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## Short Communication

# Coronary artery to pulmonary artery communications in pulmonary atresia with ventricular septal defect



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## ABSTRACT

Coronary artery to pulmonary artery communications (CAPAC) are an important source of pulmonary blood flow in approximately 10% of patients with pulmonary atresia and ventricular septal defect (PA-VSD). A diligent look for these abnormal communications is important to prevent perioperative complications and achieve a complete repair. We present two cases of PA-VSD with CAPAC, one in a 7-year-old child and the other in a 33-year-old adult. The method of occlusion of these communications could be either surgical or catheter based.

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Coronary artery to pulmonary artery communications (CAPAC) are an important source of pulmonary blood flow in approximately 10% of patients with pulmonary atresia and ventricular septal defect (PA-VSD).

A 7-year-old female child (Case 1) with PA-VSD had well-formed native pulmonary arteries, multiple major aorto-pulmonary collaterals (MAPCAs) and a large CAPAC from the proximal left coronary artery. She underwent successful intra cardiac repair with placement of a right ventricle to pulmonary artery conduit. The CAPAC which appeared like a large fistulous tract could be safely ligated during surgery (Fig. 1).

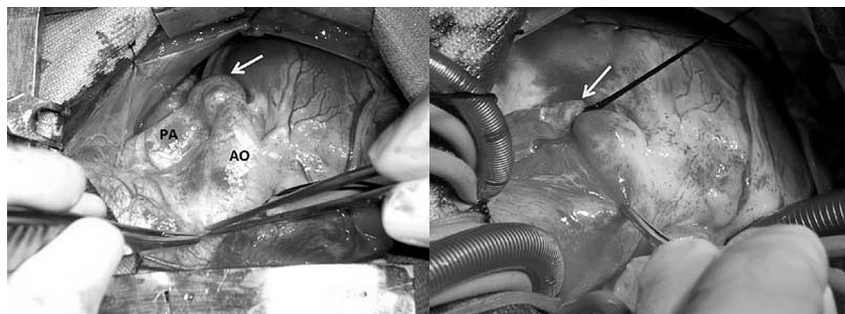
A 33-year-old male (Case 2) with PA-VSD who underwent left-sided classical Blalock–Taussig (BT) shunt at 5 years of age, presented with severe left shoulder pain which was radiating down the arm, breathlessness and fatigue. ECG showed ST elevation in inferior leads. Angiography showed a large collateral from the mid-right coronary artery (RCA), and another small collateral arising from the proximal left coronary artery, both collaterals communicating through a mesh of vessels with the bronchial and pulmonary circulation. The CAPAC from the RCA which appeared like a large collateral was embolized with coils (Fig. 2). The entry in to the RCA was

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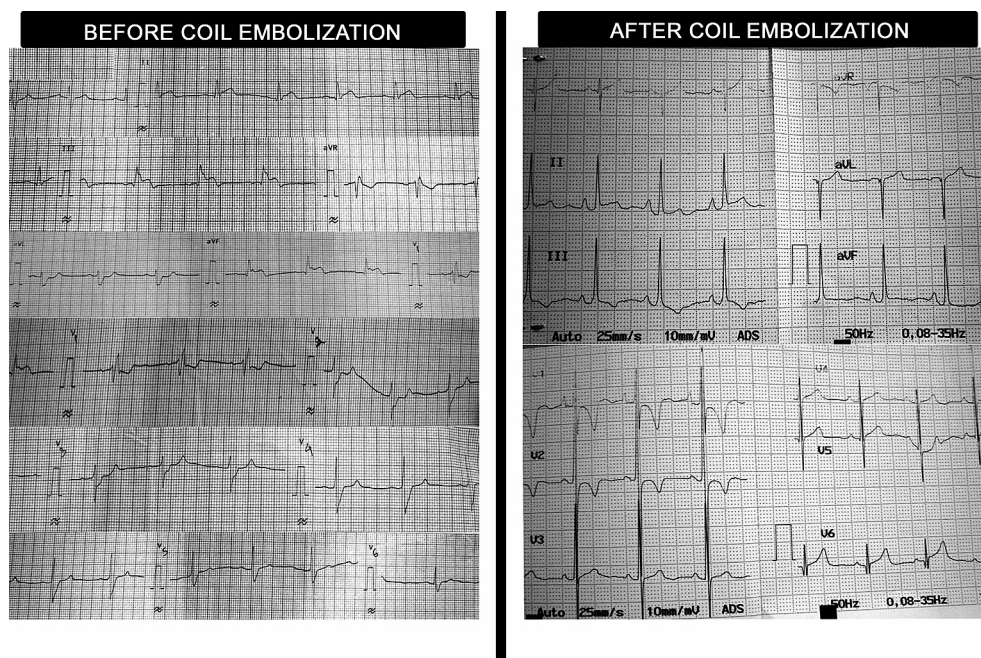
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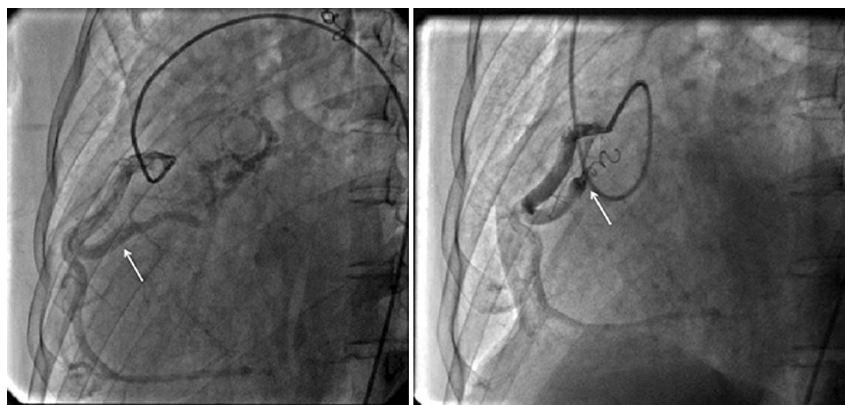
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**Fig. 1 – Case 1 – Operative photograph showing the origin of the left coronary artery and a fistulous tract (arrow) to the proximal main pulmonary artery. Ao = aorta, PA = pulmonary artery.**



**Fig. 2 – Case 2 – Angiographic pictures showing large CAPAC from mid Right coronary artery (arrow) and coil embolization of the collateral.**



**Fig. 3 – Case 2 – ST elevation in inferior leads in electrocardiography before the procedure which resolved after coil embolization of the CAPAC.**

difficult due to its abnormally high and posterior origin from the aorta. It was cannulated with a 6-french multipurpose coronary guiding catheter (Medtronic, Minneapolis, MN, USA) and then a 4-french end-hole multipurpose catheter (Cooks, Bloomington, USA) was advanced through the guiding catheter over a 014-exchange length coronary guide wire (Abbott vascular, Santa Clara, USA). To facilitate passage of the catheter into the tortuous collateral a second 014 coronary guide wire had to be placed in the collateral. A 38-6-8 embolization coil (Cooks Company, Bloomington, USA) was then deployed to completely occlude the collateral. ECG after coil embolization revealed resolution of the ST elevation in inferior leads. (Fig. 3) He subsequently underwent successful repair of the VSD, closure of the left-sided classical BT shunt and placement of right ventricle to pulmonary artery conduit.

Although rare, coronary steal due to collaterals from coronary arteries may be considered in adults with pulmonary atresia and ventricular septal defect presenting with features

of myocardial ischemia. Presence of significant sized CAPAC during intra cardiac repair can lead to loss of effective myocardial protection due to run-off of cardioplegia into the pulmonary vascular bed and postoperative endotracheal bleeding. Aortic root angiography and if necessary, selective coronary angiography should be a part of preoperative cardiac catheterization in PA-VSD, especially in adults. CAPAC as big as the coronary arteries may pose problems for the surgeons to precisely identify them during repair, especially in adult patients. Preoperative trans-catheter embolization of the collateral would save time and avoid errors in identifying CAPAC during surgery allowing safe intra cardiac repair of PA-VSD.

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### Conflicts of interest

All authors have none to declare.