Kissing stenting in Primary angioplasty –was it justified?

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Abstract

Objective: To describe a case of acute myocardial infarction where double stent technique was required for primary angioplasty.

Background: Generally, off late, all bifurcation lesions where the side branch is bigger than 2 mm, provisional stenting is done to the side branch after stenting the main branch. However, sometimes it is impossible or dangerous to stent only the main vessel as re-crossing to the side branch may be difficult. So whenever the side branch is a critical vessel two vessel stenting with kissing stents may be required. This is especially required for left main bifurcation lesions and for large LAD diagonal bifurcations. Here we describe a patient who came with acute myocardial infarction who needed kissing stenting during primary angioplasty.

Patients and Methods:

24469 angiograms were performed in Medical College Trivandrum, Department of Cardiology, from 1997 onwards to January 1st 2011. Of these there were 2034 angioplasties and of these 147 primary angioplasties were done in 2011. In one case kissing stenting was done to prevent acute closure of the circumflex artery as it was the only open vessel to the left system.

Our patient presented to the hospital 5 hours after the index pain in Killip Class 3. Her door to balloon time was 40 minutes. Electrocardiogram showed sinus rhythm, PR interval was 160 milisecs and QRS axis was +30 degrees, she had a Q wave in leads I and aVL and QS complexes with ST elevation in V1 to V3. On examination, she was in distress with pain with a HR of 90/min, her blood pressure was 130/80 mm Hg and she had bilateral crepitations over less than 50% of the lung fields. An emergency echo showed entire IVS, anterior, anterolateral and apical segments akinetic. She had severe LV dysfunction and mild pericardial effusion. Patient was taken up for Primary angioplasty after loading doses of 600 mg clopidogrel and 325 mg soluble aspirin.

On coronary angiography right coronary sinus injection showed a normal RCA. The left injection showed that the LMCA was 5 mm and bifurcated into LAD and LCx. The LAD showed an ostial total occlusion. (Fig 1 and Fig 2). The LCx was non dominant, 2.75 mm vessel proximally and continued as a major OM (2mm). LCX had and ostial 80% lesion with haziness. The patient seemed to be supported mainly on this circumflex as her LAD was totally occluded. The angle between her LAD and circumflex was approximately 60 degrees. The LMCA was cannulated with a 7 F JL 3.5 Launcher guiding catheter. The LAD total occlusion was crossed with a .014” galeo floppy wire and the wire was parked in the distal LAD. The lesion was predilated with a 2.5 x 10 Ryujin balloon at 6 atm for 10 seconds twice. The LCX was wired with .014 inch GFW wire. The decision for kissing stenting was made as we could not afford to lose the circumflex. A 2.5 x 16 mm DES was positioned at the LCX ostium with the proximal end in the LMCA. A 2.75x18 mm DES was positioned at the LAD lesion. (fig 3.). Simultaneous kissing stenting was done at 10 secs. Post dilatation was done at 12 atm for 15 seconds. TIMI III flow was attained (fig 4). The patient tolerated the procedure well. Course in the hospital On the very next day, she developed severe recurrence of chest pain. She was

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immediately taken up for a check angiography which showed subtotal occlusion of the proximal LAD just distal to the stent. (fig 5). The LMCA was cannulated with a 6 F JL Launcher G C. The angiogram showed a thrombus in the LAD with a distal TIMI 2 flow. The lesion was crossed with a .014”BMW wire and parked in the distal LAD. Thrombus aspiration was tried with a Pronto V3 Thrombus aspiration catheter but the catheter could not be tracked into the lesion. The lesion was dilated with a 1.5 x 15 mm Elect balloon at 14 atmospheres x 15 seconds followed by higher 3x 8 NC Mercury Balloon at 8 atm X 10 seconds. Partial flow was established. A dissection was noticed distal to the LAD stent. It was stented with 2.75 x 16 Biomime DES at 12 atm for 15 seconds. Overlapping dilatation was done with the same stent balloon at 13 atm into 10 seconds. The dissection was covered completely. However the thrombus was dislodged and migrated to the distal LAD showing total occlusion. The lesion in the distal LAD was crossed with a 0.14”BMW wire. As the balloons were not tracking down, a whisper Ultra Extra Support wire was passed across the distal LAD. TIMI 3 flow was established in the proximal LAD and TIMI 2 flow was established in the distal LAD (Fig 6) The patient tolerated the procedure well. She was discharged 5 days later and is doing well on follow up (12 months).

Discussion:

None of the existing bifurcation classifications takes into account the bifurcation angle (Costa et al) 1, 2. Lansky et al 5 followed the European Society of Bifurcation Group and discussed two types of angles the take off angle and the carinal angle. The take off angle is the angle between the main vessel and the side branch (proximal angle) and the carina angle is the distal angle between the main vessel and the side branch. Measurement of the bifurcation angles by using lines drawn from the middle of the coronary vessels is well accepted. The angle between the main vessel and the side branch affects the bifurcation PCI at many levels (Moussa) like the risk of side branch compromise after MV stenting, the ease of side branch wiring, the appropriateness of covering the side branch ostium and extent of geometric deformation of the SB stent. In general a shallow distal angle between the SB and the MV is associated with higher risk of losing the side branch while stenting. This especially occurs if the side branch ostium is diseased. Shallower the side branch angle, the easier the access and chance of rewiring but more the occlusion. The steeper the angle, there is more difficulty in wiring and stenting but a lesser chance for occlusion by plaque shift. Our patient had a shallow bifurcation angle of around 56 degrees and the LCX was the main supply to the left ventricle at the time of MI. We could not take the chance that the side branch, the left circumflex be occluded. Hence, we did kissing stenting to the LCX with 2 stent technique.

Criticism may arise for a strategy of direct two stent technique in spite of the current policy of provisional stenting to the side branch. But we would like to point out that many a time recrossing and redilatation of the side branch is not possible. Further, Sharma et al 3 have clearly shown that for bifurcation lesions the 2 stent approach has better results. In the Precise-SKS trial 3, in 100 patients there was less binary restenosis in the side branch with SKS when compared with the conventional stent technique (7.1% vs 24.4%). Though not statistically significant, the main vessel restenosis, stent thrombosis, death mi or TVR were not different in both groups. The Medina classification makes a distinction between more than or less than 50% stenosis of the side branch, it does not consider the lesion length, or the presence of more distal lesions in the side branch. Side branch disease at the ostium is associated with deterioration of the side branch if there is a large plaque burden. This also may apply to a heavy thrombus burden as was seen in our case.

Costa et al 6 have reported their finding of a randomized trial with drug eluting stents (Xcience V), in 2012. They randomized 54 patients with non left main bifurcations to single or double stent strategy. Only patients with the lesion in the side branch greater than 5 mm were included. All procedures were done under intravascular ultrasound guidance. All had angiographic follow up at 9 months. The results showed that 5 of those assigned to the single stent arm had crossed over to the two stent arm (19%) due to side branch compromise. The side branch restenosis was higher in the single stent arm (27.8% vs 3.3, %) than the two stent arm (p < .01). So many operators are using double stent strategy when the side branch is important.

Hence we present this case to illustrate the need for kissing stenting and double stent technique in certain cases.

Article focus:

1. During primary angioplasty especially very proximal left anterior descending coronary artery lesions are sometimes difficult to tackle. The size of the coronary artery has to be guessed, sometimes the angle between the LAD and the left
circumflex is very narrow, in that stenting the LAD would lead to plaque shift and occlusion of the left circumflex with disastrous consequences. Using a provisional stenting approach may be dangerous. This is because it has been found that many a time, recrossing into a side branch is not possible. So in left main bifurcations and in major diagonal, LAD lesions in certain circumstances it may be better to do simultaneous kissing stenting.

2. Kissing stenting is good but has a few drawbacks. It creates a new carina at the bifurcation, some part of the main vessel is left uncovered and this can lead to stent thrombosis, or restenosis. In our case we had a stent thrombosis that had to be redilated and restented. All 3 stents used were drug-eluting stents.

3. Reported studies have shown the 2 stent technique is good and the side branch compromise is less. In our patient also, the side branch is still patent and the patient is doing well without any angina.

References:


Manuscript

CASE REPORT.

Persistent arterial duct in a 21 years old lady could not be crossed from pulmonary arterial end. It was crossed from the aortic end using coronary guide wire from Judkins right coronary catheter and was snared from main pulmonary artery and withdrawn into another Judkins right coronary catheter and both catheters were placed tip-to-tip and duct was crossed by pushing the catheter from pulmonary arterial end and subsequently procedure was completed in the usual manner. This modified technique avoids the cumbersome procedure of pulling the snared wire outside the body and avoids damage to the duct while snaring, in addition to the benefits of reduction in procedural time and radiation.

Percutaneous closure of persistent arterial duct has almost replaced surgical closure. However challenges are encountered in the conventional technique of crossing the duct from pulmonary arterial end, especially in adults, related to large pulmonary arteries.

Here we report modification of the retrograde approach of crossing the duct from aortic end, employed when there is difficulty in crossing the duct from pulmonary arterial end.

21 years old lady with 3 mm sized duct was referred for non-surgical closure. Pulmonary artery pressure was 28/11 mmHg and pulmonary to systemic shunt flow ratio (Qp/Qs) was 1.6:1.

Duct could not be crossed from pulmonary arterial end despite multiple attempts. So duct was crossed from the aortic end using 6F Judkins right coronary catheter and an 0.014-inch coronary angioplasty guide wire was advanced into the main pulmonary artery.

A gooseneck™ snare (Microvena) was passed into main pulmonary artery from the venous side using another Judkins right coronary catheter. The BMW wire was snared in the main pulmonary artery and the wire was pulled deep into the right coronary catheter from venous side (Figure 1). Both the right coronary catheters were placed against each other tip-to-tip (Figure 2). The catheter from pulmonary end was pushed against the aortic catheter over the arterio-venous loop created and the catheter from the pulmonary end crossed the duct into the descending aorta.

Then the snare was released (Figure 3) and withdrawn from the venous side and the PTCA wire and the right coronary catheter from aortic end were removed. Subsequently an 0.035 exchange length guide wire was advanced into the descending aorta through the right coronary catheter from the pulmonary end. Then the coronary catheter was replaced with a 7 Fr Mullins sheath and 6x4mm Blockaid PDA occlusion device (Shanghai shape memory alloy company Limited, Shanghai, China) was deployed occluding the duct.

Abstract

Transcatheter Closure Of Persistent Arterial Duct - Modification Of The (tip-to-tip Technique).

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