Haemodynamics of some common congenital heart defects

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Purpose

An understanding of the haemodynamics of congenital heart disease allows one to:

- understand their clinical signs
- make informed clinical assessments of what is happening when signs have changed
- assess responses to resuscitation
- understand changes post-op
Ohm’s Law

\[ V = IR \]

\[ I = \frac{V}{R} \]
ONE UNIT OF CARDIAC OUTPUT

TWO separate pumps
In series

Acyanotic heart defects

Left to Right shunts
ASD

RA ENLARGEMENT

RV ENLARGEMENT

Fixed split second sound
PS murmur
TS murmur
Pulmonary vascular resistance

VSD size

LA ENLARGEMENT

LV ENLARGEMENT

Small: PSM only
Medium: ESM + MDM
Big: Loud P2
LA ENLARGEMENT

LATE VSD

RV HYPERTROPHY

LV ENLARGEMENT

↑↑ PULMONARY VASCULAR RESISTANCE

CYANOSIS

Eisenmenger syndrome

Very loud P2
RV Heave
Irreversible PHT
LA ENLARGEMENT

↑ RV outflow tract gradient

VSD

PAB

↑↑ ↑↑

RV outflow tract gradient

ESM
Mild cyanosis
No CCF
Pulmonary artery band
Cyanotic heart defects

Right to Left shunts
Classification of cyanotic heart disease

4 types

- RV outflow obstruction
- Mixing disorders
- Mixing disorders with RV outflow obstruction
- Parallel circulation
TETRALOGY OF FALLOT

- RV HYPERTROPHY
- INFUNDIBULAR STENOSIS
- AORTIC OVERRIDE
- VSD

- Ejection systolic murmur
- Single S2
- NO RV heave
- NO CYANOSIS
- MILD CYANOSIS
TETRALOGY OF FALLOT

SPELLING

Tachypnoea
NO ejection systolic murmur
Death

POSITIVE FEEDBACK

CYANOSIS
ACIDOSIS
TETRALOGY OF FALLOT
SHUNT

R modified Blalock-Taussig Shunt

Mild cyanosis
Lateral thoracotomy scar
Shunt murmur
Modified Blalock-Taussig shunt
SEVERE CYANOSIS

Two separate parallel circuits
Incompatible with life
No murmurs

LA ENLARGEMENT
LV ENLARGEMENT

Venae cavae
Pulmonary veins

RV
LV

Aorta
PA

CCF
TGA
TGA

Rashkind atrial septostomy

Followed by: Arterial switch OR Mustard operation

Raises peripheral SaO2 by increasing pulmonary to systemic shunting
Arterial switch
In summary

An understanding of the haemodynamics of congenital heart disease allows one to:

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The End