Pseudo-lesions of a Tortuous Right Coronary Artery During Percutaneous Coronary Intervention: Accordion Phenomena

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ABSTRACT

Guidewire-induced pseudo-lesions are referred to accordion phenomenon and are infrequent occurrences during percutaneous coronary intervention of tortuous coronary arteries. Their occurrence can be a diagnostic challenge to the interventionist and might lead to unnecessary intervention. Ischemia and hemodynamic compromise are possible complications, if not managed promptly. The differential diagnosis includes coronary dissection, thrombus, and spasm. We describe a patient who developed pseudo-lesions of the tortuous right coronary artery in multiple segments during PCI. The pseudo-lesions were refractory to intracoronary nitroglycerin.

Key words: Accordion phenomena, concertina effect, guidewire-induced coronary spasm

INTRODUCTION

Accordion phenomenon is a transient angiographic pseudo-lesion observed during percutaneous coronary intervention (PCI), usually in tortuous vessel and by stiff guidewire. We present a case of this transient pseudo-lesion in tortuous right coronary artery induced by a soft guidewire.

CASE PRESENTATION

A 47-year-old male with a history of hypertension and smoking presented to the emergency department with retrosternal chest pain for two hours duration. He was found to have ST elevation in leads V1 - V4 and was labeled as anterior wall myocardial infarction. PCI was performed successfully to his left anterior descending artery. Two days later, he developed chest pain with dynamic electrocardiogram changes in the inferior leads. For these reasons, he was sent to the cardiac catheterization laboratory for PCI to the right coronary artery (RCA).

In the Cath Lab, JR4 guide catheter was passed through his right radial artery to the RCA ostium. Advance® wire 0.014 was used to wire the artery with the wire tip placed in the posterior left ventricle (PLV) branch. The PLV has an early take-off from the main vessel with a tortuous course [Figure 1a]. A pseudo-lesion appeared at the proximal segment of PLV following the wiring [Figure 1b]. Withdrawal of wire from PLV branch resulted in a complete resolution of the pseudo-lesion. Guidewire was then re-introduced to the posterior descending artery (PDA) branch [Figure 2a]. This action resulted in similar diffused narrowing along the length of the PDA [Figure 2a]. Both vessels were refractory to intracoronary nitroglycerine injection.

A rapid predilatation and stenting of the true proximal lesion was done to avoid ischemia secondary to the pseudo-lesion.

Poststenting, the guidewire was completely removed from the PDA resulting in the disappearance of the PDA pseudo-stenosis. However, a new lesion was noted at the proximal edge of the stent [Figure 2b], which was suggestive of stent edge dissection. Intracoronary nitroglycerin (200 mg) was injected three times without
Figure 1: (a) A coronary angiography of the right coronary artery demonstrating a proximal stenotic lesion of 80% (b) a new stenotic (arrow) lesion appeared in proximal posterior left ventricle branch

Figure 2: (a) Guidewire-induced diffused posterior descending artery narrowing (b) poststenting of proximal true lesion and the appearance of new stent edge stenosis (arrow)

any response. A partial disengagement of the guide catheter from the ostium of RCA resulted in the resolution of this lesion [Figure 3].

DISCUSSION

Stenoses that appear after placement of the interventional guidewire in a tortuous artery and disappear when the wire is withdrawn are known as pseudo-lesions.\[^1\] This effect is known as the accordion effect or concertina effect.

A number of cases were reported describing these pseudo-lesions which are known either as accordion phenomenon or concertina effect phenomenon. These phenomena are usually seen as consequences of straightening of the tortuous segment of coronary artery. Typically, the accordion phenomena were precipitated by a stiff guidewire causing an invagination and beading appearance of the vessel.\[^2,4\] The most commonly affected arteries are left internal mammary artery and RCA.\[^3,4\] Only a few cases were reported where these phenomena
Figure 3: The final angiography after removal of the guidewire and guide catheter showing complete resolution of new lesions

appeared after soft guidewire use (and in our case, soft hydrophilic wire). The main risk factors for accordion effects are tortuous vessel, the use of stiff guidewire, and a small number of side branches. From our experience, the risk factors traditionally associated with coronary spasm such as cigarette smoking, hypertension, and female gender also contribute to this phenomenon. What makes our case more interesting was that these phenomena were observed with both the guidewire and the catheter. Interestingly, the catheter-induced segmental spasm was away from the RCA ostium where the engagement of the catheter took place.

This case described both soft hydrophilic guidewire- and guide catheter-induced coronary pseudo-lesions that were refractory to intracoronary nitrate injection but responded promptly to the instruments’ withdrawal (guide wire and guide catheter). Such events by themselves do not cause significant clinical sequelae, although a few cases have described hemodynamic compromise and ischemia as a result of the accordion/concertina phenomena.

CONCLUSION

Recognition of such phenomena is crucial to avoid unnecessary intervention that is correlated with higher procedural risk.

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Conflicts of interest
There are no conflicts of interest.

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