

Accordion Effect During Percutaneous Coronary Intervention (Pci)

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ABSTRACT

Pseudo lesions appear in a coronary artery during intervention due to guide wire manipulation are referred as “accordion phenomenon” and are infrequent occurrences during percutaneous coronary intervention of tortuous coronary arteries. Occurrence of pseudo lesion or accordion phenomena puts a diagnostic challenge to the interventionist and might leads to unnecessary intervention. The differential diagnosis includes coronary dissection, thrombus and its spasm. Ischemia & hemodynamic compromise are possible complications. The common method to overcome this situation is pulling the guide wire out of the affected segments and leaving aside only the floppy segment. Pseudo lesion at times response to intracoronary nitro-glycerine however, sometimes they are refractory. We hereby report a case of Accordion phenomenon during PCI of right coronary artery & technical challenges it imposed on.

Keywords: Percutaneous Coronary Intervention (Pci); Coronary

CASE REPORT

A 76 year old woman, a known case of diabetes mellitus, hypertension and hyperlipidemia was admitted in the Hospital with history of chest pain four days ago. She presented to a primary healthcare centre, where ECG showed evolved anterior wall MI. However, patient did not seek any further medical assistance immediately. She continues to have off & on chest pain and presented to Emergency room of our hospital on day sixth.

Patient was taken for coronary angiography which revealed subtotal occlusion of proximal part of left anterior descending artery (LAD), and 90% discrete stenosis in tortuous right coronary artery (RCA) at its mid segment, preceding this there was a segment of calcification with about 20% plaque (Figure 1).



Figure 1: Tortuous RCA – mid 90% stenosis

It was decided to intervene both LAD & RCA. LAD was subjected to intervention without any difficulty, and it was successfully stented. Following this, right coronary artery was hooked with 6F / 3.5 cm right Judkin's catheter. A 0.014" Floppy hydrophilic guide balance middle weight (BMW) wire (Abbott Vascular) was advanced across the lesion. Lesion in the mid RCA was dilated with 2.0 x 10 mm Clearline Balloon (Newtech Medical Device). After initial balloon dilatation of the lesion, it was found that multiple stenosis like lesion developed in the (Figure 2) proximal & mid segment including a horizontal shelf like projection in the mid segment of right coronary artery, just beneath the calcific segment.

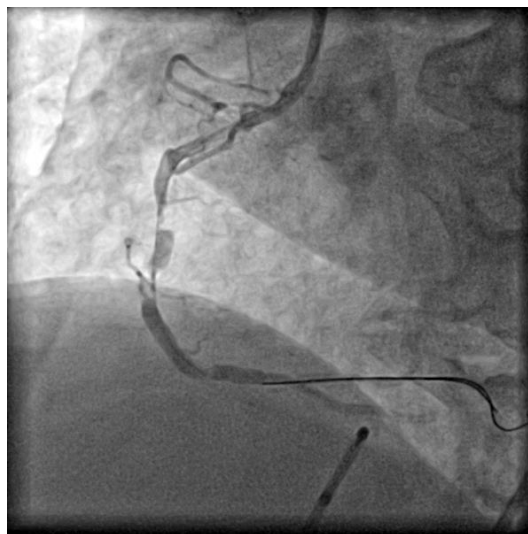


Figure 2: Pseudo lesion in mid & distal RCA

Considering that these lesions are pseudo lesions (Accordion effect) 1 mg nitro-glycerine intracoronary was given. However, there was no change in the pattern. As the balloon could be passed smoothly over these projections, it was decided to stent this artery. We chose Xience Abbott Vascular 2.5 x 18 mm stent and it was advanced over the wire.

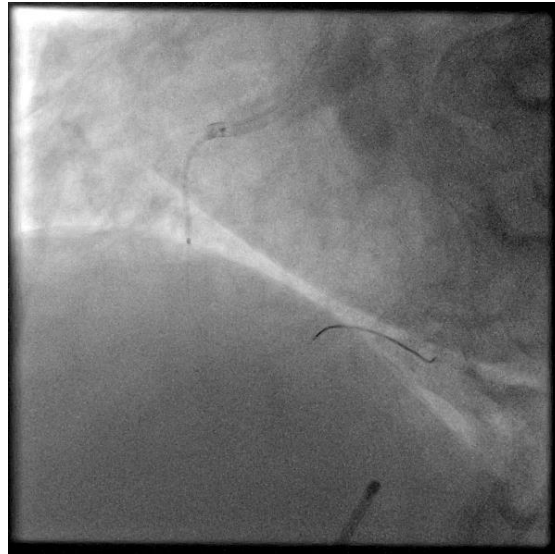


Figure 3: Xience stent stopped at shelf like projection

However, the stent could not be navigated beyond the horizontal shelf like projection seen in the mid RCA, which was approximately 10 mm before the index lesion (Figure 3). Multiple attempts were made; however, we could not navigate the stent through the pseudo lesion. We passed balance high weight (BHW) wire across the lesion into the distal coronary artery so as to create a Buddy wire and to facilitate passage of long stent over through this projection. Attempt of passing the same stent over this high weight BHW wire also failed. Then, we decided to take a small Medtronic Resolute Onyx 2.5 x 12 mm stent, which could be passed through the lesion very smoothly (Figure 4).

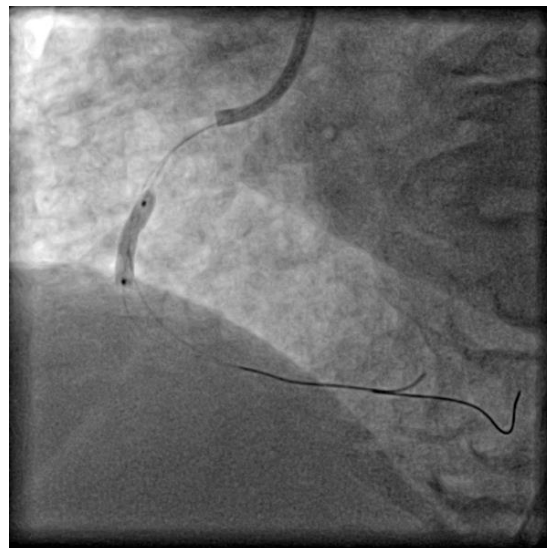


Figure 4

After positioning the stent across the lesion, BMW wire which already in placed was removed and stent was successfully deployed. Soon after deployment of stent as soon as wire was removed to proximal segment, we could see the disappearance of all those slit like projection from the right coronary artery (Figure 5). Patient was hemodynamically stable, free of symptoms and shifted to the Coronary Care Unit.



Figure 5

DISCUSSION

The accordion or concertina phenomenon is the appearance of pseudo lesions secondary to major mechanical distortion of tortuous coronary segments after the advancement of guidewires. Any material that stretches the artery will cause pleating or folds of the artery wall along its long axis that often simulate a focal atherosclerotic lesion, dissection, thrombus, or spasm. Recognition of pseudo stenosis, however, remains critical to prevent unnecessary interventions ^[1].

Grigorios Tsigkas et al ^[2] in their OCT study found that during the Accordion phenomenon, the lumen contour gradually, turned elliptical, and the vessel wall appears to protrude into the lumen, mimicking intussusception and creating severe stenosis. Alfonso F et al ^[2] have described the intravascular ultrasound picture of Accordion effect. They found in most of such patients, there was an elliptic-shaped lumen narrowing and a characteristic three-layered pattern of intimal thickening on a flattened coronary wall overlying a hypoechogenic space were demonstrated. In their study, Alfonso suggested that this unique pattern was considered the correlates of a partial coronary intussusception. This Accordion effect or pseudo-lesion induced some resistance to the advancement of catheter in patients and temporary flow impairment in some of the patients. The presence of mild calcified tissue close to the site, where the phenomenon is found to be more intense & this point act as an axis around which the intussusception and twisting of the vessel might occur. Appearance of the accordion phenomenon, during angioplasty procedure, is produced by mechanical adaptation of the geometry and the curvature of the vessel ^[4]. The straightening effect, shortening of the artery at one level and lengthening at another and vasoconstrictive effects due to guidewire or catheter balloon manipulation lead to angiographic slit-like multiple filling defects along the longitudinal axis of the involved vessel. Stretching and straightening a naturally tortuous artery, the choice of stiff guidewire and small number of side branches are usual factors that may contribute to the appearance of this phenomenon^[5]. The Accordion phenomenon is often confused with coronary spasm, dissection or thrombus formation, which may lead to unnecessary complex procedures, converting a totally reversible event into an iatrogenic complication. It is crucial for interventionalists to

recognize such events. Vasodilators can help and are strongly recommended, but frequently are ineffective in relieving pseudo stenosis. The therapeutic management is to remove everything from the vessel, resulting in reformation of the vessel and re-establishing coronary geometry. To diagnose Accordion phenomenon, while leaving a guidewire within the coronary artery, and withdrawing it gradually until its floppy segment rests equally on either side of the suspected lesion.

LEARNING POINTS

- a. New lesions appearing during coronary intervention represent a challenge for interventional cardiologists.
- b. Knowledge about pseudo lesion especially in a tortuous vessel is crucial for interventionalists, so as to avoid necessary intervention.
- c. Pseudo lesion though benign, at times may create difficulty in negotiating balloon or stent, especially the longer one.

REFERENCES

1. Javier Cuesta, Teresa Bastante, Fernando Rivero, Paula Antuna, Marcos Garcia-Guimaraes, Amparo Benedicto, et al. Coronary Pleating Mimicking Coronary Ruptures, Dissections, and Thrombi on Optical Coherence Tomography. Circ Cardiovasc Interv; 2016;9:e003654
2. Grigorios Tsigkas, Vasileios Karantalis and Dimitrios Alexopoulos et al. Mechanism of a reproducible accordion phenomenon: insights by optical coherence tomography visualization. Journal of Cardiovascular Medicine 2011;12:8.
3. Alfonso F, Delgado A, Magalhaes D, etal. Value of intravascular ultrasound in the assessment of coronary pseudostenosis during coronary intervention. Catheter Cardiovasc Interv 1999;46:327-332.
4. Doshi S, Shiu MF. Coronary pseudo-lesions indicated in the left anterior descending artery and right coronary artery by the angioplasty guide wire. Int J Cardiol 1999;68:337-342.
5. Muller O, Hamilos M, Ntalianis A, Sarno G, De Bruyne B. Image in cardiovascular medicine. The accordion phenomenon lesson from a movie. Circulation 2008;118:e677-e678.