Anomalous Origin of the Left Coronary Artery from the Pulmonary Artery: A Novel Use of the Hybrid OR for Intraoperative Assessment after Surgical Repair  
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**BACKGROUND**

Anomalous Origin of Left Coronary Artery from the Pulmonary Artery (ALCAPA) Facts:  
- a rare congenital cardiac anomaly  
- associated with increased infant mortality and sudden cardiac death in those who do reach adulthood  
- signs and symptoms include heart murmurs, myocardial ischemia and/or infarction, ventricular arrhythmias and congestive heart failure  
- diagnosis made by CT angiography, MRI or coronary angiography  
- definitive treatment is surgical correction – left coronary artery is reimplanted into the ascending aorta  
- prognosis is generally good but depends on the extent of myocardial tissue revascularization  
  - despite repair, patients are still at risk for left ventricular dysfunction and mitral valve insufficiency  
  - complications can be detected early by using intraoperative transesophageal echocardiogram (TEE)  
  - angiographic images immediately after repair might also be useful to assess repair

**OBJECTIVE**

In this review, we report the case of a 2-year-old female who underwent surgical repair for newly diagnosed ALCAPA. After cardiopulmonary bypass, hybrid OR capabilities were utilized to perform intraoperative cardiac catheterization to visualize coronary anatomy and patency and further confirm successful surgical repair.

**CASE REPORT**

2-yr old female was referred to a cardiologist after her endocrinologist detected a murmur. TTE and coronary CTA revealed ALCAPA:  
- short LMCA measuring 2.5mm  
- dilated left ventricle  
- depressed ejection fraction of 36%  
- severe hypokinesis in the left main distribution  
- mild mitral regurgitation

Surgical repair was undertaken via median sternotomy utilizing cardiopulmonary bypass with mild hypothermia. The left coronary artery, arising from the pulmonary artery, was translocated and anastomosed to the left sinus of Valsalva. Total bypass time was 131 minutes; cross clamp time of 75 minutes. The patient was weaned off of cardiopulmonary bypass without complication. Post bypass TEE revealed persistently depressed LV function and mild MR, raising concerns for obstruction or complication at the coronary anastomosis. Decision was made to proceed with a coronary angiogram for further investigation. Direct catheterization in the surgical field and injection of contrast demonstrated a patent left coronary ostium and adequate filling of the re-implanted left coronary artery. Postoperatively patient was transferred to the PICU. Post op echo demonstrated improved LV fx, trivial MR, and antegrade flow in the left coronary artery. Remaining hospital course was uneventful; patient was discharged on POD#5.

**DISCUSSION**

A hybrid catheterization suite combines the diagnostic function of a catheterization lab with the surgical functions of an operating room. In addition to combining catheter based interventions with surgical procedures to minimize invasiveness, a hybrid suite can be extremely beneficial for diagnostics in the intra-operative setting. There is the ability to operate, evaluate, diagnose and intervene in a single setting.

In this case of a 2 year old girl status post ALCAPA repair, LV function remained depressed after re-anastomosis and separation from cardiopulmonary bypass. In this case the TEE could not provide needed information regarding patency of the translocated coronary vessel. Determining the adequacy of the repair prior to leaving the OR was vital.

Using the technology of the hybrid suite, coronary angiography was available and performed immediately to examine the coronary anastomosis. The benefits of this approach include:  
- No delay in detecting problems regarding surgical correct  
- Decrease need of returning to the OR or cath lab  
- Potentially improved outcomes by detecting risk of ischemia early  
- Potential for shorter hospital stay and less morbidity

**CONCLUSION**

The technology of the hybrid suite facilitates the highest level of quality control and allows for quick diagnosis and intervention in the same session. By assessing structures and repairs in real time, the clinical team is able to provide high quality care and minimize complications.

**REFERENCES**

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