

CIT at TCTAP 2016

How To Perform DK Crush ? (With Case Examples)



Teguh Santoso

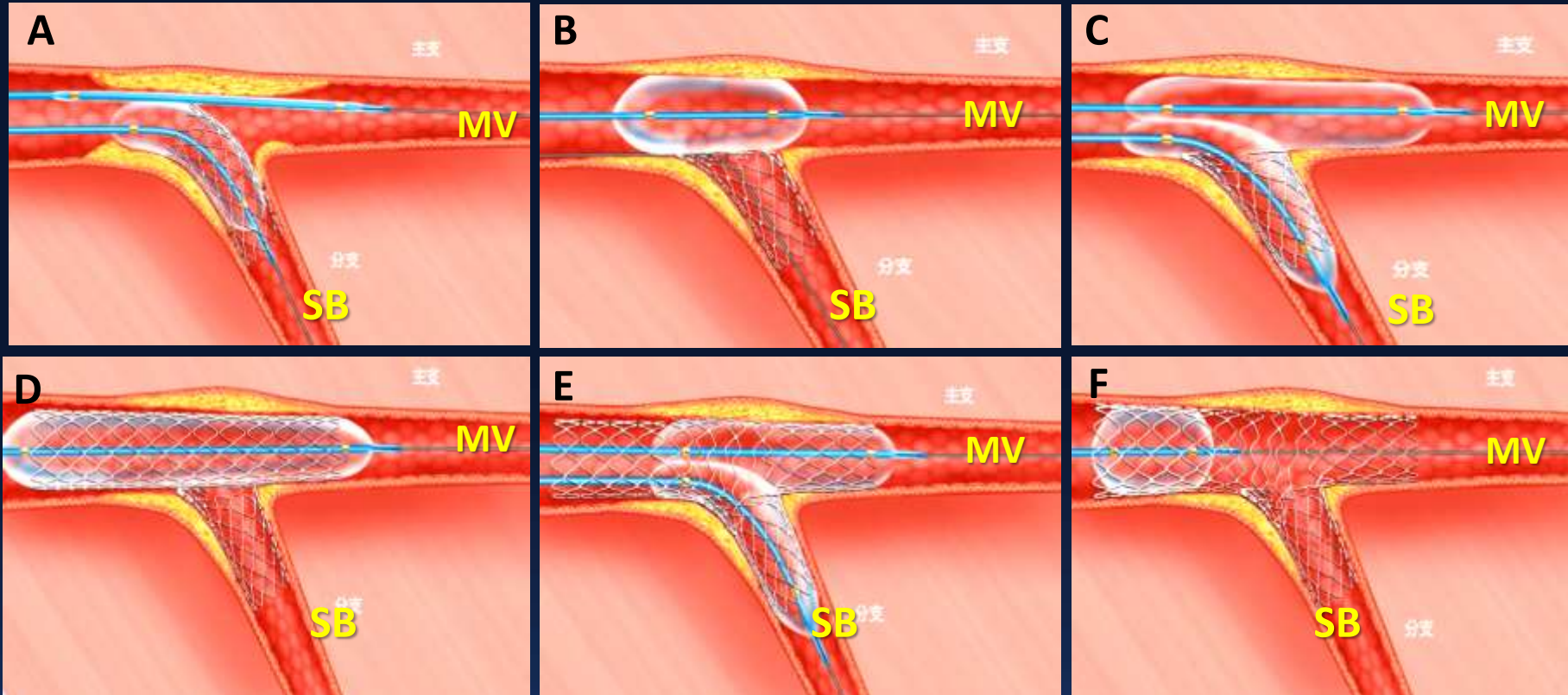
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Disclosure Statement of Financial Interest

Within the past 12 months, I, **Teguh Santoso** or my spouse/partner have had a financial interest/arrangement or affiliation with the organization(s) listed below:

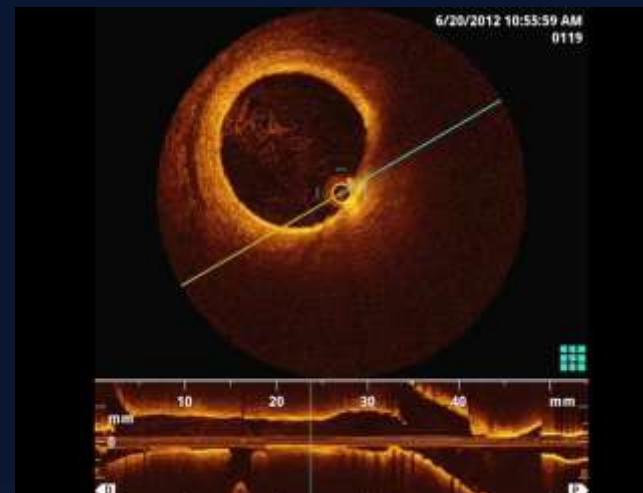
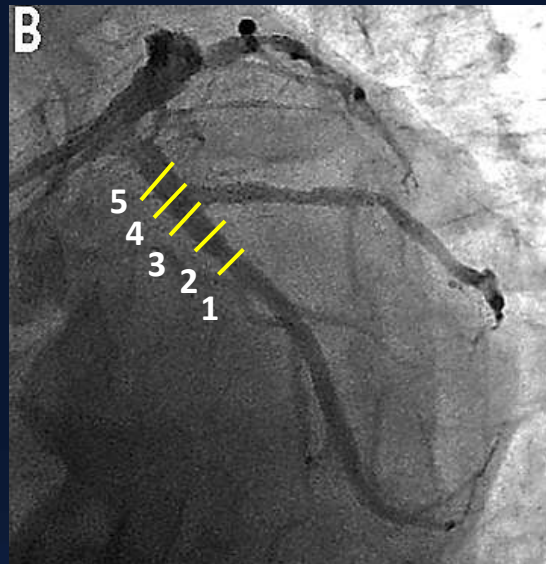
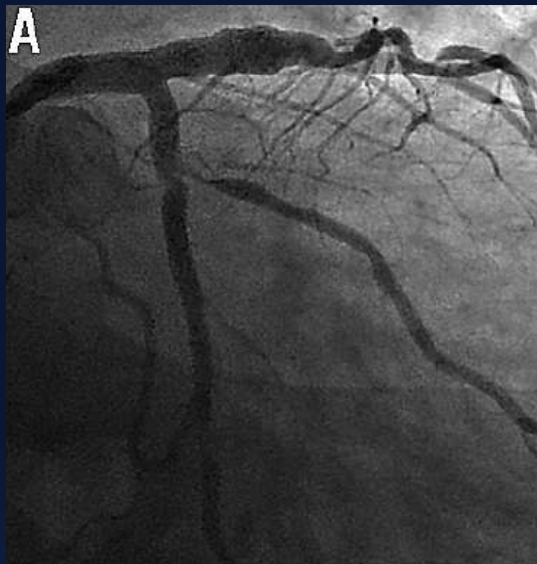
- Grant/Research Support: **none**
- Consulting Fees/Honoraria: **none**

DK Crush Stenting Technique

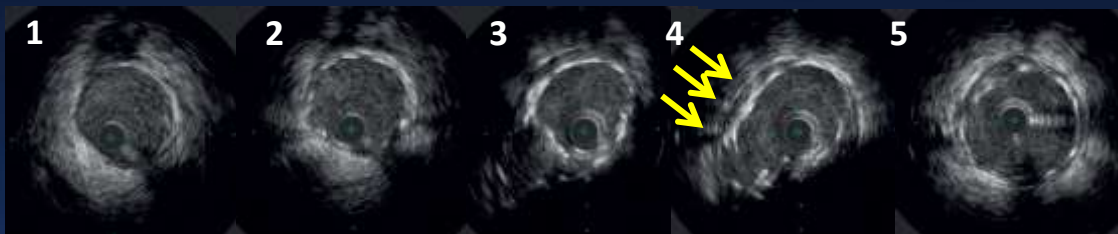


A. Stenting of the SB stent. B) Inflation of balloon in the MV to crush the SB stent. C) After rewiring the SB stent proximally, alternative, followed by first kissing inflation. D) Stenting of the MV. E) After rewiring the SB from the proximal MV stent, alternative followed by final kissing balloon inflation. F) Proximal optimisation technique (POT) to improve MV stent strut apposition.

DK Crush Stenting Technique In Simple Bifurcation Lesion



2D OCT pull back through the LCX



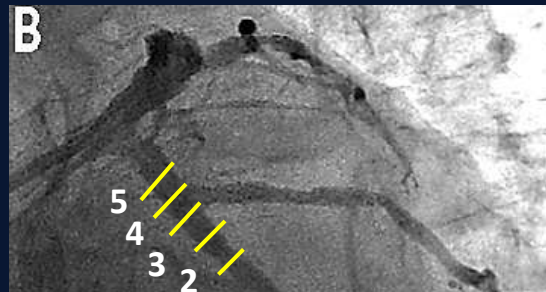
Note: (a). good strut apposition distal & proximal to the bifurcation (fig. 2 & 5) ; (b). formation of a very short neocarina at the widely open OM1 with good stent strut apposition in the main vessel (fig. 3); 3. “crushed” layers of stent struts visible at 9 o’clock (fig. 4, arrow).



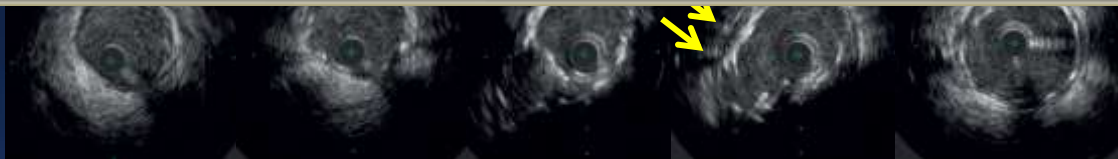
3D flythrough from the pLCX into the bifurcation

DK crush is associated with *larger SB opening & improved SB stent expansion, & high success rate of the FKB inflation*

DK Crush Stenting Technique In Simple Bifurcation Lesion



It is still unknown whether the result of DK Crush technique in complex bifurcation lesions is also excellent



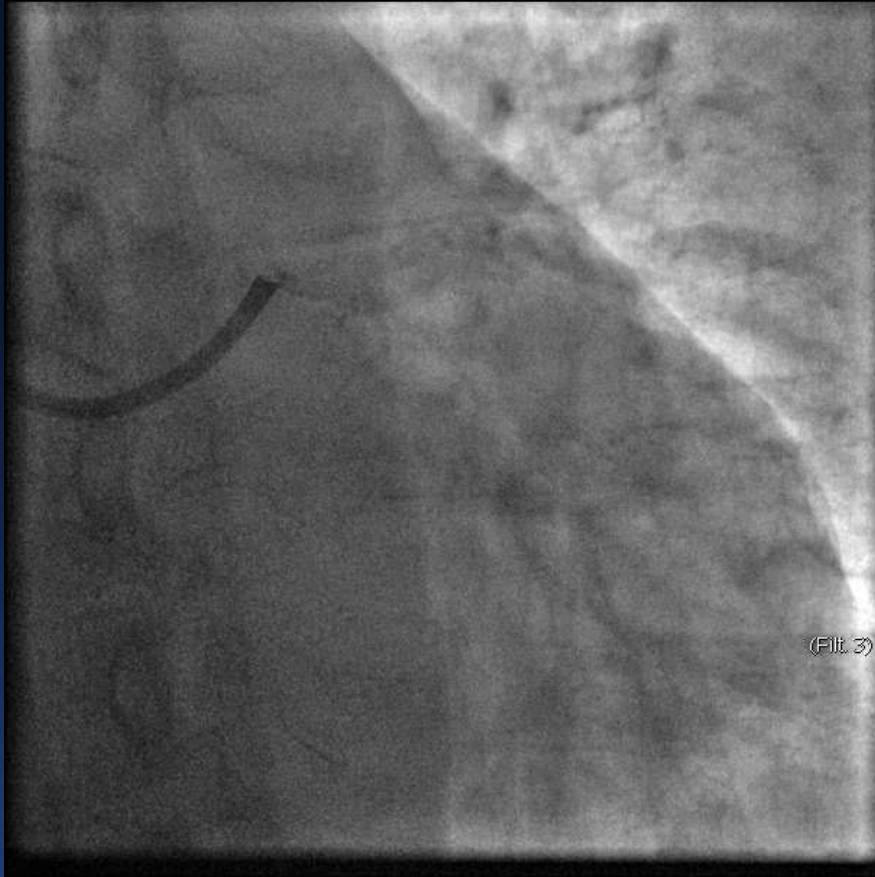
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3D flythrough from the pLCX into the bifurcation

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Case 1: DK Crush For Highly Calcified LM Bifurcation Stenosis

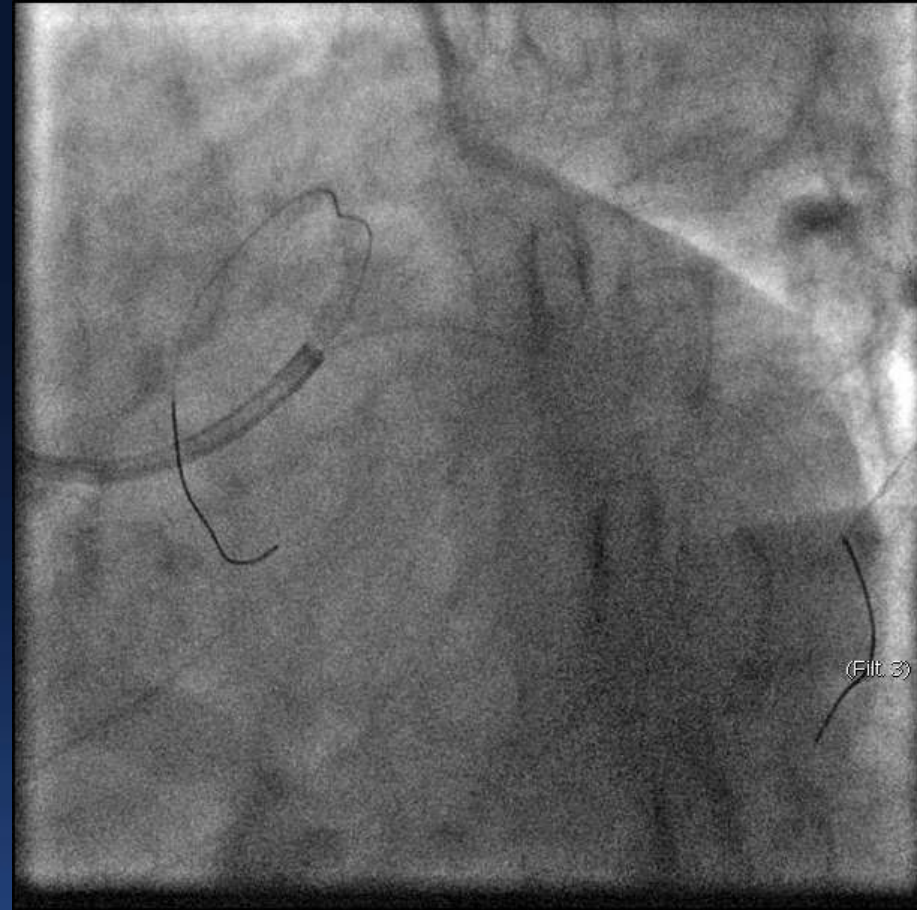
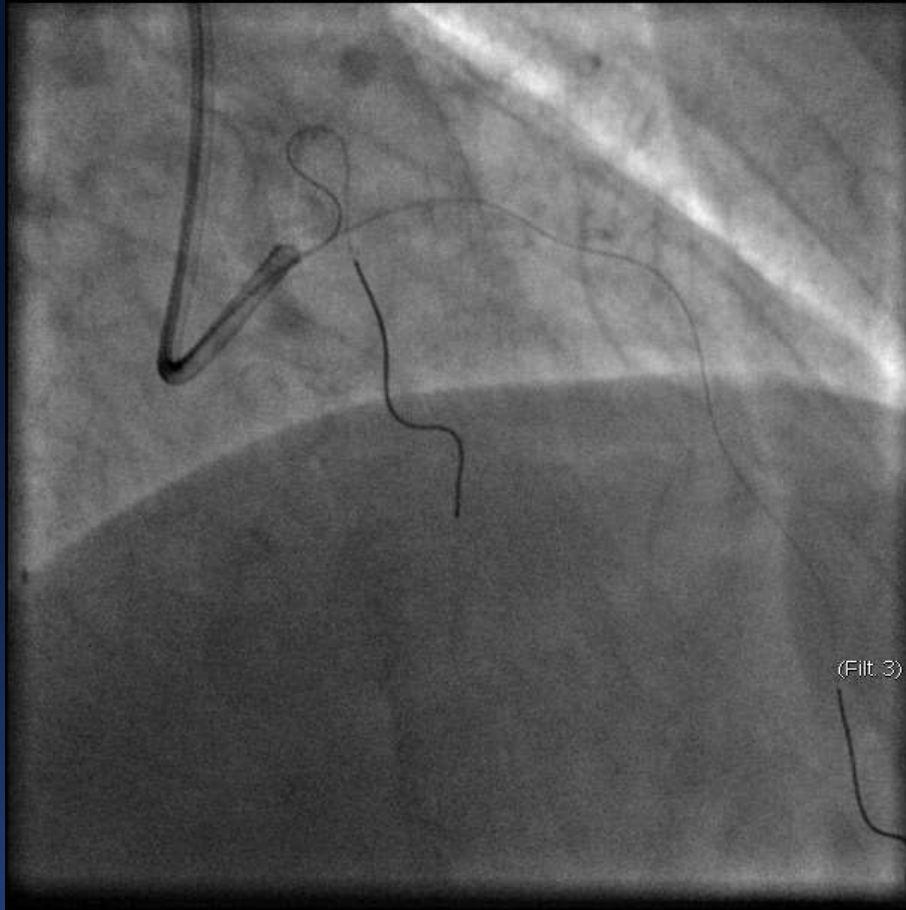
Rsl, male, 63 yrs, UAP, Medina 1,1,1, SYNTAX Score 35, EuroScore 5, NERS Score 40.72



Note: heavy calcification in the LM/LADpm/LCXp

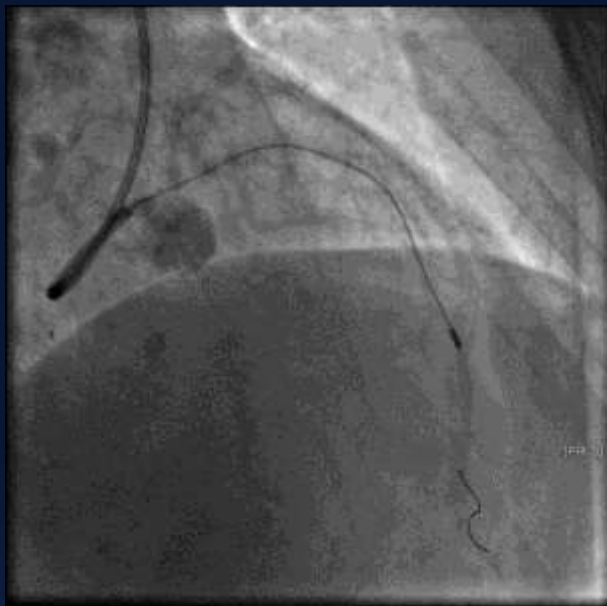
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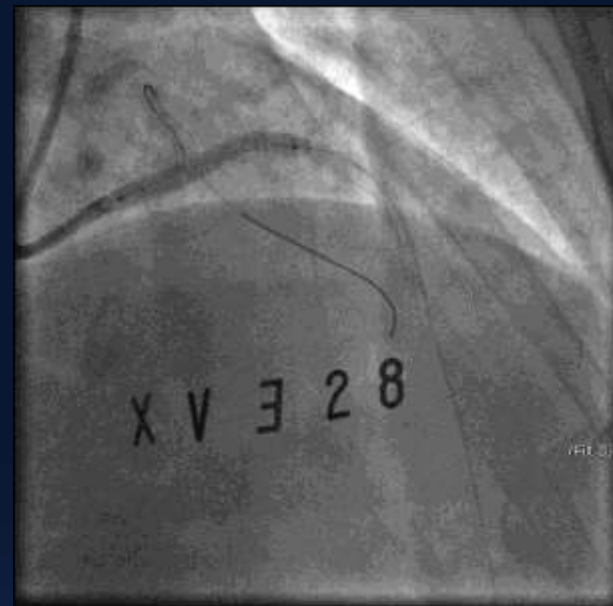
Case 1: DK Crush For Highly Calcified LM Bifurcation Stenosis



As balloons & Tornus could not cross, **rotablation** was performed (1.25-1.75 mm). Subsequently LM-LAD was dilated with **high pressure balloon** (stepwise dilatation). LCX could be dilated with high pressure balloon.



After implantation of 2 **overlapping Xience V** stents in the **LADpm** (2.5x18 mm & 2.5x23 mm), another **Xience V** stent was implanted in the **LM-LCX**. This stent was then **crushed** with a balloon placed in LM-LAD



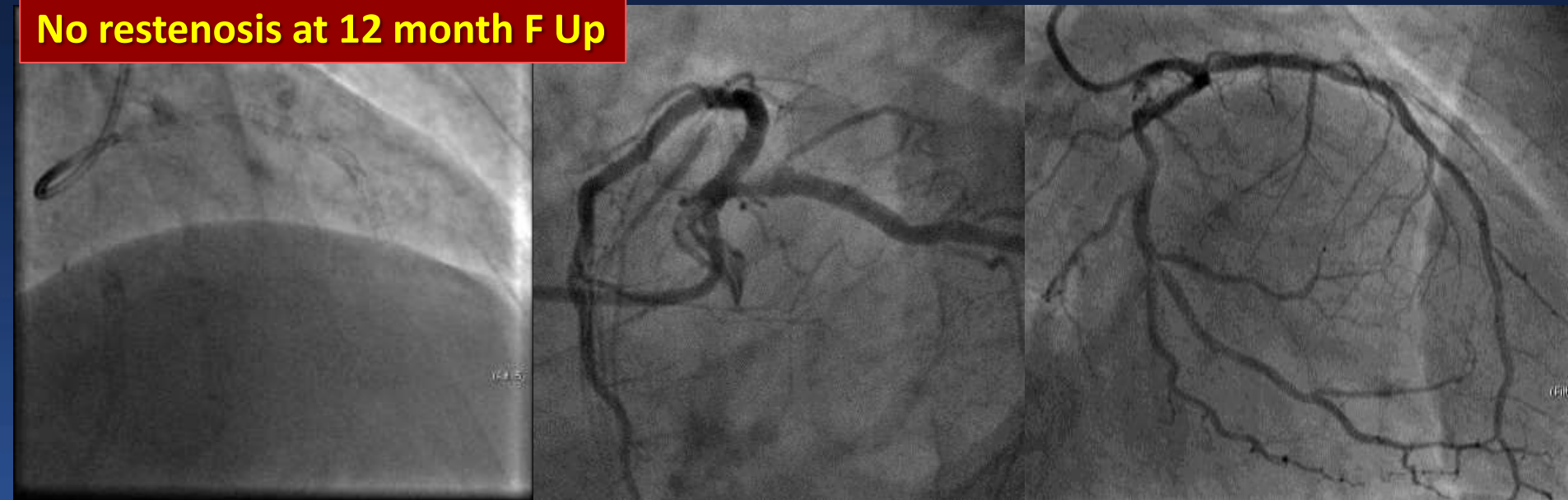
DK crush technique: After **1st kissing balloon dilatation (KBD)**(LM-LAD & LM-LCX), another **Xience V** stent was implanted (**LMos-LADp**, overlapping with previously implanted stent), followed by **2nd (final) KBD & POT** in the LM shaft/os

Case 1: DK Crush For Highly Calcified LM Bifurcation Stenosis

Excellent final result



No restenosis at 12 month F Up



Case 2: DK Crush For Very Complex Heavily Calcified LM Bifurcation Stenosis & Severe 3VD (*RCA not shown*)

BR, male, 51 yrs, UAP, **Medina 1,1,1; SYNTAX Score 60; EuroScore 0.83%; NERS Score 60.92; STS Score 12.3% (mortality & morbidity for CABG)**

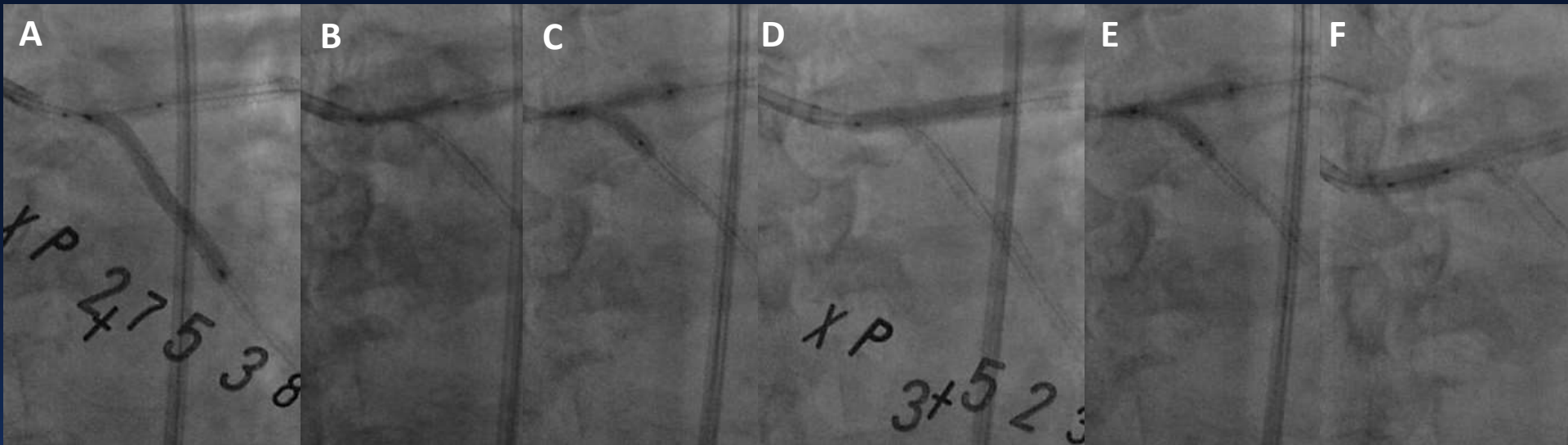


Note: critical LM stenosis & diffusely diseased LAD & LCX/PL branch

High PCI & Surgical Risk !!!

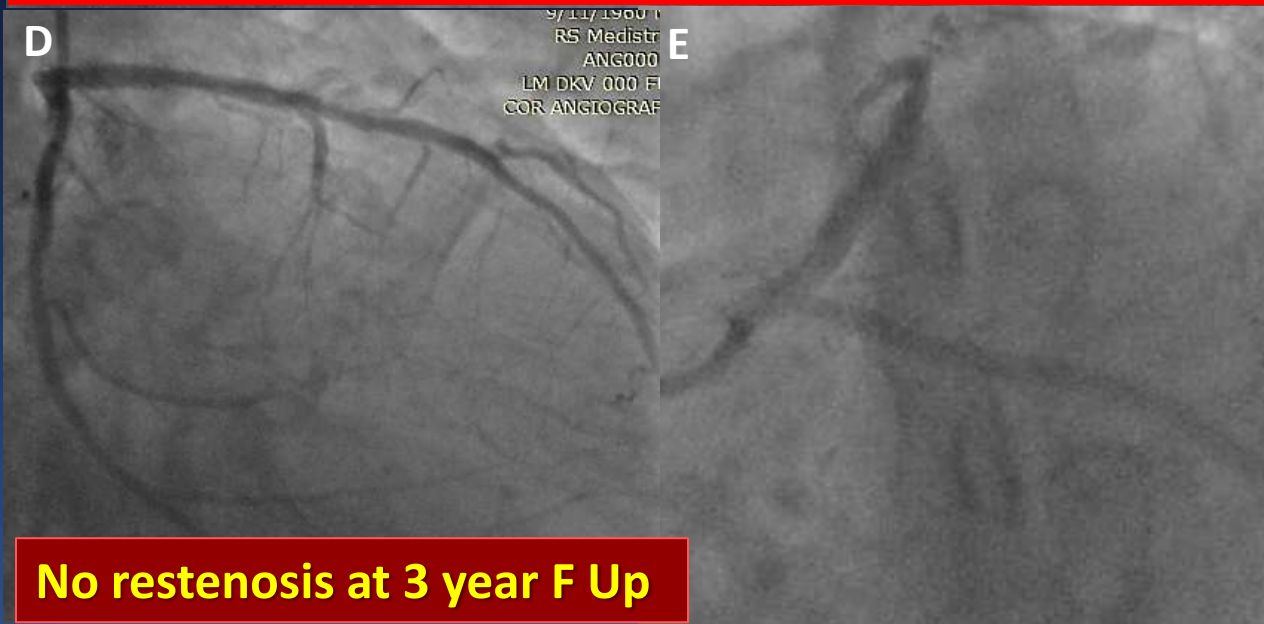
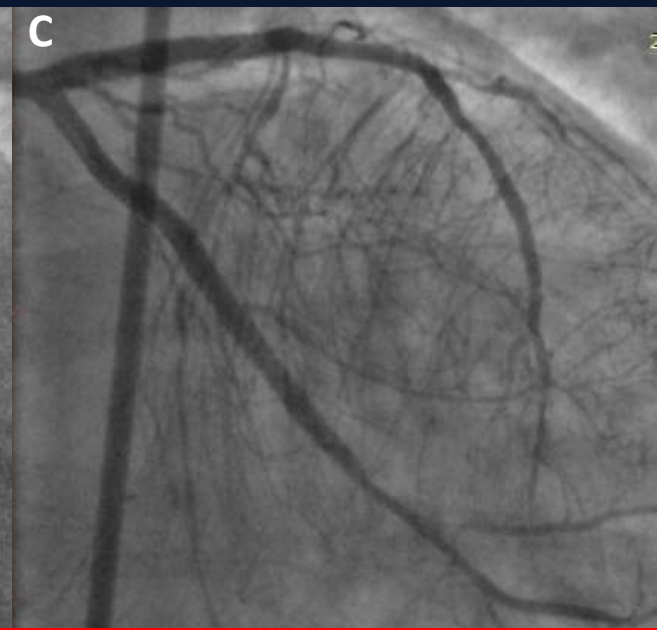
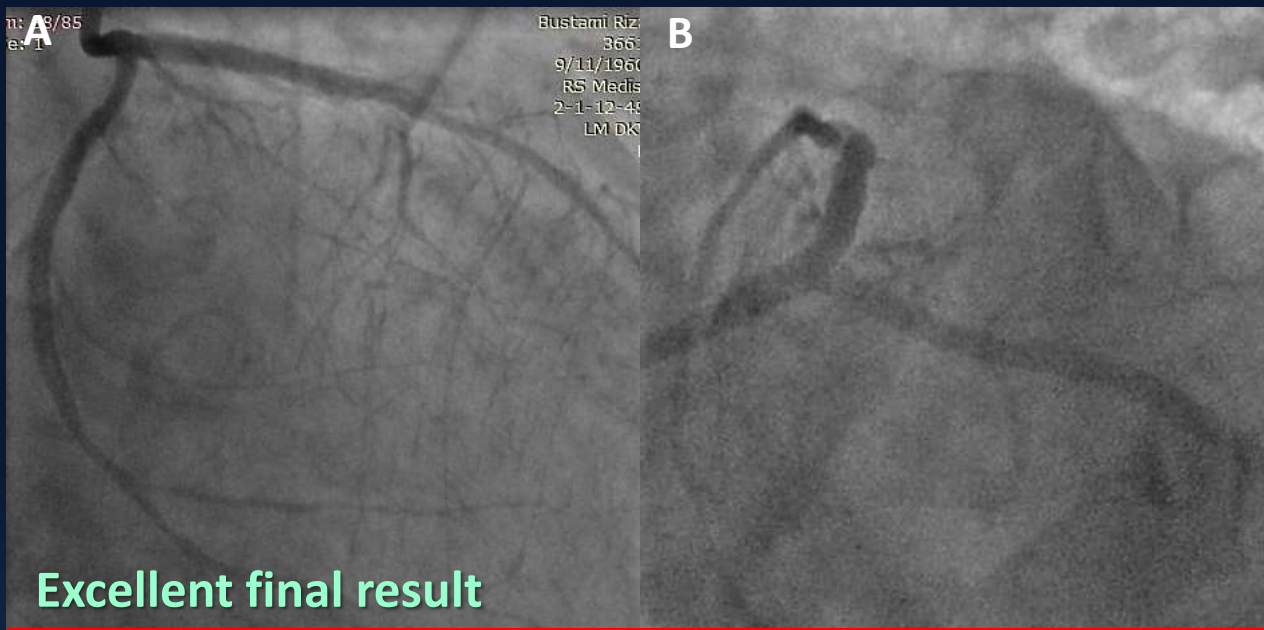
Case 2: DK Crush For Very Complex Heavily Calcified LM Bifurcation Stenosis & Severe 3VD (RCA not shown)

After stenting the long segmental stenosis in the p-m LAD & mL CX-PL branch

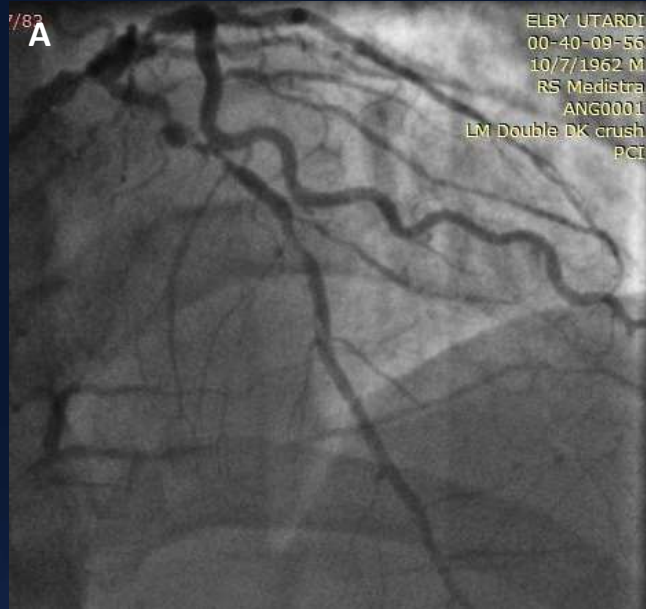


DK Crush technique: A long Xience (2.75x38 mm) stent was implanted in the p-osLCX (A) followed by crushing (B), 1st KBD (C), stent implantation in the LM-LAD (Xience 3.5x23 mm) (D), final KBD (E) & POT (F). Stents in the LM-LAD & p-mLAD, as well as those in the LM-LCX & p-osLCX were implanted in overlapping fashion.

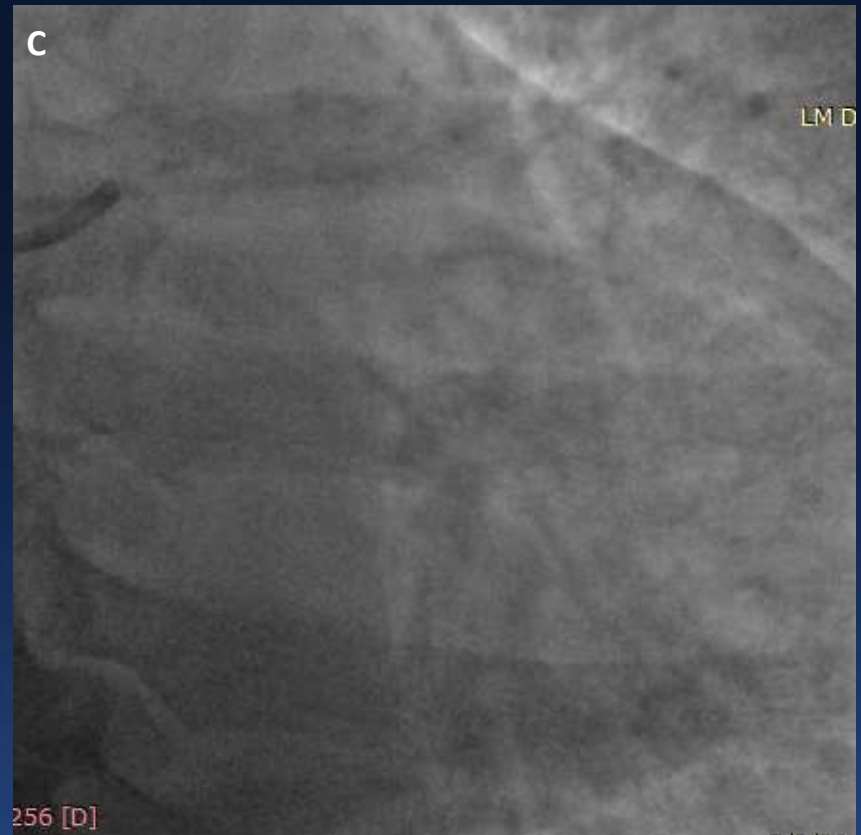
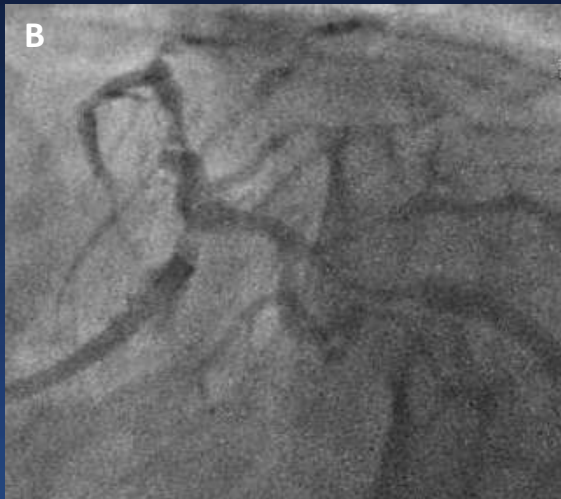
Case 2: DK Crush For Very Complex Heavily Calcified LM Bifurcation Stenosis & Severe 3VD (RCA not shown)



Case 3: Double DK Crush For Double Bifurcation Stenosis



EU, male, 51 yrs, SAP, Medina 1,1,1; SYNTAX Score 47; EuroScore II 2.47%; NERS Score 41.42; STS Score 15.477% (mortality & morbidity for CABG)

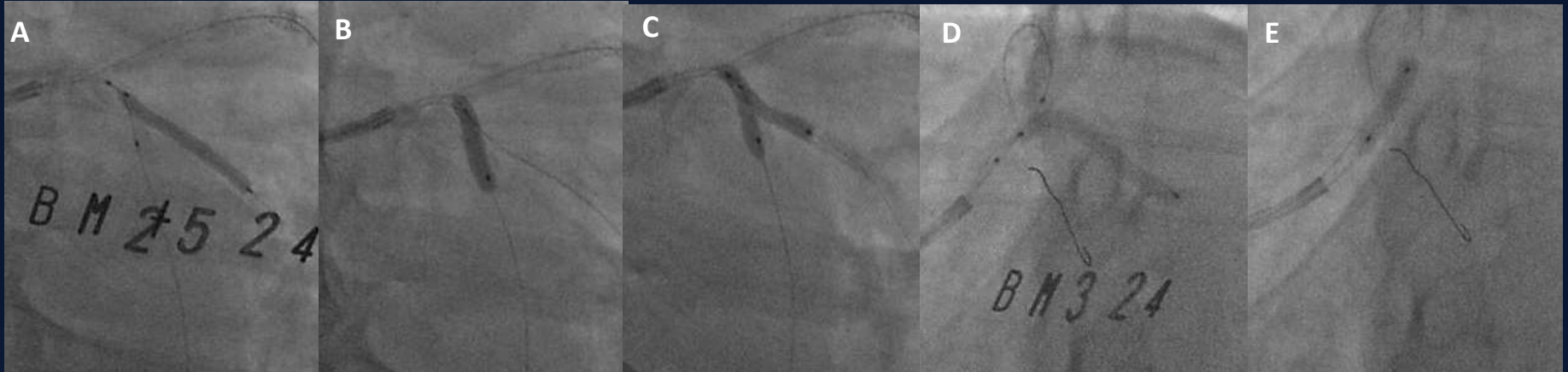


High PCI & Surgical Risk !!!

Double bifurcation: LM bifurcation & LCX-OM1 bifurcation

Case 3: Double DK Crush For Double Bifurcation Stenosis

After stenting the pLAD (BM 2.75x36 mm)



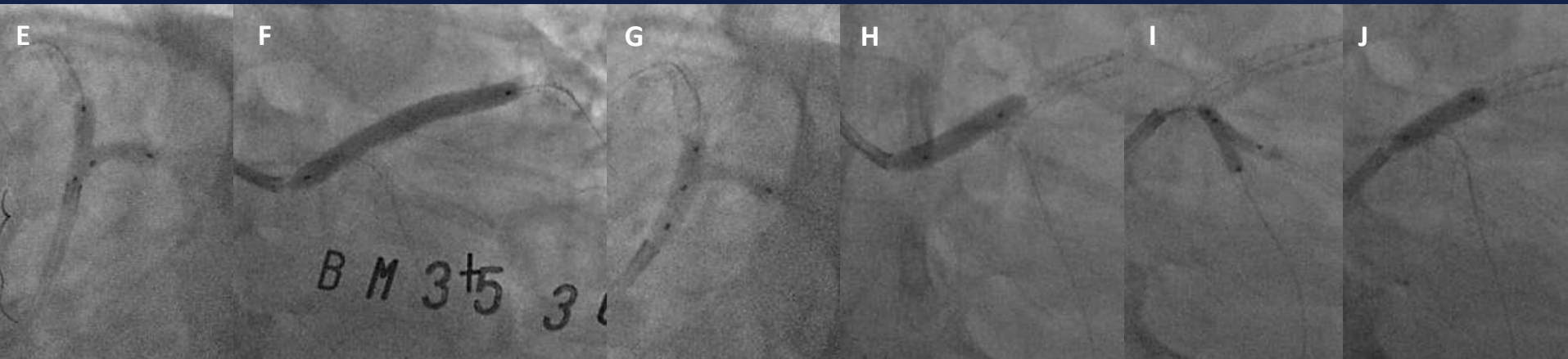
Stenting the OM1
(BM 2.5x24 mm)

Stenting crushing

Sequential balloon
dilatation, then 1st
KBD for LCX-OM bif.

Stenting the LM-
pLCX
(BM 3x24 mm)

Stenting crushing



Sequential balloon
dilatation, then 1st
KBD for LM bif.

Stenting the LM-
LAD
(BM 3x36 mm)

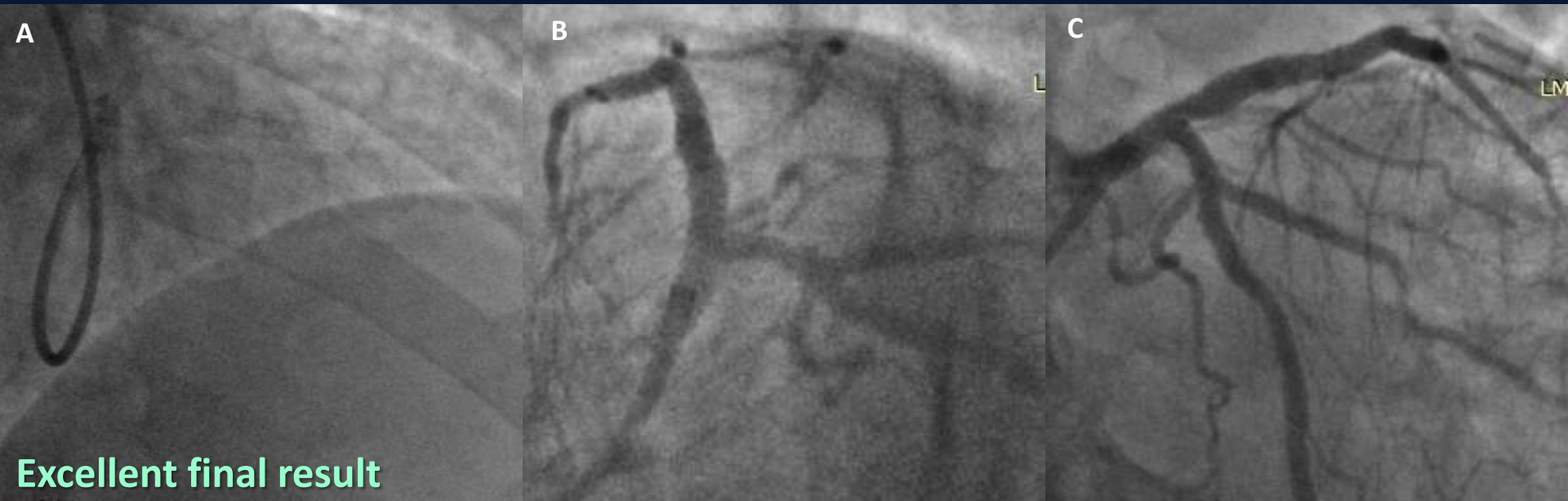
Sequential balloon
dilatation, then final
KBD for LM bif.

1st POT

Sequential balloon
dilatation, then final
KBD for LCX-OM bif

2nd POT

Case 3: Double DK Crush For Double Bifurcation Stenosis



Excellent final result



No restenosis at 1 year F Up

Case 4: DK Crush For LM Trifurcation Stenosis

HT, male, 51 yrs, NSTEMI, **Medina 1,0,1,0**; SYNTAX Score 34; EuroScore 1.29%; NERS Score 20.82; STS Score 13.804% (mortality & morbidity for CABG)

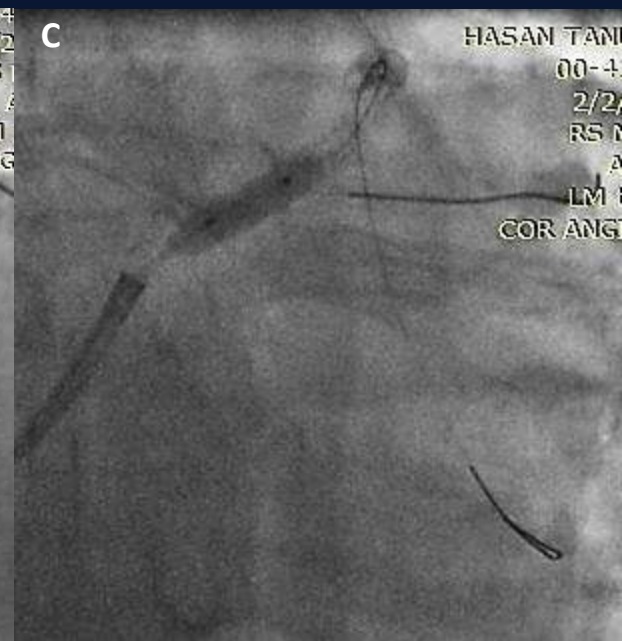
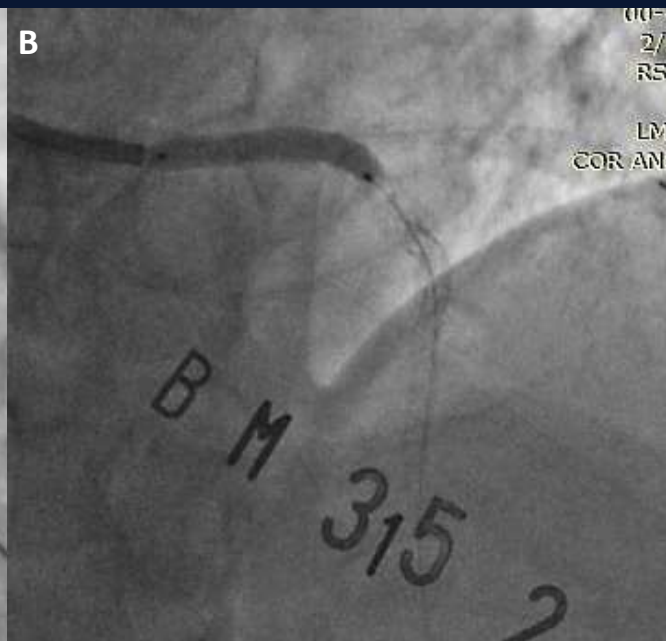
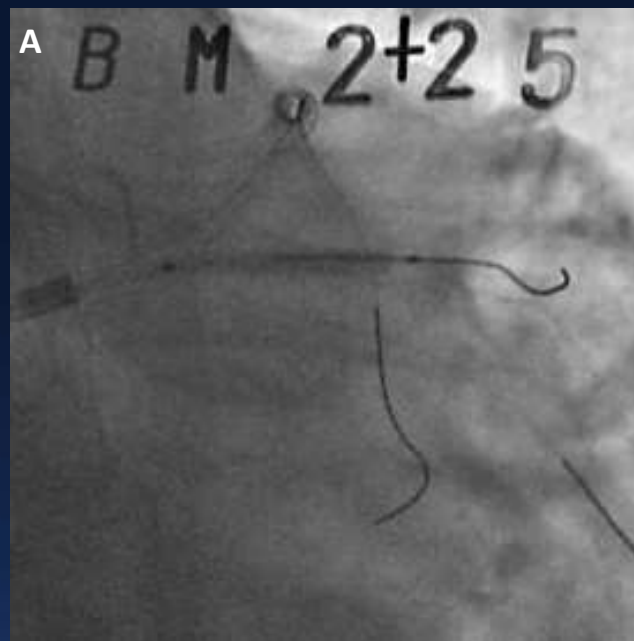


LM trifurcation stenosis: LM: 90% stenosis with plaque rupture; LAD: diffusely diseased in the p-m segments; D1: high take off (giving the appearance of LM quadrifurcation stenosis); LCX: normal; Intermediate artery: big & long vessel with 80% stenosis, extending > 10 mm from the ostium.

Strategy: after fixing the p-m LAD stenosis, the LM trifurcation stenosis was attended with implantation of 2 stents (*LM-LAD & LM-Intermediate artery*) using the **DK crush technique**

Case 4: DK Crush For LM Trifurcation Stenosis

After implantation of overlapping stents in the mLAD (BM 2.75x33 mm) & pLAD (BM 3.0x33 mm)

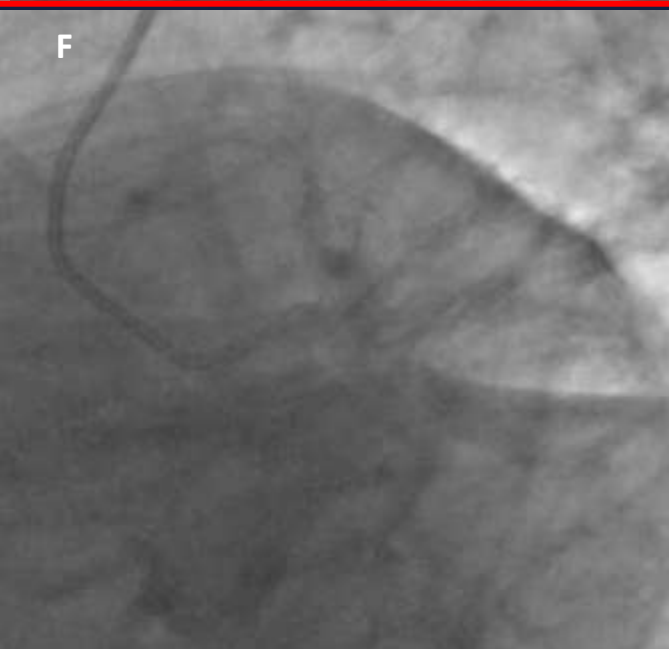
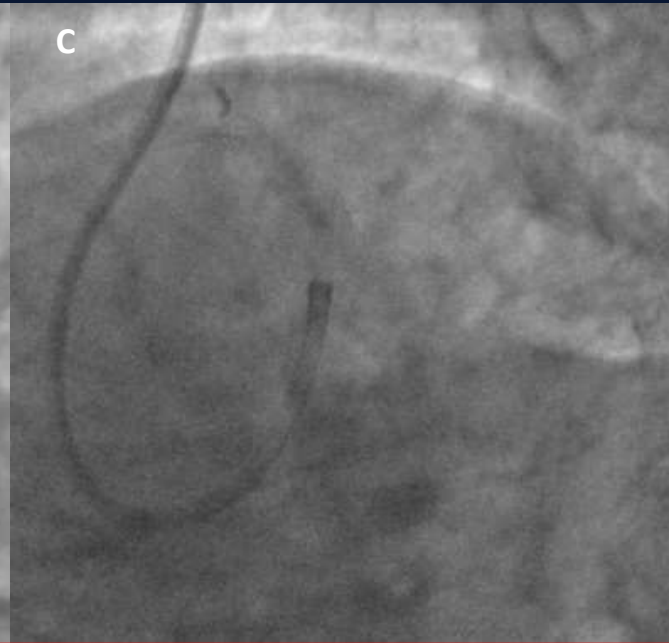
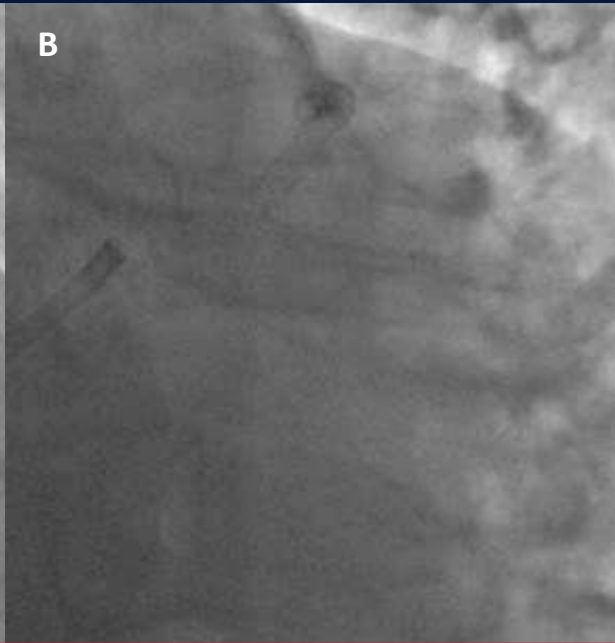
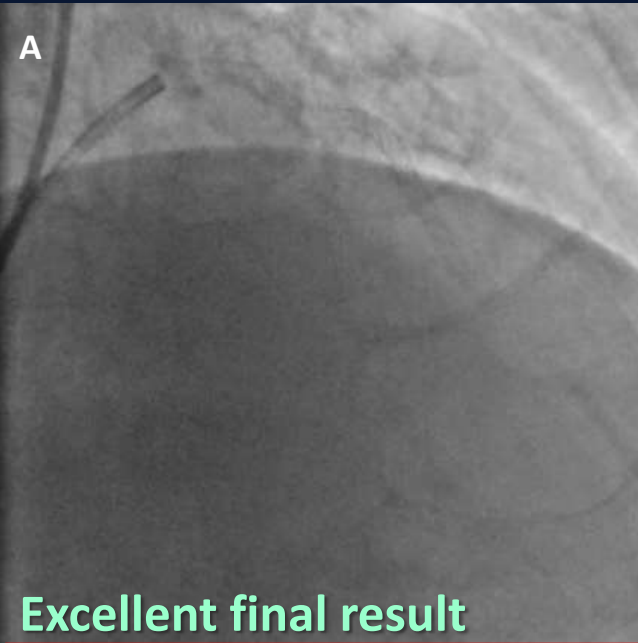


Stenting of LM-D1 (Biomatrix 2.25x18 mm), followed by **balloon crush & 1st KBD**

Stenting of LM-LAD (Biomatrix 3.5x24 mm), followed by **final KBD**. Stent was implanted in overlapping fashion with previously implanted stents in p-mLAD

POT in the LAD & LM

Case 4: DK Crush For LM Trifurcation Stenosis



Is DK Crush Technique Superior To Provisional Stenting Or Other Complex Stenting Techniques For The Complex Bifurcation Lesions* ? : Unknown

- **DEFINITION Study***: **Simple bifurcation lesions**: All two-stent techniques = one stent approach (“the less is still the better”). **Complex bifurcation lesions**: two stent techniques → less in-hospital mortality & one-year MACE.
- **DEFINITION II (ongoing study)** : A prospective, multi-center, randomized trial comparing **two-stent with provisional stenting techniques** for patients with **complex coronary bifurcation lesions**

▪ **Complex bifurcation Stenosis***:

- Medina 1,1,1 / 0,1,1 with SB \geq 2.5 mm
- Major criteria: SB lesion length \geq 10 mm / SB DS \geq 70% (LM) or \geq 90% (Non-LM)
- Minor criteria: MV lesion length > 25 mm
 - Bifurcation angle \leq 45^o or \geq 70^o
 - MV RVD \leq 2.5 mm
 - Moderate to severe calcification
 - Thrombus
 - Multiple lesions

Complex bifurcation lesion = 1 major + any 2 minor

Thank You
For Your Kind Attention



Borobudur, world's biggest Buddhist temple, Indonesia