Transcatheter Closure Of Persistent Arterial Duct - Modification Of The Retrograde Technique (tip-to-tip Technique).

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Abstract

Persistent arterial duct in a 21 years old lady could not be crossed from pulmonary arterial end. It was crossed from the aortic end using coronary guide wire from Judkins right coronary catheter and was snared from main pulmonary artery and withdrawn into another Judkins right coronary catheter and both catheters were placed tip-to-tip and duct was crossed by pushing the catheter from pulmonary arterial end and subsequently procedure was completed in the usual manner. This modified technique avoids the cumbersome procedure of pulling the snared wire outside the body and avoids damage to the duct while snaring, in addition to the benefits of reduction in procedural time and radiation.

Manuscript

Percutaneous closure of persistent arterial duct has almost replaced surgical closure. However challenges are encountered in the conventional technique of crossing the duct from pulmonary arterial end, especially in adults, related to large pulmonary arteries.

Here we report modification of the retrograde approach of crossing the duct from aortic end, employed when there is difficulty in crossing the duct from pulmonary arterial end.

CASE REPORT.

21 years old lady with 3 mm sized duct was referred for non-surgical closure. Pulmonary artery pressure was 28/11 mmHg and pulmonary to systemic shunt flow ratio (Qp/Qs) was 1.6:1.

Duct could not be crossed from pulmonary arterial end despite multiple attempts. So duct was crossed from the aortic end using 6F Judkins right coronary catheter and an 0.014-inch coronary angioplasty guide wire was advanced into the main pulmonary artery.

A gooseneckTM snare (Microvena) was passed into main pulmonary artery from the venous side using another Judkins right coronary catheter. The BMW wire was snared in the main pulmonary artery and the wire was pulled deep into the right coronary catheter from venous side (Figure 1). Both the right coronary catheters were placed against each other tip-to-tip (Figure 2). The catheter from pulmonary end was pushed against the aortic catheter over the arterio-venous loop created and the catheter from the pulmonary end crossed the duct into the descending aorta.

Then the snare was released (Figure 3) and withdrawn from the venous side and the PTCA wire and the right coronary catheter from aortic end were removed. Subsequently an 0.035 exchange length guide wire was advanced into the descending aorta through the right coronary catheter from the pulmonary end. Then the coronary catheter was replaced with a 7 Fr Mullins sheath and 6x4mm Blockaid PDA occlusion device (Shanghai shape memory alloy company Limited, Shanghai, China) was deployed occluding the duct.
DISCUSSION.

Per-cutaneous closure is the preferred method employed in treatment of non-hypertensive arterial duct and the efficacy and safety of this modality are well established in children as well as adults. An adult with persistent arterial duct represents a different group, as the anatomy of the duct is usually different from children. 15% of adults with persistent arterial duct have difficult anatomy with calcification, tortuosity and eccentricity of the ductal lumen.

Usual problem encountered in per-cutaneous closure of arterial duct in adults is the difficulty in crossing the duct from the pulmonary end. This is related to the gross size mismatch between the moderate sized arterial duct (usually 3-6 mm) and the markedly dilated pulmonary artery related to long duration shunt. The wire used to cross the duct via transvenous approach tends to go into the dilated pulmonary artery branches rather than into the narrow mouth of duct.

There are reports of closing the duct per-cutaneously from aortic approach. Here usually the conventional snaring technique is employed where a 300 cm length exchange wire is advanced from aortic end and is snared and pulled out through the venous access and subsequently another catheter is tracked over the exchange wire to cross the duct.

The advantage of the modified technique, which we have described, is the use of coronary guide wire, which can be easily snared inside the lumen of the catheter from pulmonary end. This is unlike snaring a larger wire, which is difficult to take inside a catheter, necessitating pulling out the wire out from the body across the venous sheath and subsequently tracking another catheter. All this nuances can be avoided, by using coronary guide wire and tip-to-tip tracking over the duct.
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While doing the conventional snaring technique there is probability of damaging the duct, as there will be traction across the ductal wall while pulling and pushing the exchange wire, unless we keep a catheter across the duct. In the modified technique the catheters are kept tip-to-tip and so the risk of traumatizing the duct is remote. Other obvious advantage is saving procedure time and reducing radiation.

There is a report by Hsin et.al employing technique of crossing from the aortic end. They initially used an 0.035 Terumo wire to cross through the duct, which was exchanged for a 260 cm coronary wire. Both were not necessary in this modified technique using two catheters.

REFERENCES.


