Neonatal Hypertension

DEFINITION: Systolic or mean arterial blood pressure (BP) >95th percentile for birth weight, gestational age and post-natal age. (See graphs of normal BP on P. 36.)

EPIDEMIOLOGY:
-95th percentile for systolic BP = 65 mmHg at 24 weeks and 90 mmHg at 40 weeks post-conception.
-By definition, 5% of all infants have a blood pressure above the 95th percentile, but real incidence of hypertension in ICN is about 0.8%
-In infants with bronchopulmonary dysplasia (BPD), intraventricular hemorrhage (IVH), umbilical arterial catheters (maintained in "high" position) or patent ductus arteriosus, incidence of hypertension is 9%.
-Incidence varies widely in different ICNs.

SIGNS/CONSEQUENCES include lethargy, irritability, apnea, tachypnea, seizures, intracranial hemorrhage, congestive heart failure or cardiogenic shock.

DIFFERENTIAL DIAGNOSIS:
-Commonest cause of neonatal hypertension is **reno-vascular hypertension** due to thrombi from **"high" umbilical arterial catheter (UAC).** Maintain UAC so that tip is below 3rd lumbar vertebra (L3). (See section on Catheters, P. 25)
-Other **renal** causes: thromboembolism, renal artery stenosis, coarctation of aorta, renal vein thrombosis, renal anomalies, polycystic or dysplastic kidneys, acute tubular necrosis
-**Iatrogenic**: glucocorticoids, dopamine (and other pressors), caffeine, **pain**, fluid/Na^+ disturbances
-**Neurological**: intracranial hypertension, seizures, IVH, subdural hematoma
-**Endocrine**: congenital adrenal hyperplasia, hyperthyroidism, hyperaldosteronism
-**Pulmonary**: hypercarbia, chronic lung disease, pneumothorax (early, followed by hypotension)

EVALUATION:
-Document presence of hypertension with multiple limb BPs and invasive measurement, if possible.
-History: recent and current medications, procedures (UAC)
-Physical examination, including state (pain, agitated, seizure, quiet, *etc.*)
-Laboratory: BUN, Creatinine, electrolytes, Ca, UA with micro, chest radiograph, renal ultrasound with Doppler flow studies, cranial ultrasound
-Other laboratory tests (in selected infants with consultation): thyroid function tests, urinary VMA/HVA, cortisol, aldosterone, echocardiography
-Further workup and management with appropriate consultation (*e.g.*, nephrologist, cardiologist, endocrinologist)

TREATMENT varies with cause of hypertension. Treat the etiology, if possible. Correct or treat iatrogenic causes!

-Unless the hypertension is immediately life-threatening, do not automatically give an anti-hypertensive agent!
-Emergency treatment: hydralazine (0.15-0.6 mg/kg IV). Other emergency therapies include diazoxide, esmolol, labetalol, and sodium nitroprusside, but these are rarely needed in newborn infants.
-Monitor BP closely (preferably by arterial line) during drug therapy as these agents can cause hypotension and shock.
-Maintenance therapy: captopril (0.01-0.5 mg/kg/dose TID). Other potential agents: long acting hydralazine, amlodipine, propanolol and labetalol.