

## HEART FAILURE

### Definition

Defined as the inability to provide adequate cardiac output to meet the metabolic demand of the body.

### Causes of heart failure (see Table 1)

- congenital structural heart lesions, more commoner during infancy
- primary myocardial and acquired valvular diseases, more common in older children

### Clinical presentation

- varies with age of presentation
- symptoms of heart failure in infancy
  - feeding difficulty: poor suck, prolonged time to feed, sweating during feed
  - recurrent chest infections
  - failure to thrive
- signs of heart failure in infancy
  - resting tachypnoea, subcostal recession
  - tachycardia
  - hyperactive praecordium, praecordial bulge
  - hepatomegaly
  - poor peripheral pulses, poor peripheral perfusion
  - wheezing
- common signs of heart failure in adults, i.e. increased jugular venous pressure, leg oedema and basal lung crackles are *not usually* found in children

Table 1. Causes of heart failure

<b>congenital heart disease</b> left to right shunt lesions VSD, PDA, AVSD, ASD <i>obstructive left heart lesions</i> hypoplastic left heart syndrome, coarctation of aorta, aortic stenosis <i>common mixing with unrestrictive pulmonary flow</i> truncus arteriosus, TAPVD, tricuspid atresia with TGA, single ventricle, pulmonary atresia with VSD, large aortopulmonary collateral <i>valvular regurgitation</i> AV valve regurgitation, Ebstein anomaly, semilunar valve regurgitation <i>myocardial ischaemia</i> anomalous origin of left coronary artery from pulmonary artery	<b>myocardial disease</b> <i>primary cardiomyopathy</i> idiopathic, familial <i>secondary cardiomyopathy</i> - drug-induced: anthracycline - infection: post viral myocarditis, Chagas disease - ischaemic: Kawasaki disease - myopathic: muscular dystrophy, Pompe disease, mitochondrial disorders - metabolic: hypothyroidism - arrhythmia-induced – congenital heart block, atrial ectopic tachycardia - others – iron overload (thalassaemia) acute myocarditis viral, rheumatic, Kawasaki disease
<b>acquired valvular disease</b> <i>chronic rheumatic valvular diseases</i> <i>post infective endocarditis</i>	<b>miscellaneous</b>

## Treatment

### General measures

- oxygen supplementation, propped up position
- keep warm & gentle handling
- fluid restriction to  $\frac{3}{4}$  normal maintenance if not dehydrated or in shock
- optimize caloric intake; low threshold for nasogastric feeding; consider overnight continuous infusion feeds
- correct anaemia, electrolyte imbalance, treat concomitant chest infections

### Antifailure medications

- frusemide (loop diuretic)
  - dose: 1 mg/kg/dose OD to QID, oral or IV
  - continuous IV infusion at 0.1 – 0.5 mg/kg/hour if severe fluid overload
  - use with potassium supplements (1 - 2 mmol/kg/day) or add potassium sparing diuretics
- spironolactone (potassium sparing diuretic, modest diuretic effect)
  - dose: 1 mg/kg/dose BD
- captopril
  - angiotensin converting enzyme inhibitor, afterload reduction agent
  - dose: 0.1 mg/kg/dose TDS, gradual increase up to 1 mg/kg/dose TDS
  - monitor potassium level (risk of hyperkalaemia)
- digoxin
  - role controversial
  - useful in heart failure with excessive tachycardia, supraventricular tachyarrhythmias
- IV inotropic agents - i.e. Dopamine, Dobutamine, Adrenaline, Milrinone
  - used in acute heart failure, cardiogenic shock, post-op low output syndrome

### Specific management

- establishment of definitive aetiology is of crucial importance
- specific treatment targeted to underlying aetiology. Examples:
  - surgical/transcatheter treatment of congenital heart lesion
  - pacemaker implantation for heart block
  - control of blood pressure in post-infectious glomerulonephritis
  - high dose aspirin  $\pm$  steroid in acute rheumatic carditis