Adult Congenital Open-Heart Surgery: Before and After Surgery, What Should We Be Considering?

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Interesting Adult Congenital Cardiopulmonary Bypass Scenarios In Hopes Of Not Boring My Perfusion Colleagues













Disclosures:

- I enjoy interacting with perfusion in the OR
- I show my affection for perfusion by picking on them
- I MUF, but begrudgingly
- High line pressures and drainage issues are almost never the surgeon's fault
- I may or may not have performed an epic version of "The Humpty Dance" at a karaoke bar with several perfusionists at last year's Academy in Savannah







21 year-old male with HTN and notable transverse aortic arch hypoplasia presents for surgical repair.









Case #1 – What to Consider

- CT scan to assess extent of hypoplasia
- STAR perfusion
 - LV vent LV beating against a clamp
 - Proximal ascending aorta continuous coronary perfusion needle Y'd to arterial inflow with walrus tubing
 - Ascending aortic cannulation and slide into innominate during arch isolation
 - Descending aortic cannulation with cardioplegia line tubing +/- aortic cannula +/- Javid clamp
 - Keep warm (34C)
 - 50cc/kg head-heart MAP 50 R radial
 - 75cc/kg lower body as much as possible







STAR Perfusion

Surgical Technique for Sustained Total All-Region (STAR) Perfusion During the Norwood Operation

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20 year-old female with a large secundum ASD with no superior rim for device closure presents for robotic ASD closure.







Case #2 – What to Consider

- Femoral vessel ultrasound (>5mm)
- CTA if other vascular anomalies or >40yo to assess plaque precluding femoral cannulation
- Sew on 6 or 8mm Dacron graft to femoral artery to avoid leg ischemia (can be long cases depending on learning curve) – also allows you to go down to smaller patients (youngest 8 yo)
- Watch graft site bleeding
- Bicaval venous drainage via R IJ
- Fibrillating during case with pads require monitoring ongoing fib
- De-airing maneuvers vent via ASD into LV as closing; CO2 insufflation; table gymnastics in Trendelenburg (drainage in IVC worsens sometimes)







Robotic ASD Closure









Robotic ASD Closure

Left Atrial Approach for Robotic Atrial Septal Defect Repair







22 year-old male with a history of coarctation repair via a left thoracotomy as an infant presents after years lost to follow-up with HTN, recoarctation and a mycotic pseudoaneurysm.









Case #3 – What to Consider

- CT scan to assess approach, size of pseudoaneurysm, left atrium for cannulation
- Right radial arterial line to monitor native output
- Partial left heart bypass

Duke Surgery





Drainage from LA / patient inflow descending aorta

Partial Left Heart Bypass

Determine with or without oxygenator (lower heparin dose in closed/ECMO system) based on concern for bleeding and need for pump suckers (coarct vs mycotic pseudoaneurysm)

Management includes maintaining pulsatility (right radial arterial line), monitoring cerebral NIRS









22 year-old female with a history of TOF s/p repair at 6 months of age with a transannular patch presents with exercise intolerance, free PI and a dilated RV. She had coronary compression on balloon testing for transcatheter pulmonary valve assessment and now presents for surgical pulmonary valve replacement via a left anterior mini-incision (LAMI).









Case #4 – What to Consider

- CT scan to assess depth and location of MPA
- Femoral vessel U/S peripheral cannulation
- Bubble study if small pfo, need to keep from emptying out too much on cardiac entry (or better yet, consider fibrillating)
- TTE for location of incision right over PV
- Sew on 6 or 8mm Dacron graft to femoral artery to avoid leg ischemia (can be long cases depending on learning curve) – patch artery at end
- Additional venous drainage (subclavian or IJ)
- Postop pain control







LAMI









25 year-old male with HLHS s/p 3 stages of single palliation with an 18 mm extracardiac, non-fenestrated Fontan. He has been listed for heart transplant and a promising donor heart is being worked up.







Case #5 – What to Consider

- Cath collateral burden
- CT scan re-entry
- Femoral vessel dopplers peripheral cannulation
- Liver workup heart-liver combo?
- Femoral wires, femoral cannulas, axillary cannulation depending on degree of re-entry concern
- Fix cardiac injuries as you go if possible
- Emergent bypass with cardiac injury primary benefit is to provide pump suckers. Perfusion don't empty out and surgeons don't put pump suckers in 1V cardiac injury. Can't go wrong cooling and Trendelenburg.
- Assess neuro status early and use cooling protocol as needed









Dave Kaemmer and Greg Smigla AKA: Statler and Waldorf