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.