PCI on a tear: Not all perforations need coverage

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Key Points
- Coronary perforations are a potentially lethal complication of PCI requiring prompt treatment.
- The study by Rosseel et al demonstrates no difference in 5-year outcomes in patients with large coronary perforations treated with and without covered stents.
- Covered stents are effective in treating coronary perforations and are invaluable in the cardiac catheterization lab.

Coronary artery perforation (CAP) is one of the most dreaded and challenging complications that can occur during percutaneous coronary intervention. In this issue of Catheterization and Cardiovascular Interventions, Rosseel et al. report the results from a large volume, single-center experience with regards to outcomes following Ellis type 2 and 3 perforations, and cavity spilling in patients treated with and without covered stent implantation.

We first introduced the concept of the polytetrafluoroethylene (PTFE)-covered stent 26 years ago. In 1993, we successfully treated a complex aneurysmal lesion in a saphenous vein graft that was causing ischemic symptoms by creating a barrier to seal off the aneurysm by preparing the stent graft with commercially available PTFE, and a commercially available Palmaz stent.2 We then subsequently treated six patients that had diffuse saphenous vein graft disease, aneurysms, and multiple restenoses. Our results and early work were presented in several international conferences, and we were grateful and overwhelmed with requests for use of our device for the treatment of coronary perforations, aneurysms, and saphenous vein disease. This lead to the development of the Jomed JoStent, currently marketed by Abbott Vascular, Inc., based upon our original design.

In the study by Rosseel et al.,1 over a 10-year period, large CAPs occurred in 55 out of 19,061 percutaneous coronary intervention procedures, giving an incidence of 0.29%. They found no significant difference between in-hospital mortality, and 5-year MACE and all-cause mortality between patients treated with and without covered stents.

There were significantly more type A lesions and less type C lesions in patients with CAP treated with covered stents. This is not a surprising finding as it would be more difficult or impossible to deliver a bulky covered stent in more complex lesions. Three newer generation covered stents are available: the BeGraft (Bentley Innomed, Hechingen, Germany) which has a PTFE membrane, PK Papyrus (Biotronik, Berlin, Germany) which has a polyurethane membrane, and Aneugraft Dx (ITGI Medical Or Akiva, Israel) which has an equine pericardium membrane, and was also used in this study. All three have a low-profile, single-layer design, and the first two are compatible with 5-French guide catheters. Unfortunately, the lower profile covered stents have not translated into greater procedural success; there was no difference in deliverability between the Graftmaster Rx (Abbott Vascular) and Aneugraft Dx (ITGI Medical, Santa Clara, CA) in this study. These results are in line with another study that retrospectively compared the Jostent Graftmaster (Abbott Vascular) PTFE covered stent with PK Papyrus stent (BIOTRONIK) in the treatment of CAP and found that while the newer PK Papyrus stent had shorter time to delivery and resulted in a lower rate of pericardial effusion and cardiac arrest, there was no difference in procedural success and 1-year follow-up MACE.3

There are several treatment options for CAPs in addition to prolonged balloon inflation and covered stent implantation. We previously described a case where an Ellis type 3 perforation in the mid-left anterior descending artery was treated with autologous blood. We mixed the patient’s blood with protamine to accelerate heparin reversal, injected it via an over-the-wire balloon at the site of the perforation thereby administering thrombus into the perforated segment, and promoting local thrombogenesis, which sealed the perforation.4 Other treatment options for more distal, smaller caliber vessels include coiling, thrombin injection, and fat embolization.5

Covered stents are indispensable for interventional cardiologists, and have a definitive role in the cardiac catheterization laboratory for treating CAPs. We congratulate the authors on their study, which is the first to compare long-term outcomes in patients with CAP treated with and without covered stents in a large cohort of patients.

CONFLICT OF INTEREST
Nothing to report.

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REFERENCES


