

Eliminating Stent Slippage Using a Combined Sheath-Balloon Catheter

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Introduction:

Percutaneous stent placement has become a mainstay of transcatheter treatment of vascular stenosis & coarctation. Pre-mounted stents may not be available in the sizes needed. The stents are usually hand crimped onto the balloon in vitro, and advanced into the stenosis through long sheaths previously placed. Stents can rarely slip off the balloon during its introduction through the hemostatic valve of the sheath, but more likely through the heart or vessels that have tight corners that distort or kink the sheath. The stent has to be retrieved, repositioned or remounted prolonging the procedure. Surgical removal may be necessary if the stent slips distally. Despite advances in balloon and catheter technology and delivery techniques, this complication persists. We describe a novel method of stent delivery that eliminates stent slippage using a front loaded stent-in-sheath delivery system.

Methods:

The stents (n=8) were delivered under GA to relieve pulmonary artery stenoses or prior to pulmonary valve replacements (n=6). Initially, using a conventional balloon-in-balloon catheter, a Palmaz P4010 stent slipped off the balloon completely as it was advanced through the sheath in the right ventricular. The stent was retrieved and remounted on the balloon of an all-in-one balloon sheath catheter (NuMed Inc., Hopkinton, NY). The stent, front loaded on the balloon (10-18 mm), covered by the sheath, permitted movement of the stent-in-sheath as one system. The procedure was repeated in others with pulmonary artery stenosis.

Results:

Multiple arrhythmias occurred during the passage of the stent-in-sheath through the RV, but there was no myocardial or vascular injury. Significant friction was encountered during the stents' passage through the RV and stenotic pulmonary valve. Despite significant force used to advance the stent-in-sheath through the RV and into the pulmonary artery, the stents remained on the balloon, and was deployed uneventfully

Conclusion:

Using the front-loaded all-in-one balloon sheath catheter, stent slippage off the balloon is eliminated. The procedural time is shortened, and morbidity reduced. This should be the device of choice in stenting stenoses.