Twisting of balloon and deformation of stent during post-dilatation – an unusual complication.

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Abstract

Post dilation of stent was complicated by twisting of the non compliant balloon used for post dilation, which resulted in stent deformation, which was managed by post dilation using another non compliant balloon. Pushing the long non compliant balloon against resistance resulted in twisting.

Manuscript

Percutaneous coronary intervention is among the most common intervention performed world wide and the procedure is well standardized including post-dilatation of stent after initial deployment. Post-dilatation of stents for optimization of result is found to beneficial especially in the case of drug-eluting stents. Here we report an unusual complication of twisting of a long balloon while attempting to post-dilate with a long balloon.

45 years old lady was referred for percutaneous coronary intervention to right coronary artery after evaluation following inferior wall myocardial infarction. Right coronary artery had long segment lesion extending from the proximal to mid segment (Figure 1). After predilating, the lesion was stented with sirolimus eluting 2.5 X 38 mm at 14 atmospheres to 2.76mm (Figure 2). The mid-segment of the stent looked slightly under-expanded and as it was a long drug-eluting stent it was decided to post-dilate the stent for optimal result. Post-dilatation was performed using 3 x 20 mm non compliant balloon. There was some difficulty in advancing the balloon through the stented segment.

On inflating the balloon to nominal pressure (6 atmospheres) the balloon was noted to have a waist in its centre which persisted even at 12 atmospheres (Figure 3). As we were certain that the stent had expanded reasonably well during deployment this waist was unexpected and surprising.

So the balloon was deflated (which took slightly more time), taken out and inspected outside and was found to be twisted on itself in its middle portion. When the balloon was untwisted it could expand fully with nominal pressure and could sustain 28 atmospheres in vitro.

Subsequent angiography showed luminal irregularity inside the stent at the region where the waist appeared (Figure 4).

It was assumed that at the region were the balloon twisted, the stent struts might have got distorted or it could be intra coronary thrombus leading to the particular appearance. So another 3x14 mm non compliant balloon was used and the stent was post-dilated at 16 atmosphere pressures. After this the stent appeared fully expanded with TIMI -3 flow (Figure 5). Patient had an uncomplicated hospital stay and was discharged the next day and is doing well on follow-up.

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Discussion

Twisting of coronary angioplasty balloon has not reported in the literature so far. Twisting of the balloon might have happened during manipulation to enter the stent where the distal edge of balloon might have got entangled with the stent strut and got twisted with continuing push and subsequently got released. Length of the balloon might have facilitated twisting. So we think it would be better to use shorter balloons for post-dilatation, as the probability of twisting will be less.

What produced distortion of stent is not clear. It could be uneven expansion of the balloon related to twisting. Twisting could have lead to other complications such as non-deflation of distal half of balloon leading to balloon trapping and possible stent strut damage also.

Was it possible to untwist the balloon? It could have been attempted, provided the possibility of balloon twisting was considered. However, as this was such a rare complication not previously reported, this probability was not thought about before taking out the balloon and noticing the twist.

Conclusion

Twisting of balloon should be considered in the differential diagnosis of appearance of waist in an angioplasty balloon and the probability of twisting may be higher while using a long balloon.

References


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References

Figure 3  Post-dilatation with 20 mm balloon showing waist in the centre of balloon

Figure 5  Stent after re-dilatation

Figure 4  Stent distortion after post-dilatation

Figure 5  Stent after re-dilatation