Stent Embolization in the Current Era of Percutaneous Coronary Intervention: a NUHCS Experience

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ABSTRACT
In the current era of percutaneous coronary intervention, coronary stent dislodgement is an uncommon but recognized complication. We present a case of stent embolization and its management strategy.

CASE REPORT
This is a case of a 51 y/o Malay gentleman, a smoker with no other comorbidities, who came in for anterior ST elevation myocardial infarction. He underwent emergency coronary angiography via the right radial approach, which revealed a mildly calcified proximal left anterior descending artery (pLAD) with a 90% bifurcation and angulated lesion. (Fig.1) A 0.014” Runthrough NS guide wire was used to cross the lesion with its tip secured distally. A 2.5 x 15mm Sprinter balloon was used to predilate the lesion. (Fig.2) Attempt was made to deliver a 3 x 23mm Genous (EPC) stent across the lesion. However, we encountered difficulty in advancing the stent across the lesion. Decision was thus made to further predilate the lesion. The stent and its delivery system was pulled out of the guiding catheter. On careful examination however, the stent is noted to be not on its balloon. Fluoroscopy showed the stent was dislodged in the left main. (Fig.3) Attempt was made to retrieve the dislodged stent using a two wire twisting technique using another 0.014” Runthrough NS guide wire. (Fig.4) While in the process of pulling the twisted wires together with the stent to the guiding catheter, the wire got untwisted and the stent embolized to the left subclavian artery. (Fig.5) Decision was then made to snare the stent via the right common femoral artery approach. (Fig.6) In the process however, the stent was dislodged again. Fluoroscopy document the stent to be dislodged in the left ulnar artery. Attempt was made to retrieve the stent through the left...

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radial approach but because of the severe angulation of the radial to ulnar artery, we were unable to pass the wire from radial to ulnar artery and to the stent. (Fig.7) Because the stent was embolized quite distally in the peripheral vessel and there is good antegrade flow of the ulnar artery and the fact that the stent looks stable in its position, decision was made to leave it alone. We thus proceeded with percutaneous coronary intervention (PCI) and was able to successfully stent the proximal LAD lesion. (Fig.8) Vascular scan of the left ulnar/radial arteries was performed before discharge which showed no hemodynamically significant obstruction. Patient on follow up likewise was asymptomatic from the embolized stent.

![Initial coronary angiogram showing a 90% proximal LAD lesion](image)

**DISCUSSION**

The incidence of stent dislodgement was 0.32 to 8% \(^2\) It is more common in the days where stents are manually crimped and is less common in this era of premounted stents. Stent dislodgement although uncommon, can occur if the lesion is inadequately predilated or if there is improper guide alignment with the coronary ostium wherein the tip of the guide may catch the proximal edge of the stent and strip it off the deployment balloon. Severe coronary angulation as well as a calcified coronary arteries likewise contribute to the risk of stent embolization.

In this case, the proximal LAD artery is just minimally calcified although there is about a 90 degrees angulation between the lesion as well as the mid left anterior descending artery segment which might have contributed to the difficulty encountered in advancing the stent across the lesion.

There are different approaches in managing stent dislodgement. We can retrieve it using a snare, a small balloon technique or a two wire twisting technique as was done in this case. Or we can just deploy the stent, crushed it or even leave it undeployed if it’s extracoronary such as in the limb vessels. (Like what was also done in this case).

A loop snare technique is effective if the embolized fragment has a free end for ensnarement and it is positioned perpendicular to the object or the dislodged stent in this case. This technique was tried when the stent dislodged to the left subclavian artery but was unsuccessful as the dislodged stent is freely flowing in the left subclavian artery and further embolizes. The two wire twisting technique is likewise performed in this case when the dislodged stent is first noted in the left main. Here, the first wire was kept in place and a second wire was used to pass through the stent struts and was advanced as distally as possible. Thereafter, the two wires were twisted proximally with the stent straddling the stiff segments of the wires. Attempt to remove the trapped stent between the two
entangled wires was made in this case but unfortunately, the wire got untwisted in the process thus this technique failed.

When a problem with defective equipment arises inside the coronary artery or ascending aorta, it is ideal to remove the entire system below the level of the renal arteries so the problem can be corrected without the risk of embolization to any vital organs especially the brain. If the stent slips off the delivery balloon inside the coronary artery, effort should be made to keep the wire inside the stent. We have an option of deploying it or retrieve it (if threatening malposition occurs or stent is loose in the aorta). Of course, in all these, the most important consideration is to avoid complications by selecting appropriate tools, careful alignment of the guide and adequate predilatation of the target lesion.

In summary, we have presented a case of a 51y/o gentleman who came in because of anterior wall ST elevation myocardial infarction who underwent emergency PCI. In the process, although the culprit lesion is just minimally calcified, it is quite angulated that despite predilatation with a 2.5mm balloon, there was still difficulty encountered in advancing the stent which eventually leads to stent dislodgement. As the stent is dislodged in the left main, decision was made against deploying it and several stent retrieval techniques were applied in this case with an attempt to retrieve the dislodged stent without risk of embolization to any vital organs.

Fig. 2: predilatation was performed using a 2.5 x 15mm Sprinter balloon
Fig. 3: Stent was dislodged in the left main

Fig. 4: Dislodged stent was retrieved using a two-wire twisting technique
Fig. 5: Stent embolized to the left subclavian artery

Fig. 6: A 6F Jr 4 catheter via the right common femoral artery was used in an attempt to snare the dislodged stent
Fig. 7: Stent was dislodged in the left ulnar artery

Fig. 8: Final angiogram post stenting of the proximal LAD artery
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REFERENCES