TRANSITIONAL ATRIOVENTRICULAR CANAL REPAIR IN THE PEDIATRIC JEHOVAH'S WITNESS PATIENT
I have no disclosures
Review of acyanotic congenital deformities, specifically AV canal defects.

Explore pediatric surgical considerations.

Examine various strategies of pediatric perfusion practice.
Many defects manifest after birth once shunts close.

Acyanotic congenital deformity classification

- Left to right shunts
- Intracardiac or valvular stenosis
- Valvular regurgitation

Shunt direction dependent on

- Pulmonary and systemic resistance
- Ventricular pressure
- Ventricular compliance

Eisenmenger syndrome is possible.
ATRIOVENTRICULAR SEPTAL DEFECT

- There are three different variations of AV canal defects
  - Partial (Incomplete) AVC
  - Transitional (Intermediate) AVC
  - Complete AVC

- In general AV canal physiology results from a large left-to-right shunt.

- The larger the defect the greater the mitral insufficiency and the sicker the infant.

- Cyanosis is rare.
Failure of endocardial cushions to grow and fuse causes:
- Defect in the lower atrial and upper ventricular septa
- Deficiencies in the mitral and tricuspid valves.

20% of children with down’s syndrome have this anomaly.
Three and a half year old male weighing 17kg.

Down’s syndrome.

Preoperative HCT of 34%.

Jehovah’s Witness.

Prenatally diagnosed, medically managed and allowed to grow to safely accommodate bloodless surgery.
Care for an infant undergoing heart surgery demands meticulous attention to detail and extreme vigilance.

A well thought-out plan is invaluable.

Operative blood loss cannot be predicted.

Large discrepancy between the patient’s circulating volume and the CPB circuit priming volume.

Optimal HCT during CPB is relative.

“IT TAKES A PERFECT CASE FOR AN AVERAGE RESULT.” DR. BRUCE LYTLE
THE GOOD, THE BAD, AND THE UGLY:
RELIGION, MEDICINE, AND OXYGEN TRANSFER
Anemia and hemodilution ultimately bring about:

- Reduced cardiac output and oxygen content
- Inadequate oxygen delivery

Compensation will ensue and flow will redistribute in favor of the heart and brain away from other organs.

Life overrides Law: Parental requests for infant patient

Signed parental waiver requesting refusal of blood
Ohio law mandates transfusion if medically necessary
STRATEGIES FOR A BLOODLESS SURGERY

- Preoperative erythropoietin, iron, and B-complex vitamins.

- A smaller circuit to save priming volume since the patient’s reported preoperative weight was borderline (13kg).

- Retrograde autologous priming, continuous ultrafiltration, and cell salvage.

- Vacuum-assisted venous drainage.

- Use of near infrared spectroscopy (NIRS).
The patient could not tolerate IM or IV infusions of EPO or iron. 

PO iron given as tolerated, however, intake was erratic and unreliable.

The discussed smaller circuit for reported weight impractical. 

Would not deliver adequate gas exchange
Patient weighed 5kg more than preliminary report

The appropriate CPB circuit was utilized and customized.

Larger oxygenator needed for gas exchange
Shortened circuit to decrease prime volume
Applied continuous ultrafiltration and RAP practices

2 units of PRBCs were cross-matched and available for immediate use as well as cell salvage autologous blood.
PUTTING THE PLAN INTO ACTION

- On bypass HCT is relative to the preoperative HCT
  Prebypass HCT = 24%

- Predetermined group strategies carried out.
  Standard heparin and cannulation protocols
  Retrograde Autologous Prime
  Slowly executed as MAP tolerated
  The patient was cooled to 34 degrees
The heart was arrested with 170mL of delNido cardioplegia

- 4:1 crystalloid cardioplegia to blood
- 136mL delNido:34mL cold blood

Excess volume removed by ultrafiltration

The surgical repair was made with blood loss of 40mL

The lowest on bypass HCT=21% with continuous ultrafiltration

Bypass time of 38 minutes with a 29 minute cross clamp

NIRS sats did not drop
The patient was extubated in the OR and sent to the PICU.

He stayed in the PICU for 1 day and was sent to a regular Peds floor.

The patient was discharged on post-op day 4.

Current follow ups show the patient as doing well and free of infection.
Advanced planning is always an aid to good medicine.

Many centers employ a “bloodless surgery” mindset and use these techniques in every case with similar outcomes as standard surgery.

Minimizing blood loss is a goal of the entire OR team.

Individual patient requests due to specific belief and ethical systems can lead to better care for the entirety of patients.

“A good plan today is better than a perfect plan tomorrow.”

-George S. Patton
REFERENCES


- http://www.cincinnatichildrens.org/health/a/avsd/

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