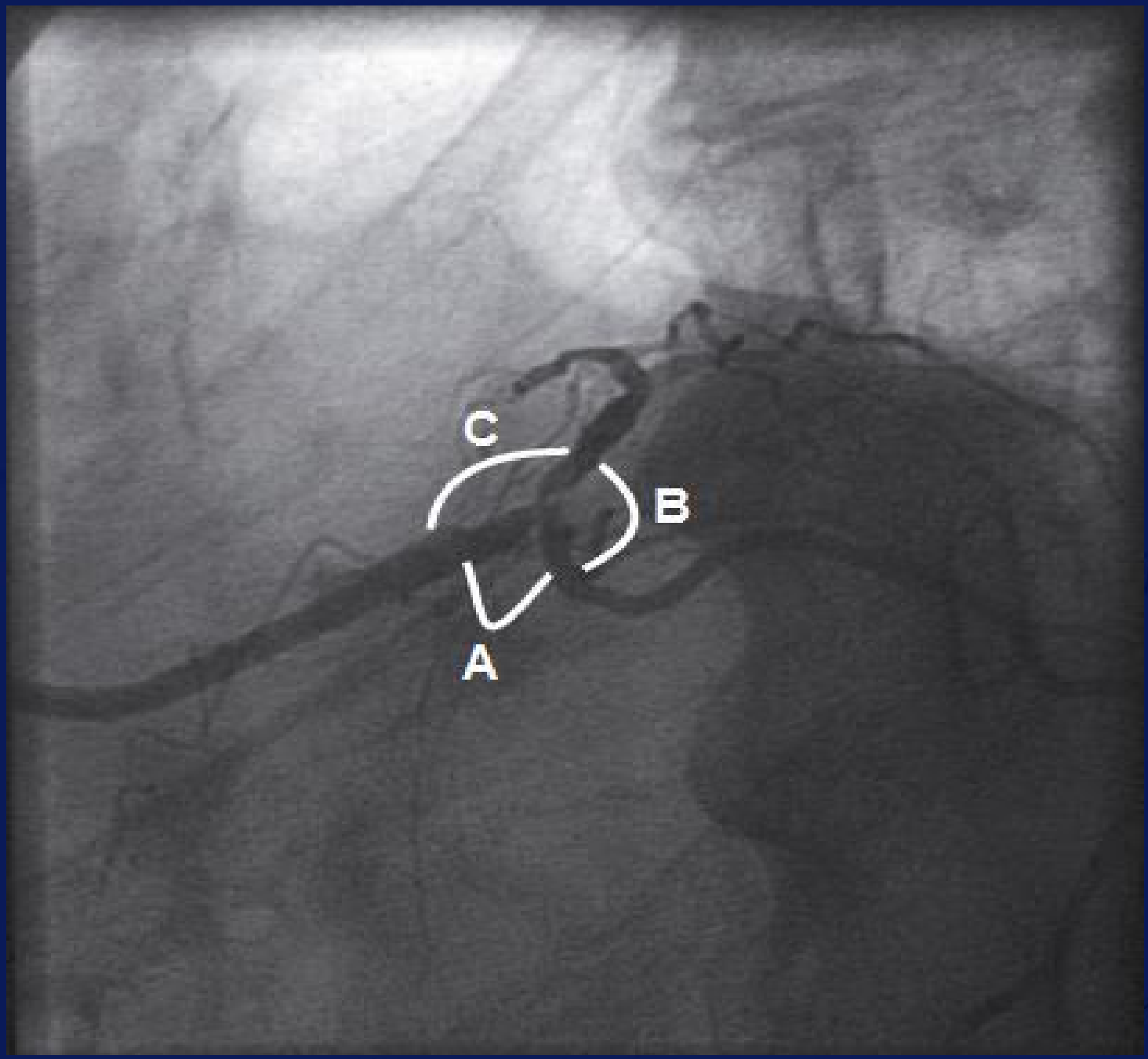
EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.

1 stent

2 stents

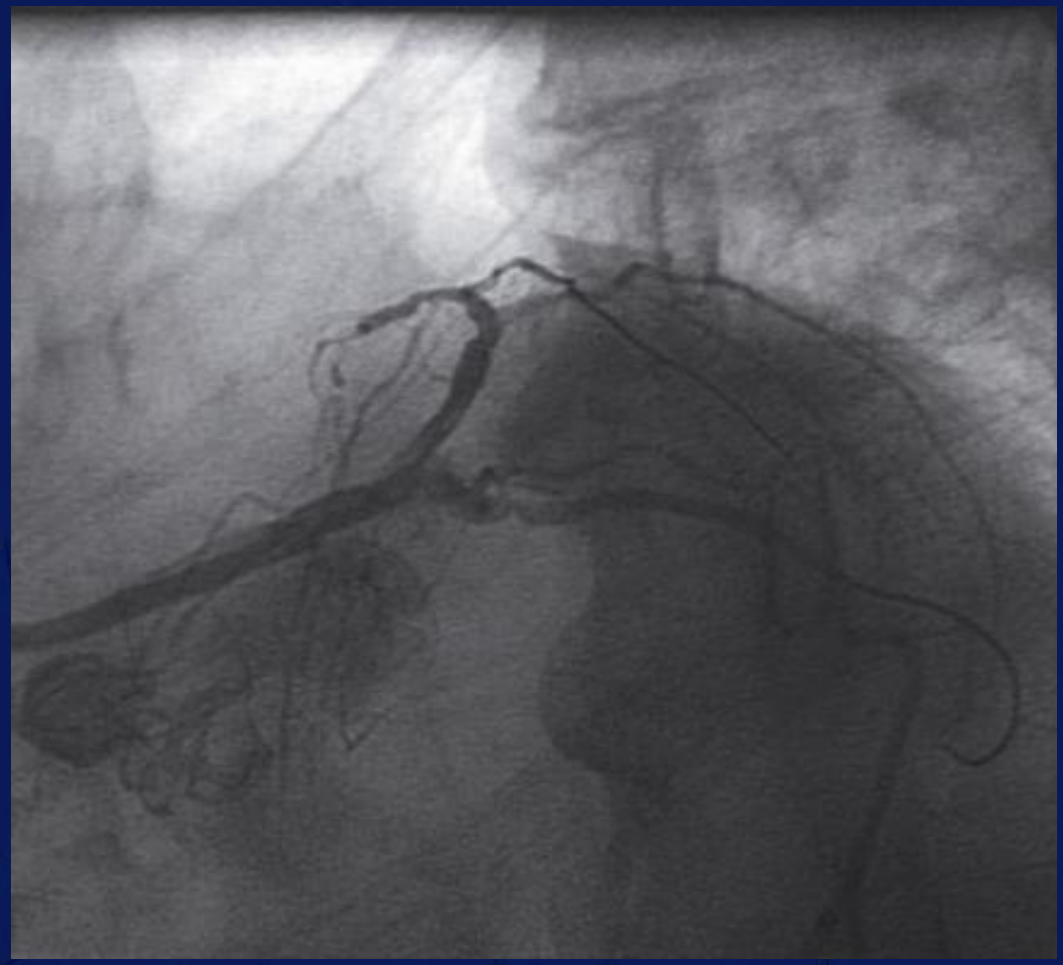
EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.

Unfavourable angle



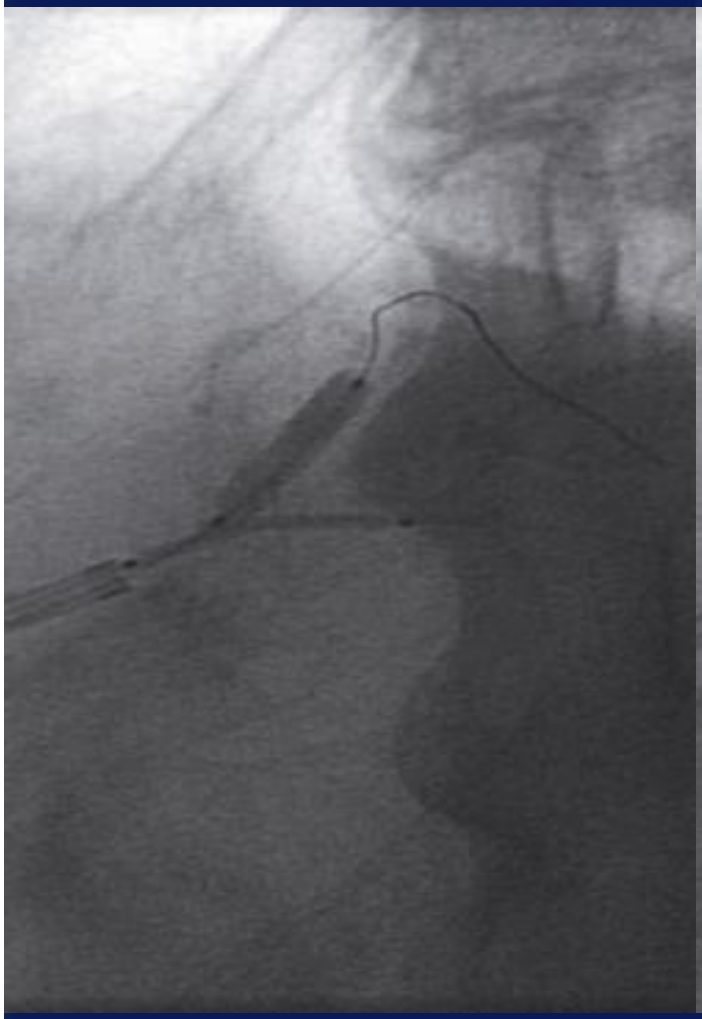
EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.

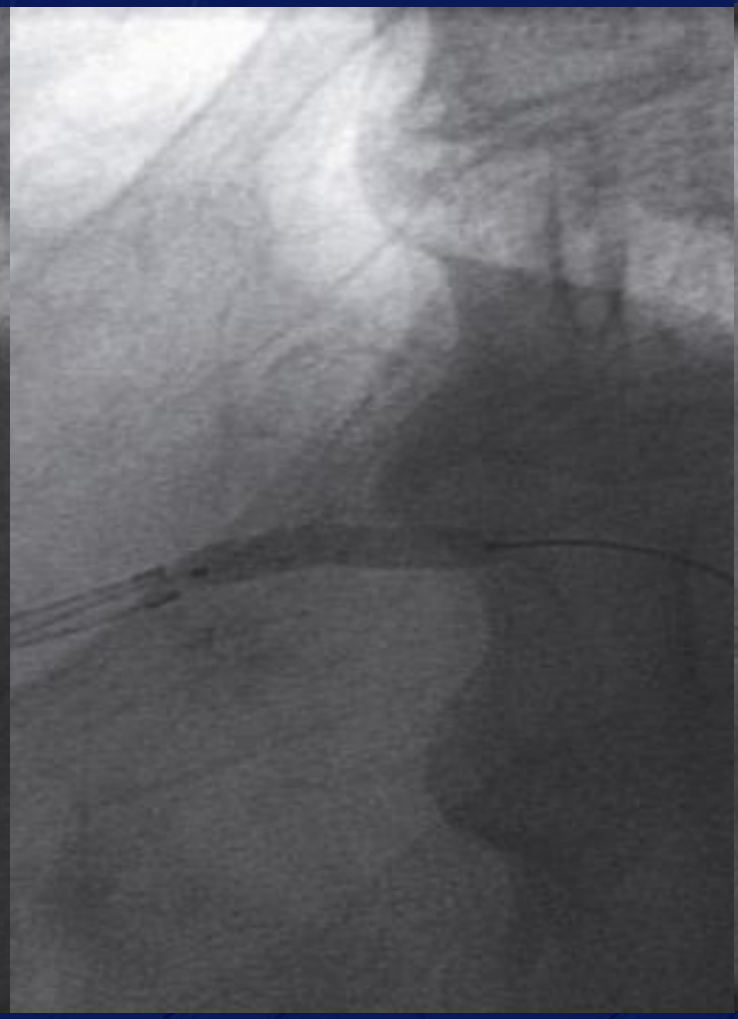
Unfavourable angle

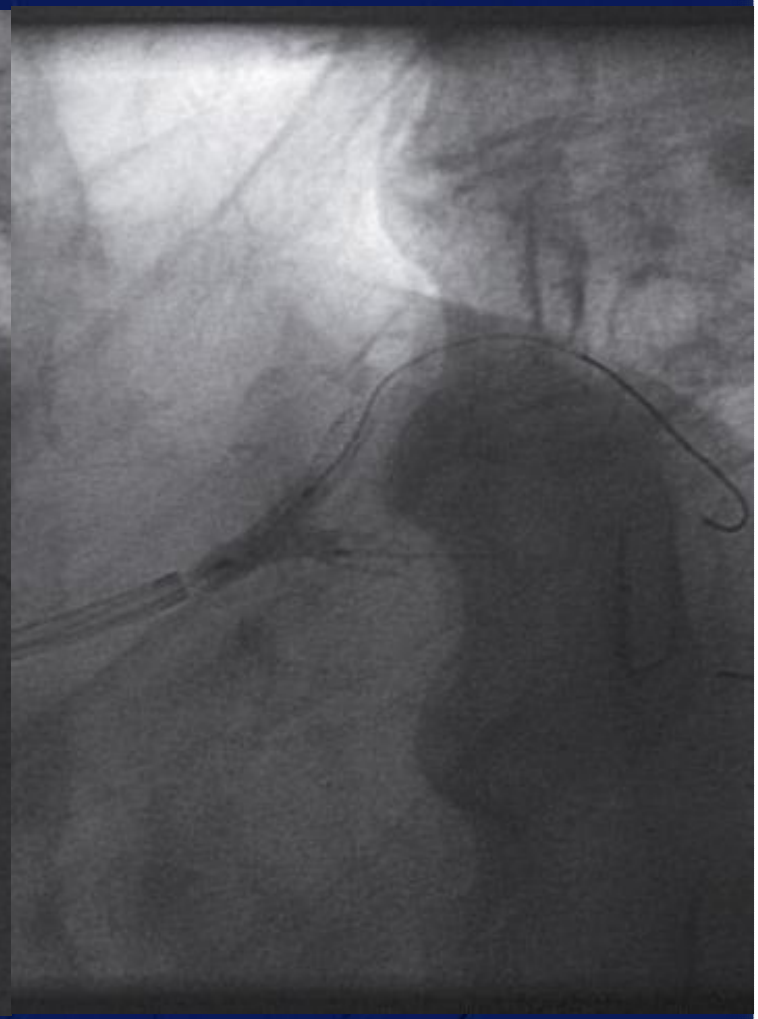


EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.

Unfavourable angle: mini crush

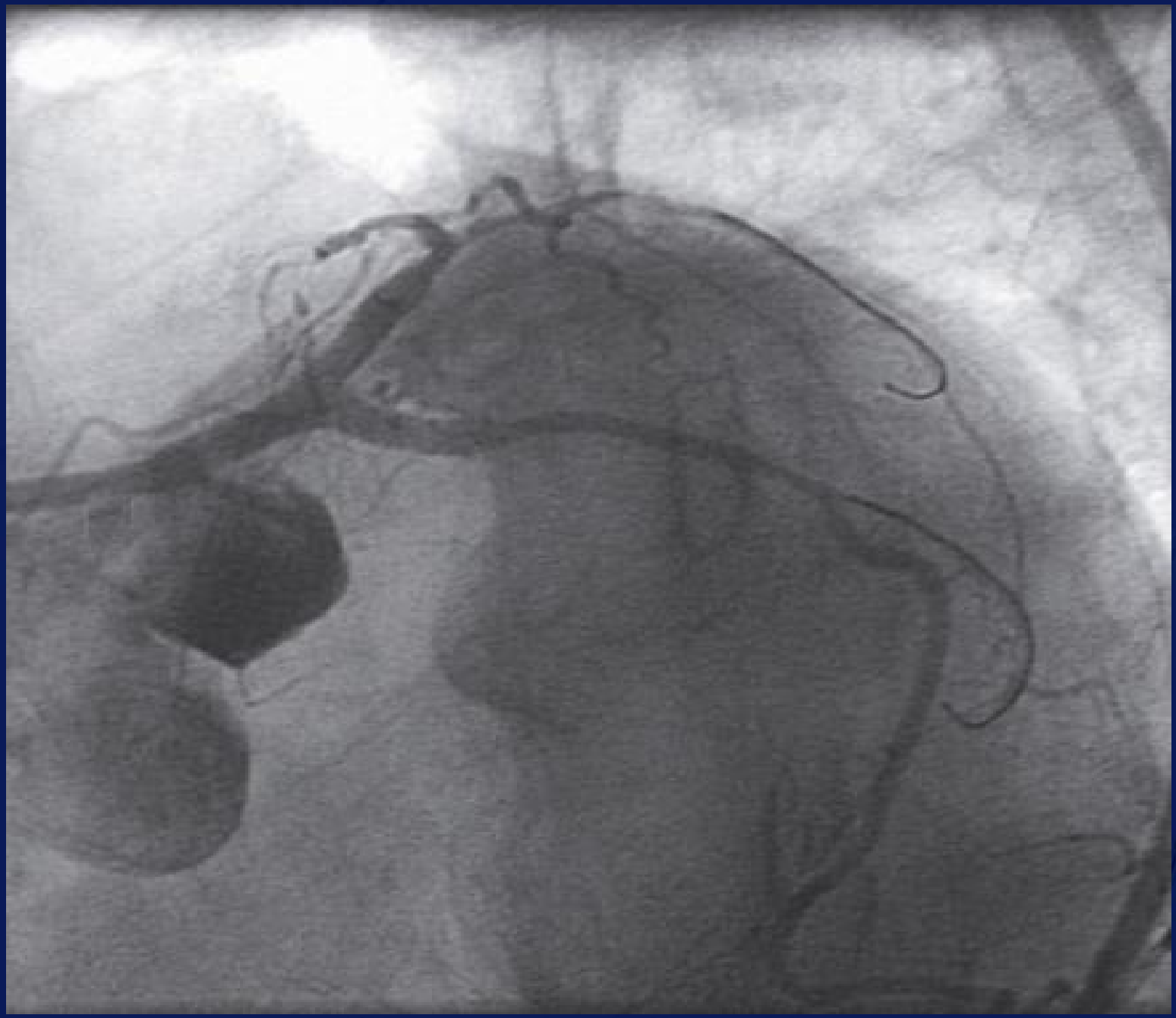






EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.

Final



EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.

Techniques for 2 stents

Culotte: more complex

Crush: immediate patency

T stenting: no overlap

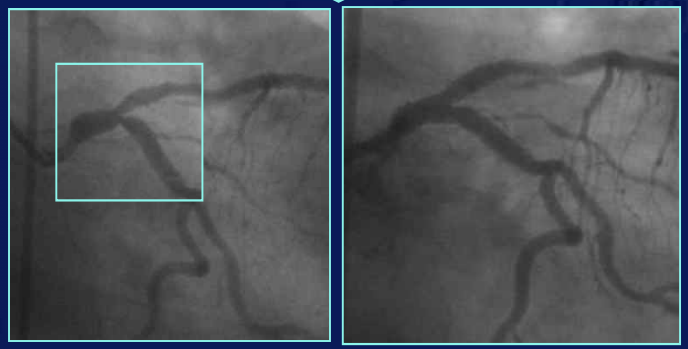
V stenting: immediate patency, specific antomy

EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.

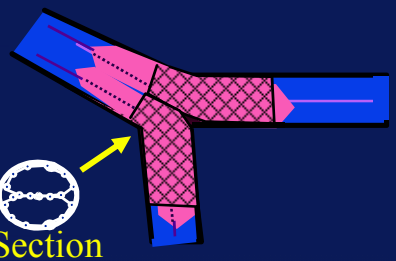
An approach for bifurcational lesions when using 2 stents as intention to treat

Bifurcational lesion with no disease proximal to the bifurcation or very short left main

V-Stent

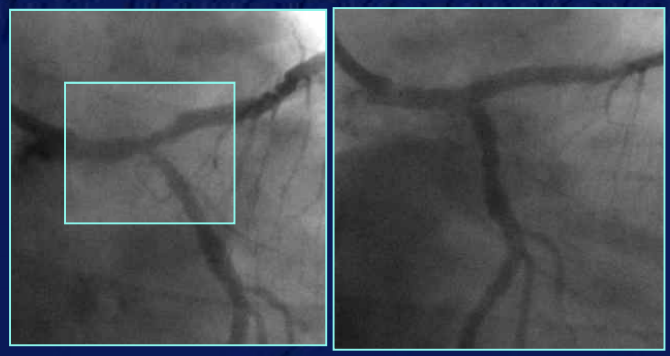


Pre Post

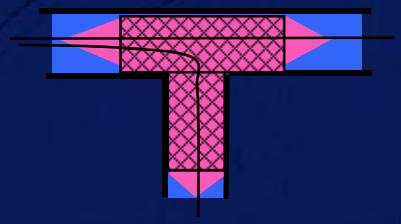


Bifurcational lesion with main branch disease extending proximal to the bifurcation and side branch which has origin with about 90° angle

T-Stent

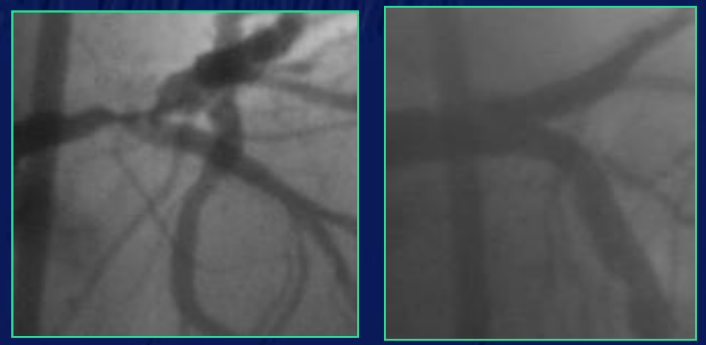


Pre Post

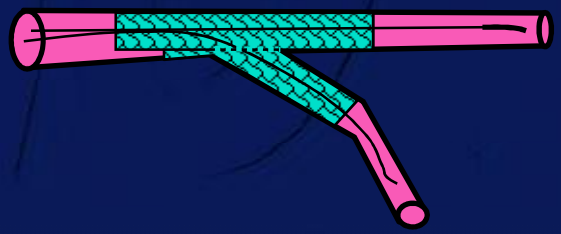


Bifurcational lesion with main branch disease extending proximal to the bifurcation and side branch which ha origin with about 60° angle

Short-Mini Crush



Pre Post



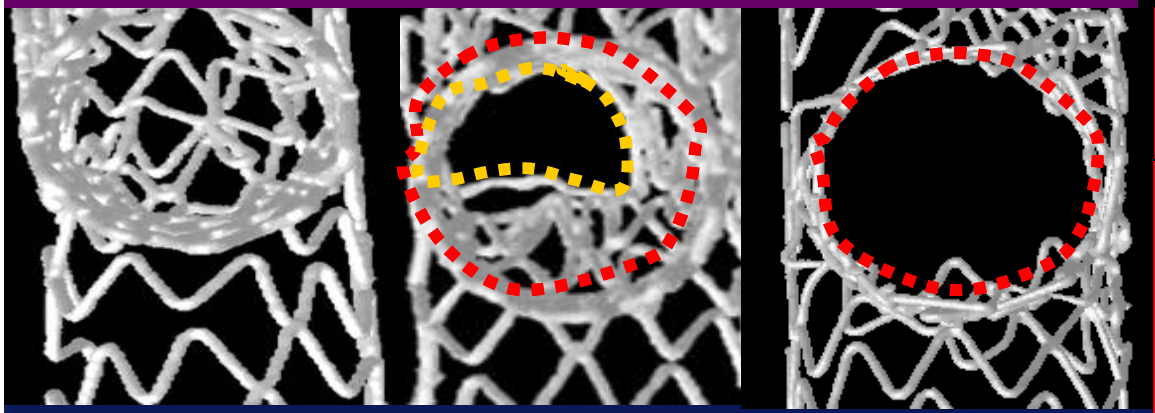
EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.

If crush 2 steps kiss

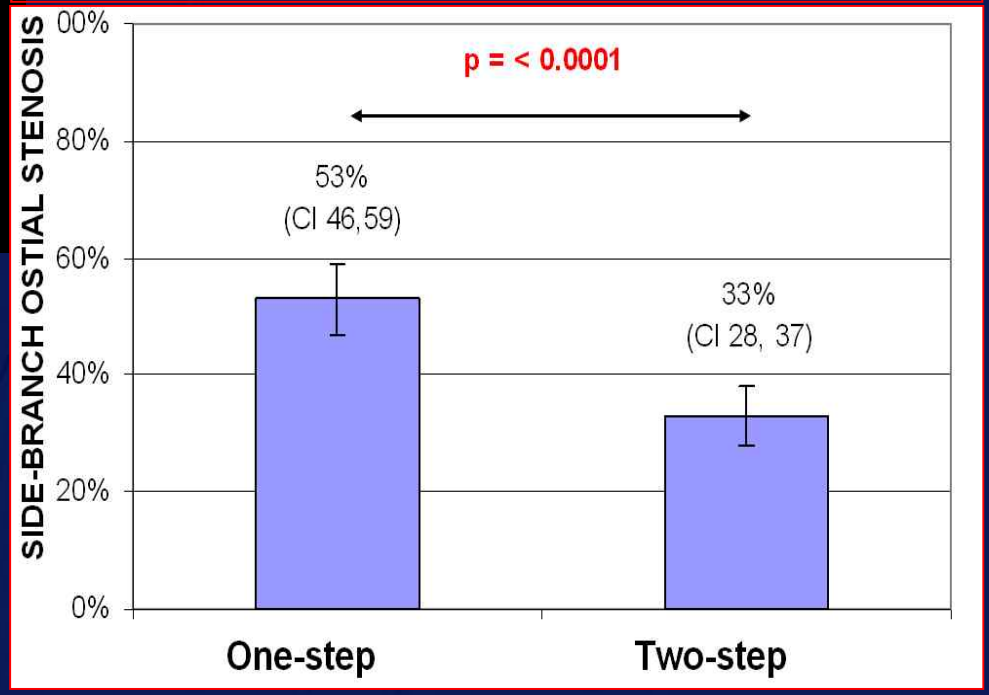
EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.

We observed that two-step kissing was more effective than one-step kissing for improving metallic side-branch ostial area

No kissing | One-step kissing post-dilatation | Two-step kissing post-dilatation



SB ostial stenosis (%) with one step vs. two step kissing



Two steps:
1) Inflate at high pressure only the SB balloon
2)Perform kissing inflation

Ormiston

EMO GVM CENTRO CUORE COLUMBUS s.r.l.

Influence of Final Kissing in the CACTUS trial

	YES Final Kissing 163 pts.	NO Final Kissing 14 pts.	P
Myocardial infarction	7.5%	29%	0.001
TLR	6.3%	12.9%	0.25
MB restenosis	4.7%	16%	0.03
SB restenosis	11.9%	36%	0.001
Stent thrombosis	0.9%	6.5%	0.06

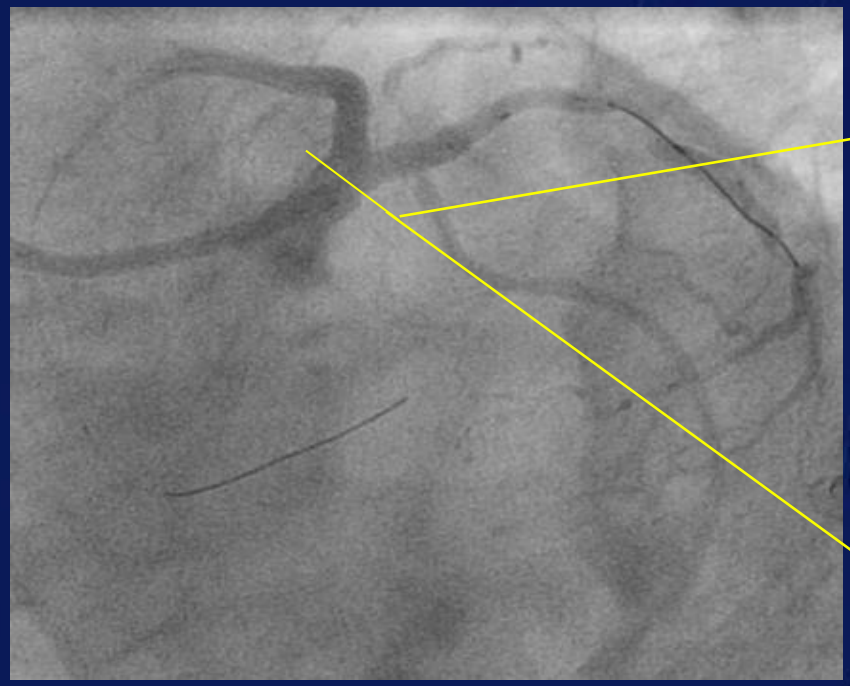
EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.

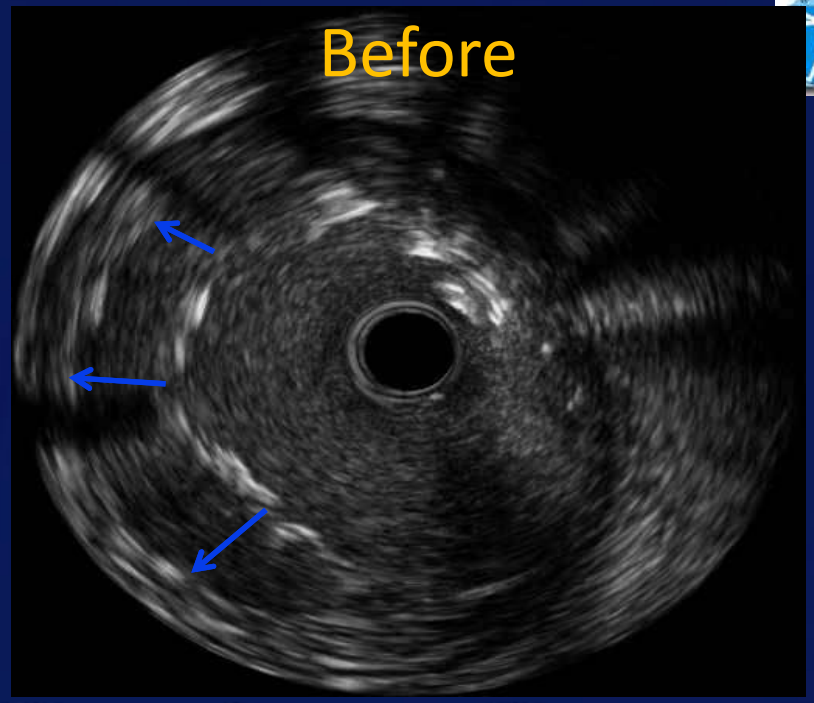
IVUS evaluation mandatory every time 2 stents are implanted:

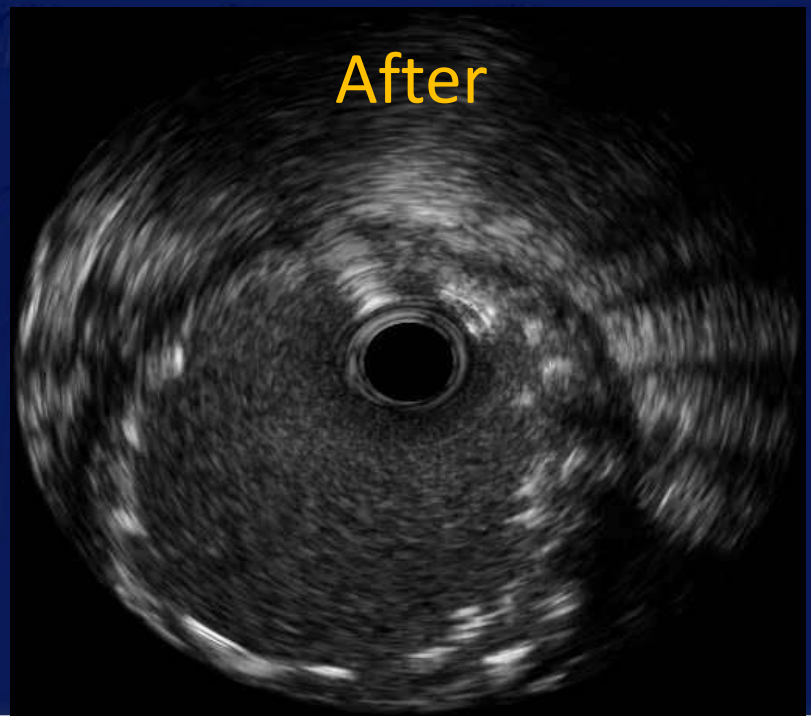
If IVUS cath does not cross the stent perform a better postdilatation

EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.

After appropriate sizing

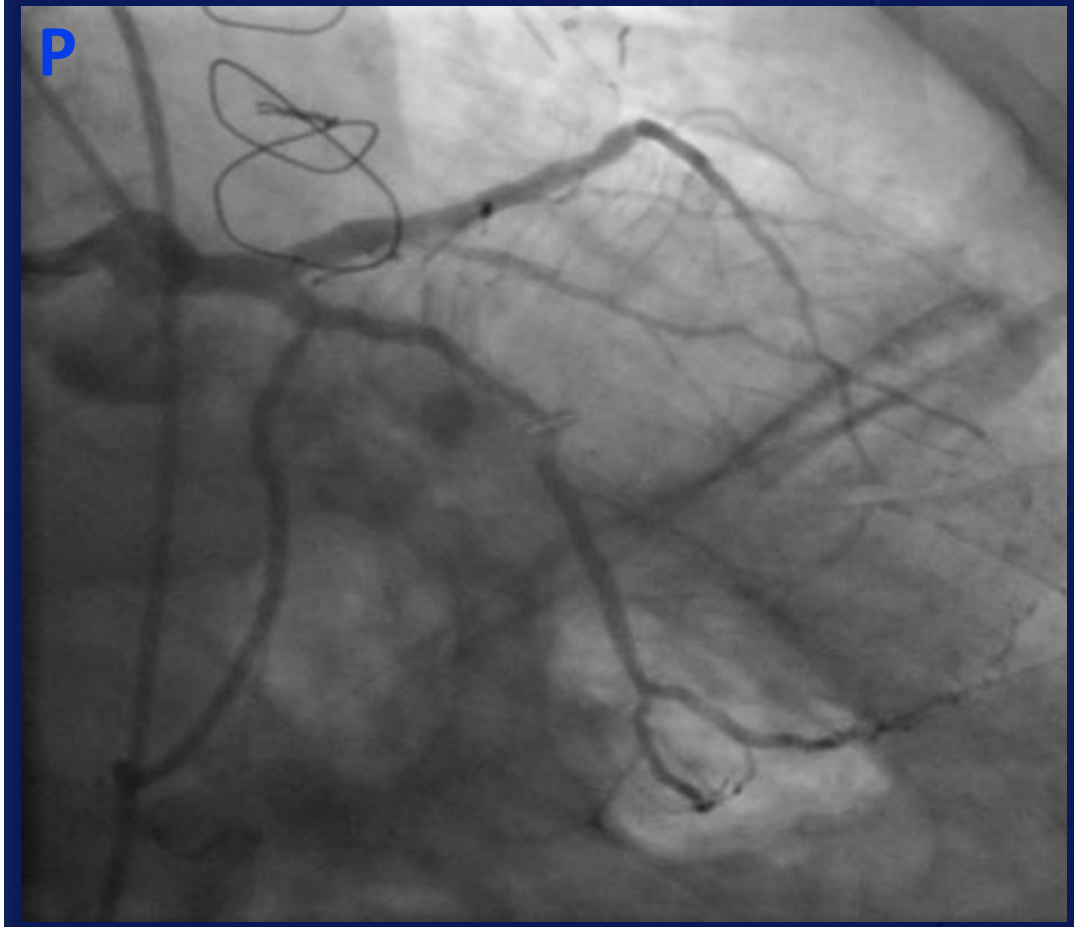






EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.

Final



EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.

The AVIO (Angiography Vs. IVUS Optimization) definition of optimal stent result is based on the achievement of % of CSA inside the stent corresponding to 70% of the balloon CSA.

The balloon is selected according to the media to media diameters in the stented segment.

At the stent edges the 70% criterion can be reduced to 60%, to lower the risk of peri-stent dissection

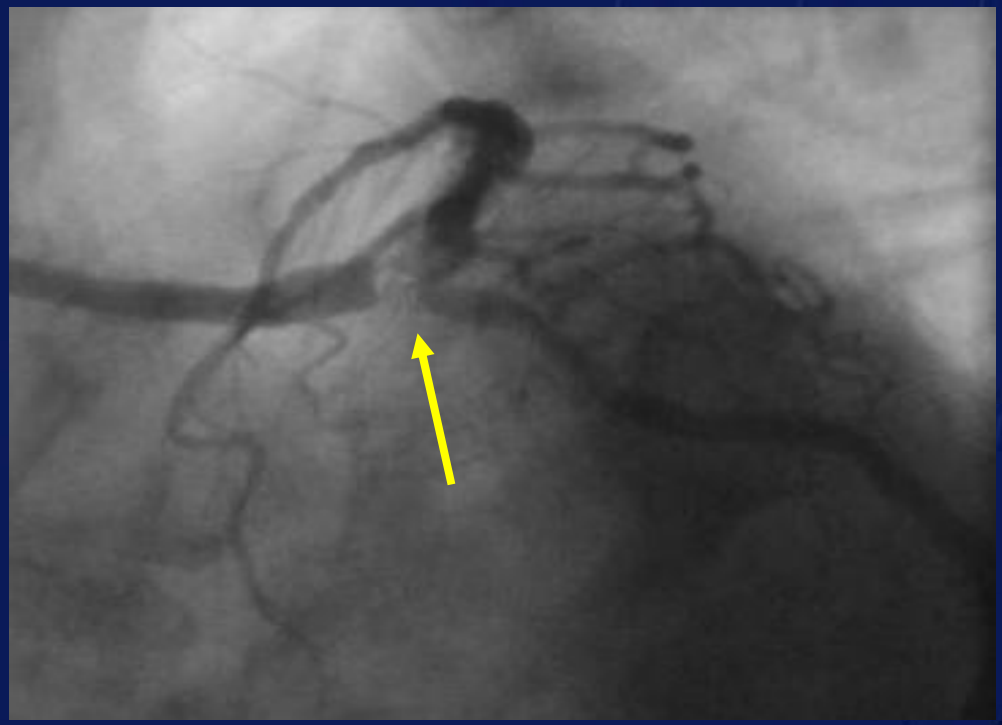
Balloon size (mm)	60%	70%
3	4.24	4.95
3.5	5.77	6.73
3.75	6.62	7.73
4	7.54	8.79
4.25	8.51	9.93
4.5	9.54	11.13

CCI 2008

EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.

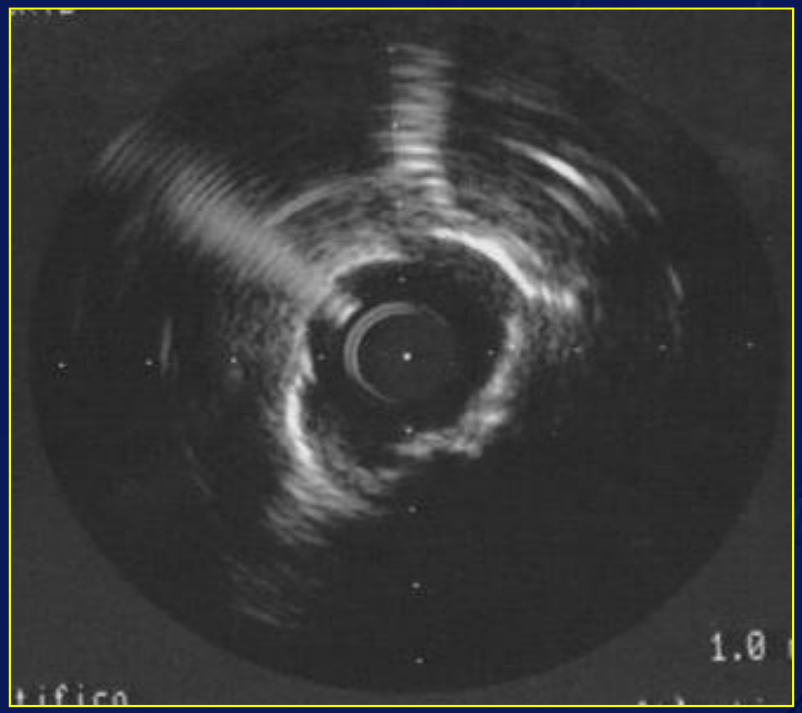
2. Lesion preparation

EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.



EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.

IVUS Images Post Rotablator

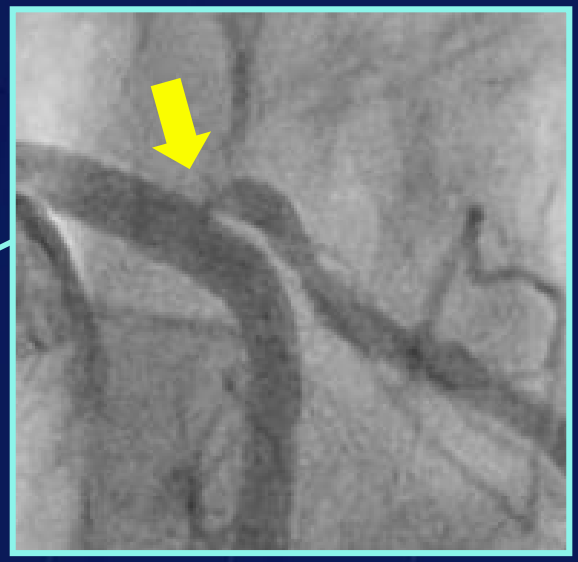


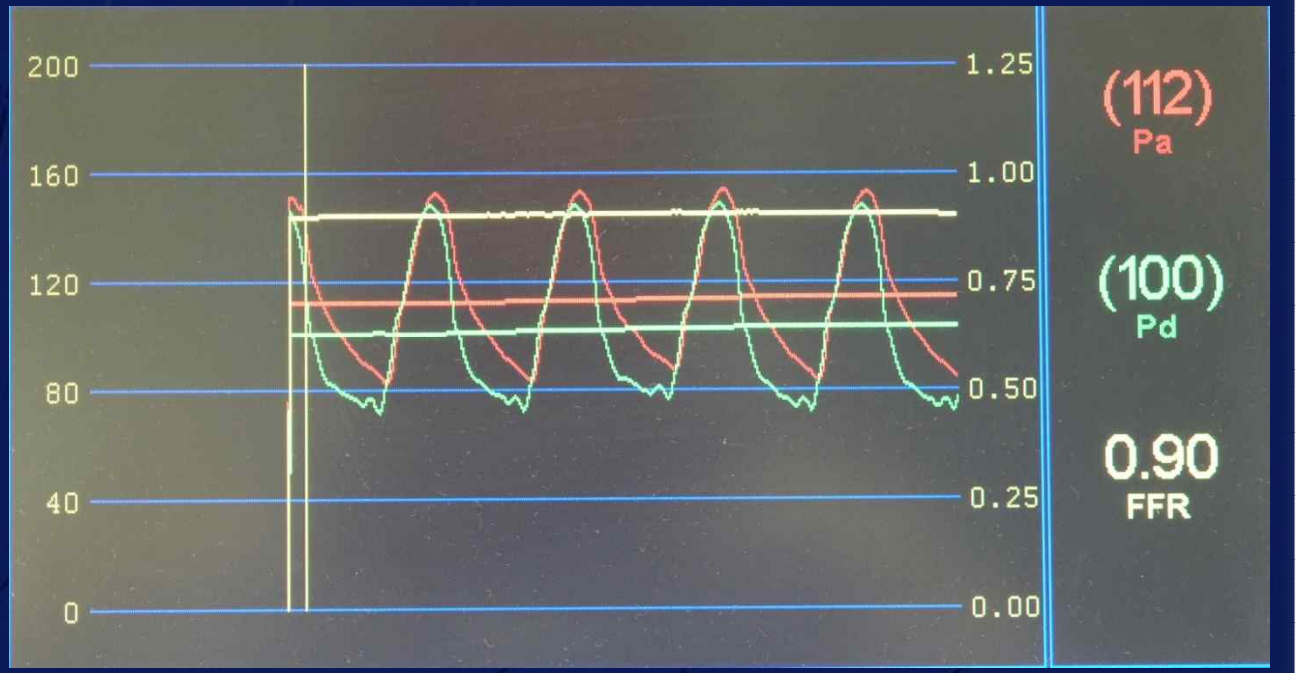
LAD Os

Cx Os

- Crush technique: 3.0x33 Cypher in Cx and 3.5x18 Cypher in LAD.

EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.



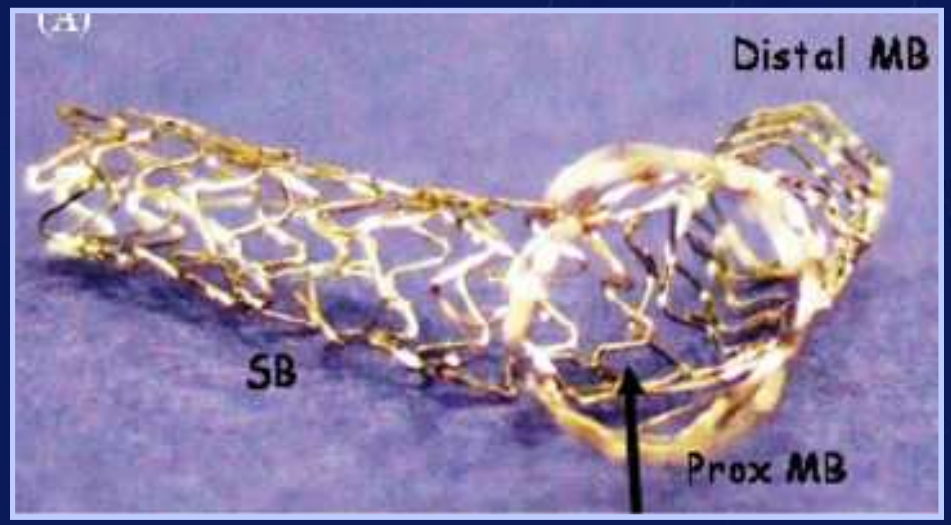


29072008 *CCC*

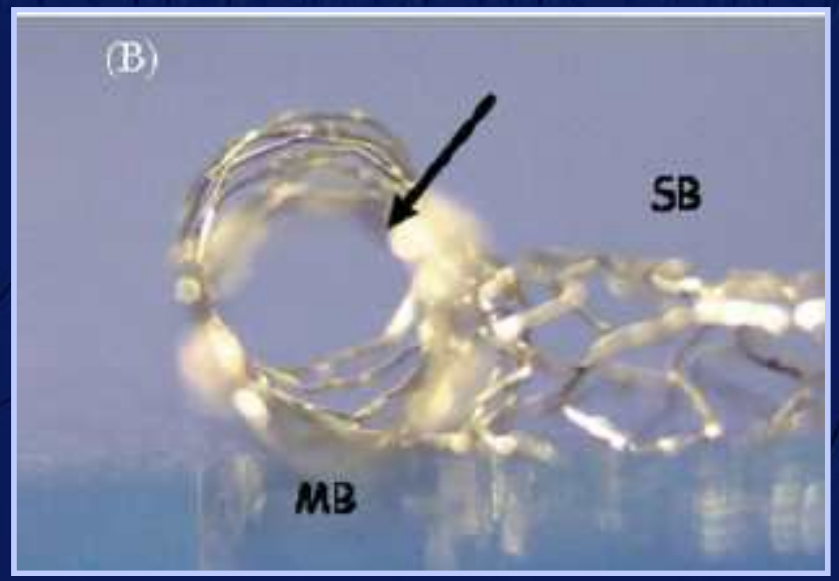
EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.

Modified T-Stenting With Intentional Protrusion of the Side-Branch Stent Within the Main Vessel Stent to Ensure Ostial Coverage and Facilitate Final Kissing Balloon: The T-Stenting and Small Protrusion Technique (TAP-Stenting). Report of Bench Testing and First Clinical Italian-Korean Two-Centre Experience

Francesco Burzotta,[1*] MD, PhD, Hyeon-Cheol Gwon,[2*] MD, Joo-Yong Hahn,[2] MD, Enrico Romagnoli,[1] MD, PhD, Jin-Ho Choi,[2] MD, Carlo Trani,[1] MD, and Antonio Colombo,[3] MD

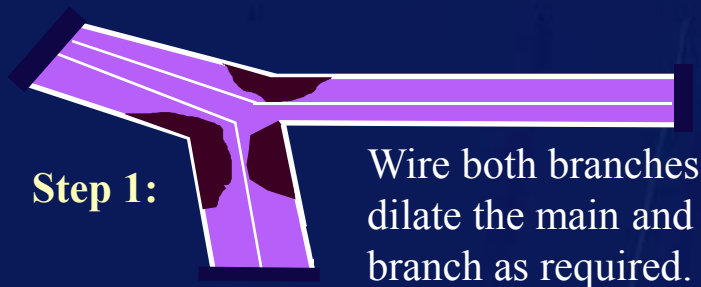


CCI 2007

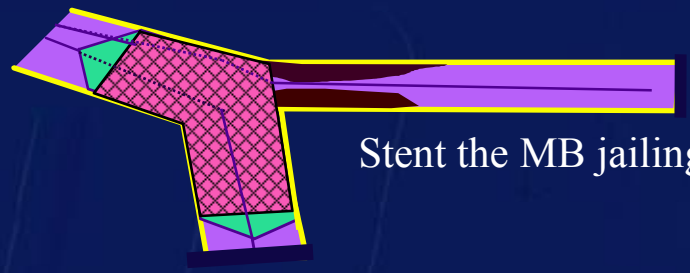


EMO GVM CENTRO CUORE COLUMBUS s.r.l.

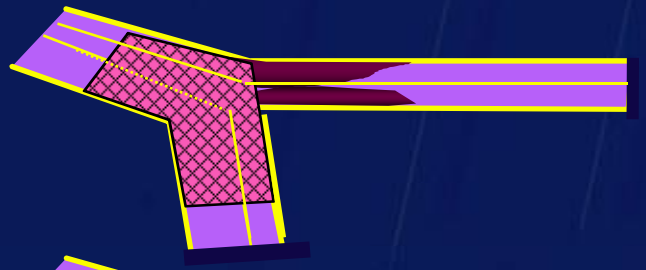
The T-stenting with protrusion technique (TAP)as a cross-over from the provisional approach



Step 1: Wire both branches and pre-dilate the main and the side branch as required.

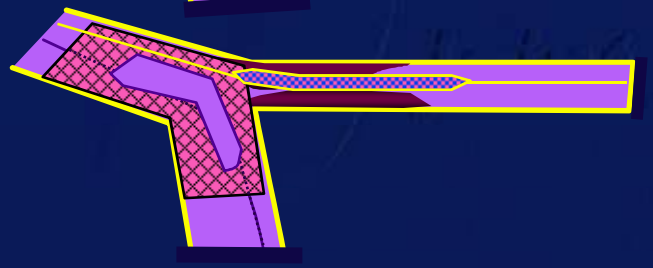


Stent the MB jailing the SB wire

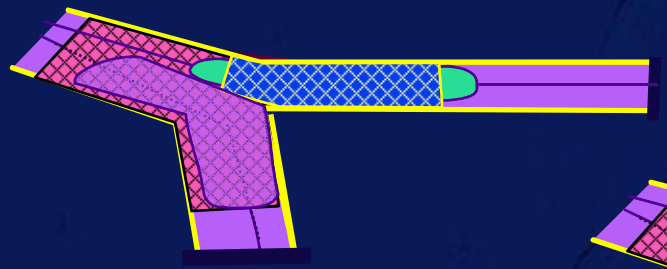


Step 2:

If the result in SB unsatisfactory due to plaque shift or dissection and SB has to be stented, then re-cross into the SB through the MB stent struts

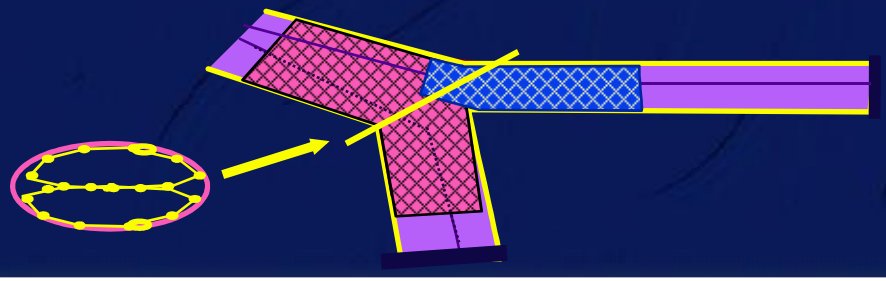


Step 3: Position stent in SB ensuring coverage of ostium with minimal protrusion into MB and place non-compliant balloon in MB stent



Step 4: Inflate the delivery balloon in the SB and the MB balloon simultaneously

Final Result:



EMO GVM
CENTRO
CUORE COLUMBUS s.r.l.

Approach to Bifurcational Lesions including LM

The bifurcation is a True Bifurcation (significant stenosis on the MB and SB)

- **No** → Provisional SB stenting or KIO
- **Yes** → The SB is suitable for stenting
  - **No** → Stent on MB and KIO
  - **Yes** → The disease on the SB extends for more than 3 mm from the ostium of the side branch:
    - **No** → Provisional SB stenting
    - **Yes** → Elective implantation of two stents (MB and SB)