# [Pulmonary artery interventions after the arterial switch operation: Unique and significant risks.](https://www.ncbi.nlm.nih.gov/pubmed/30620141)

Lee J, Abdullah Shahbah D, El-Said H, Rios R, Ratnayaka K, Moore J.

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**Take Home Points:**

* Patients s/p ASO for d-TGA (and its variants) commonly develop the need for late re-intervention on the pulmonary arteries.
* Due to the orientation of the branch PAs (LeCompte position) to the aorta and re-implanted coronary arteries, these patients are at higher risk for development of adverse events related to PA angioplasty/stenting procedures—most notably they are at risk for AP fistula formation and coronary artery compression with PA stent/attempted PA stent placement.
* Vigilance to coronary arteries (including intraprocedural dynamic balloon testing) is important even with branch PA intervention.
* Risk factors for AP fistula formation may include overdilation of existing PA stents, stent fracture, and presence of bilateral PA stents.



**Comment from Dr. Wendy Whiteside (Michigan), section editor of Congenital Heart Disease Interventions Journal Watch:**  Many patients who undergo the arterial switch operation (ASO) for d-Transposition of the great arteries eventually require reintervention, the most common of which are for pulmonary artery (PA) angioplasty and/or stenting. There has been an increasing appreciation for potential complications related to stenting branch PA in these patients s/p ASO, with the PAs in a LeCompte position. The branch PAs in this anatomy may be on stretch as they drape over the aorta and the re-implanted coronary arteries may be in close proximity to the MPA or its branches. This may put patients at risk for development of aorto-pulmonary fistula (at the site of branch PA stent placement) or coronary compression.

Lee et all report their single center experience over a 10-year period (2006-2016) of catheterization procedures performed in patients s/p ASO. During this time period 47 patients had diagnostic or interventional cath procedures performed; in 29 patients, 37 procedures were performed for pulmonary artery stenosis. Of the 37 procedures, 16 were for angioplasty of PA branches, 21 for stenting of PA branches, 16 for angioplasty of main PA, and 1 for percutaneous pulmonary valve replacement. Median age at the time of c All AP fistulae were treated by covered stent implantation. ath was 11.3 years and time from ASO to catheterization procedure was 10.7 years. Coronary artery angiography or, more recently, 3D rotational angiography, were performed routinely at this center before intervention in these patients to delineate the proximity of the coronary arteries and bronchi to the targets of stenting.

There were 5 major adverse events (14%) including 3 AP fistula and 1 left main coronary artery compression. There were 6 additional episodes (16%) of intended stent procedures that were aborted (or modified) due to threatened left main coronary artery compression—4 episodes due to close proximity to the LPA and 2 to the supra-valvar MPA area. All patients with coronary compression had typical coronary artery anatomy. There were no deaths or urgent surgeries. These rates of serious adverse events in patients s/p ASO were significantly higher than would be expected for the larger group of PA angioplasty/stent procedures as a whole (2-3% by IMPACT and C3PO data, respectively).

In the 3 patients with AP fistula, 2 were from the LPA and 1 from the RPA and all patients had stent fractures noted at the fistula site. All stent fractures occurred at time of post-dilation of existing stents. In one patient, the fistulae developed immediately, with post-angioplasty angiography revealing the shunt, and in the other 2 cases, it was appreciated at a later time with development of congestive heart failure (unknown period of time later) or new continuous murmur (noted 2 years post-stent dilation). All AP fistulae were successfully treated by covered stent implantation. While formal risk factor analysis was not performed, the authors suggest that factors leading to fistula formation included re-dilation of stents to larger than recommended diameters, stent fracture, and the close relationship of the stent to the pulsatile, high-pressure aorta. Interestingly, all patients who developed fistulae had bilateral PA stents in place, suggesting that decreased compliance of the stented PAs against the aorta may contribute added risk.

While this is a small series, this and other studies suggest an increased risk of both complications of AP fistula formation and of coronary artery compression when performing PA work in patients s/p ASO. While we have all become very accustomed to testing coronary arteries prior to transcatheter pulmonary valve implantation and RVOT interventions, it would be prudent to assess coronaries also in these patients s/p ASO, both via cross-sectional imaging prior to the procedure and with possible dynamic testing during the procedure. Additionally, when intervening on LeCompted branch PAs, primary covered stent implantation may be worthwhile to prevent fistula formation, particularly in those with high risk features. There should be continued vigilance for development of new continuous murmurs/heart failure over time that may be indicative of latera fistula development.