الكلية : الطب

القسم او الفرع :طب الاطفال وحديثي الولادة

المرحلة: الخامسة

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اسم المادة بالغة العربية : طب الاطفال وحديثي الولادة

اسم المادة باللغة الإنكليزية : طب الاطفال وحديثي الولادة

اسم المحاضرة الأولى باللغة العربية: عجز القلب

اسم المحاضرة الأولى باللغة الإنكليزية : HEART FAILURE

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HEART FAILURE (lec 3 /1 hr)

Heart failure (HF) is a pathophysiological process in which the heart (as a pump) is unable to meet the metabolic requirements of the tissue for oxygen or substrates.

Causes of HF according to age

Neonate:

- Asphyxial cardiomyopathy
- Fluid overload
- Congenital heart disease: hypoplastic heart syndrome, large VSD
- Viral myocarditis

Infancy:

- L-to-R Shunt: VSD, PDA
- Dilated cardiomyopathy
- Supraventricular tachycardia
- Acute HTN (hemolytic uremic syndrome)

Childhood and adolescence

- Rheumatic heart disease
- Viral myocarditis & cardiomyopathy
- Anticancer therapy (radiation and adriamycin)
- Hemochromatosis, hemosiderosis
- Acute HTN (glomerulonephritis)

Pathophysiology:

preload or volume overload as in: Lt.→ Rt. Shunt, valvular insufficiency, severe anemia.

#↑ after load or pressure overload as in: aortic stenosis, aortic coarctation, acute HPT.

Myocardial abnormalities: this impair its contractility as in myocarditis, dilated cardiomyopathy.

Diastolic dysfunction i.e. Impaired ventricular filling so this reduce stroke volume as in: hypertrophic cardiomyopathy, tachy-dysrrhythmias.

Compensatory mechanism against HF:

Increased myocardial contractility with increased filling volume*.

Hypertrophy of myocardium.

Activation of rennin-angiotensin system.

C/F:

Hx is important in both Dx and evaluation of HF, and knowing the cause of HF.

In infants:

Feeding difficulties (less volume per feeding).

Dyspnoea (crying, sucking).

Profuse sweating, irritability.

Poor weight gain.

Weak cry and noisy labored respiration.

In children (as in adult C/F):

Fatigue

Effort intolerance

Anorexia

Cough, dyspnea

Abdominal pain which is due to (hepatic capsule stretching or intestinal vascular congestion).

O/E:

Infant with HF:

Weak peripheral pulse, narrowed pulse pressure, hypotension

Tachycardia, Gallop rhythm, murmur of the cause.

Rhonchi: (compressed airway by congested pulmonary vessel).

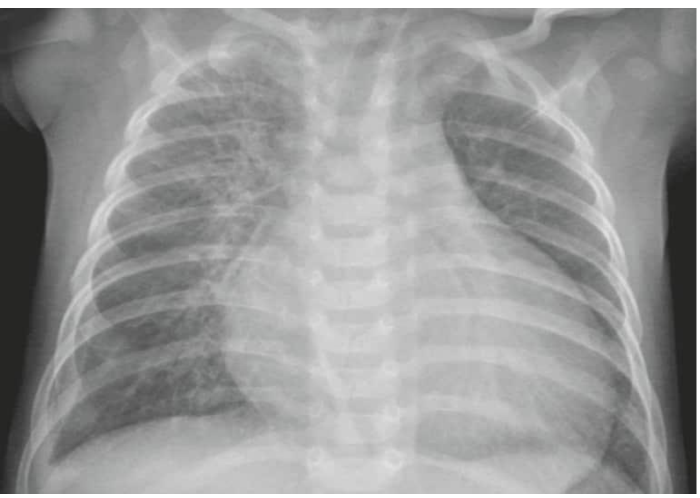
Basal crepitations

Peripheral edema (rare in infant).

In children → facial edema, and edema of dependant body part is more common than peripheral edema.

Dx:

CXR: the most important to look for is heart size, pulmonary vascular shadow → this is usually elevated, frank pulmonary edema is rare in children.



ECG: non specific but it is helpful in assessing the cause .

Echo: to diagnose structural defect, assess myocardial function by determining stroke vol., end-systolic vol., End-diastolic vol.

Blood gases & pH: to assess severity of HF& to follow up the patients.

Rx of HF: Aims are:

Improve myocardial performance by digoxin (digitalis).

Relief of pulmonary and systemic venous congestion by diuretic and vasodilator.

Rx of underlying cause.

General Rx measures:

Bed rest.

Semi-up right position or using infant chair.

Diet: low-salt diet.

Medical Rx:

1. Digoxin: it remains the most widely used pharmacologic agent in Rx of HF in infant and children, it is +ve inotropic agent i.e. increases myocardial contractility.

Mechanism of action: Inhibit Na+-K+ pump → so ↑ intracellular Na+ and indirectly ↑ Ca+2 → increase the myocardial contractility..

Slowing heart rate by direct effect on AV-node, vagus N. stimulation and by anti-adrenergic effect.

Dose:

There is individual variation in response to drug.

Digitalization dose is 0.04-0.06 mg/Kg/day, we give 1/2 dose immediately and subsequent 2 doses 8-16 hrs later.

Maintenance dose is 0.01 mg/Kg/day. This should be started 12 hr after full digitalization.

Factors that potentiate toxicity:

1 Prematurity

2 Myocarditis

3 Hypokalemia

4 Hypercalcemia

5 Renal and hepatic disease

CONTRAINDICATIONS:

Contraindications to the use of digoxin include obstructive cardiomyopathy, Ventricular fibrillation Hypersensitivity to the drug . It needs to be used with caution in patients with renal failure, hypokalemia, myxedema, acute myocarditis, premature infants with impaired renal clearance, and co-administration with drugs inhibiting AV conduction (beta-blockers, amiodarone, verapamil, diltiazem). In these settings, dose reduction of the drug is appropriate.

2. Diuretic:

Loop diuretic as frusemide □ 1-2 mg to decrease preload.

3. Vasodilators:

ACE inhibitors □ captopril 0.6-6 mg/Kg

4. Inotropic agent ; dopamine, dobutamine (if digoxin not effective)

5. Medical Rx for underlying cause (e.g.. closing the VSD)