

Unexpected ischemia during transcatheter patent arterial duct closure

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Brief Report

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Abstract

A child undergoing routine transcatheter patent arterial duct closure developed severe transient ischemic changes in the electrocardiogram (Pardee waves) while the aortic retention skirt of the Amplatzer™ Duct Occluder was pulled against the duct orifice. The occluder was then released, and the delivery system was pulled back to inferior caval vein which led to electrocardiogram normalisation. Aortic root angiography showed a single coronary artery originating from the right sinus of Valsalva with the left coronary stem wedged behind the posterior aspect of the right ventricular outflow tract. We believe that the left coronary artery was compressed while applying tension on the occluder delivery system.

Case report

A 5-year-old child developed severe transient ischemic changes in the electrocardiogram (Pardee waves) during transcatheter patent arterial duct closure. Angiography of aortic isthmus was performed, and an Amplatzer™ Duct Occluder was introduced progradely into the descending aorta using a 6 French Amplatzer™ 180° Delivery System. While the aortic retention skirt was pulled against the duct orifice, significant ischemic electrocardiogram changes appeared in the leads II, III, aVL, aVF (Supplementary Fig S1). The occluder was opened in the duct, and an angiogram of the aortic isthmus was performed (Fig 1). The configuration of the occluder in the duct appeared to be optimal, and we were suspicious that the ischemia is caused by the tension of the delivery wire and not by the occluder itself. Therefore, we decided to release the occluder and pull back the delivery system to the inferior caval vein which led to electrocardiogram normalisation. Angiography of aortic root showed a single coronary artery originating from the right sinus of Valsalva with the left coronary stem wedged behind the posterior aspect of the right ventricular outflow tract (Fig 2). Echocardiography focused on coronary arteries, and CT angiography confirmed the aforementioned anatomy (Supplementary Fig S2). After the procedure, the ventricular function remained normal, and no further electrocardiogram changes were noticed. We believe that the left coronary artery was compressed while applying tension on the occluder delivery system, which deformed the posterior aspect of the

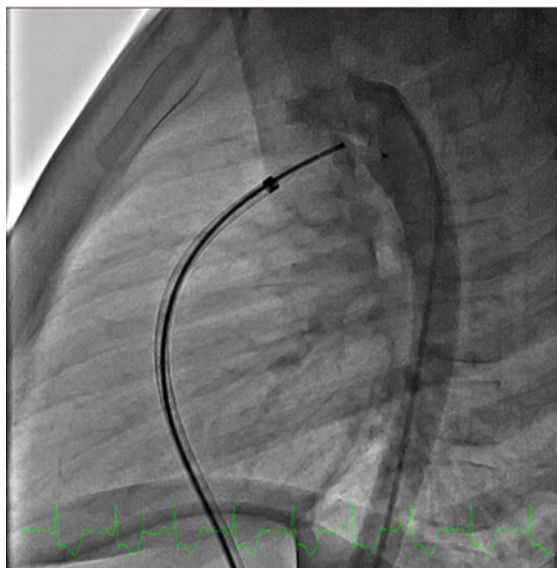


Figure 1. Angiography. Occluder in the patent arterial duct attached to delivery system at the time of ischemic electrocardiogram changes.

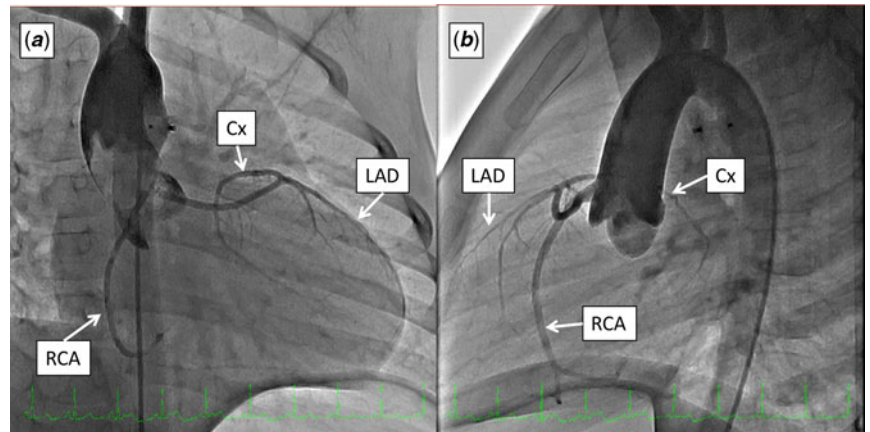


Figure 2. Coronary angiography. (a) frontal view, (b) lateral view. Cx=circumflex artery; LAD=left anterior descending artery; RCA=right coronary artery.

right ventricular outflow tract. A single coronary artery arising from the right sinus of Valsalva is a rare condition with a reported prevalence of 0.02–0.05% on angiographic studies and is associated with the risk of sudden cardiac death.¹ The incidence of coronary artery anomalies in association with an isolated patent arterial duct may be considerably higher.² We suggest that echocardiography prior to transcatheter duct closure should always be focused on the anatomy of the coronary arteries, and interventional cardiologists should be aware that this type of anatomy may cause a potentially life-threatening complication.

Supplementary Material. To view supplementary material for this article, please visit <https://doi.org/10.1017/S104795111900218X>

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Conflict of Interest. None.

Ethical Standards. The research does not involve human and/or animal experimentation.

References

1. Villa ADM, Sammut E, Nair A, Rajani R, Bonamini R, Chiribiri A. Coronary artery anomalies overview: the normal and the abnormal. *World J Radiol* 2016; 8: 537–555.
2. Dotan M, Roguin A, Sinyor D, et al. Increased incidence of coronary artery origin anomalies associated with isolated patent ductus arteriosus. *Pediatr Cardiol* 2013; 34: 907.