Care of Children after Repair of CHD: Role of the Pediatrician

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Learning Objectives

- Types of CHD
- Concept of corrective vs palliative repair
- Care after repair
  - Growth & nutrition
  - Exercise
  - School
  - I.E. prophylaxis
  - Vaccination
  - Medications
Introduction

- CHD ~ 1% of live births
- Surgical repair
  - From improving survival to improving QOL
  - 90% of children will survive into adulthood*
  - Increasing number of ‘GUCH: Grown Ups with CHD’
  - In 2008: No. of GUCH in USA > no. of children with CHD**

*Garson et al., Arch Pediatr Adolesc Med 1994
**Sommer et al., Circulation 2008
Predicted Survival to Age 16 After Repair

Wren et al., Heart 2001
Classification of CHD by Repair

1. Left to right shunt lesions
   - VSD
   - ASD
   - PDA

2. Obstructive lesions
   - Coarctation
   - Aortic stenosis, pulm. Stenosis

3. Cyanotic lesions
   - TOF
   - Transposition of GA’s

4. Complex (single ventricle)
   - HLHS
   - Tricuspid atresia
Ventricular Septal Defect
Repair of VSD

Patch repair
Secundum ASD
Single Ventricle

Hypoplastic Left Heart Syndrome

Tricuspid Atresia
The Ultimate Palliation: 
*Cavo-pulmonary Connection*

- **4-6 months**
  - SVC
  - RPA
  - Right Atrium
  - Glenn

- **2-3 yrs**
  - SVC
  - RPA
  - Aorta
  - LPA
  - IVC
  - Fontan

*Images depict surgical connections and stages of palliation for congenital heart defects.*
The Road to Fontan

HLHS

Stage 1: Norwood

Stage 2: Glenn

Stage 3: Fontan
Care After Repair
Growth & Nutrition

-25% of children with CHD have Wt & Ht <3rd percentile*

![Graph showing percent of patients before and after surgery for VSD and ASD with weight and height percentiles]

-Mehrizi et al., J Pediatr 1962
-Vaidyanathan et al., J Pediatr 2006
-Fernandez et al., Anales de Pediatr 2003
Exercise
Exercise in Repaired CHD

- Important to maintain well-being and reduce CV risk factors
- >50% of children do not exercise regularly
- Benefits vs risks
Is Exercise Safe?

**Benefits**

- Cardiac: improve function, reduce HTN
- Skeletal: ↑ strength, ↓ osteoporosis
- Psychosocial: ↓ depression, ↑ self-esteem, ↑ interpersonal communication

**Risks**

- Arrhythmia
- Sudden death
- Desaturation
Children <19 yrs with repaired CHD

- N=3600 1958-1996
- Total of 46,000 patient-years of FU
- Inc. of sudden death 1/1000 pt-yrs
- 90% of cases: AS, CoA, TOF
- Risk is near zero for ASD, VSD, PDA, PS


ACC Recommendations on Exercise in CHD: 36th Bethesda Conference  
Maron et al., J Am Coll Cardiol  2005

ASD, VSD, PDA, PS, TGA (arterial switch)  
• No restrictions >3 months

AS, Coarctation, TOF  
• Only after exercise testing

Palliative cyanotic  
Low intensity (bowling)  
Need Clearance!!
I.E. Prophylaxis

- Risk is lifetime but decreases after repair
- Corrective repair
  - No prophylaxis after 6 months
- Palliative repair
  - Prophylaxis recommended
  - Ampicillin or amoxicillin
Who Needs I.E. Prophylaxis?

1. Cyanotic
2. Previous I.E.

1. Palliative (Cyanotic) (eg: BT shunt, Glenn
2. Corrective for 6m or with residual shunt
3. Prosthetic valve
4. Heart transplant
Examples: Who Needs Prophylaxis?

1. A child with VSD
   - No

2. A child with VSD undergoing dental extraction
   - No

3. A child with tetralogy of Fallot
   - What’s the procedure?
     - Dental extraction Yes
     - Endoscopy No
- **ASD/VSD Device**: 6m
- **With residual shunt**: Until shunt resolves

![Blalock-Taussig Shunt](image1)

**Prosthetic Valve**

**Fontan Procedure (6m)**

**Glenn Procedure**

![Fontan Procedure](image2)

![Glenn Procedure](image3)
School and Quality of Life

❖ Risks
- Motor dysfunction
- Social & behavioural problems
- Learning disability
- ADHD

❖ Causes
- Associated anomalies
- Cardiopulmonary bypass
- Hospitalizations, CHF, cyanosis,…

Weinberg et al., Pediatr 1990
Mahle et al., Pediatr 2000
Disability per Type of Repair

- IQ
- Visual & Motor
- Memory & Learning

Forbess et al., Circulation 2002
Vaccination

- Children with CHD are *not* immunocompromised
  - Routine vaccination
  - Delay live vaccines for 4-6 weeks after surgery
  - Need extra vaccines
    - Flu & varicella vaccines in patients taking aspirin
    - Pneumococcal vaccine in asplenia
    - RSV immunoglobulins (Palivizumab) in certain patients
Medications

❖ For common infections
  ■ Treat as a normal child

❖ Special circumstances
  ■ Aspirin
    □ Hold until fever subsides
  ■ Warfarin
    □ Watch for drug interaction
Take Home Message

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Corrective: 95%

Palliative
Thank You...

HLHS survivor.....