Respiratory Alkalosis


Normal control: inhibitory action of hypocapnia on the respiratory center

Causes
- Hypoxia and lung disease
- Drugs: salicylates, catecholamines, nicotine, progesterone
- CNS disorders: meningitis, encephalitis, head trauma, space-occupying lesion, infarction (brainstem)
- Metabolic: sepsis, hormonal, pyrexia, hepatic disease
- Mechanical ventilation
- “Hyperventilation syndrome”

Compensation
- Acute: HCO3 decreases 0.22 for every mmHg decrease in PCO2
  - Steady state within 10 minutes and lasts up to 6 hours
- Chronic: HCO3 decreases 0.5 for every mmHg change in PCO2
  - Begins by 6 hours and complete within 2-4 days
- Rarely below 12-14nmol/L

Electrolytes
- Potassium:
  - Hyperkalemia initial (alpha adrenergic)
  - Hypokalemia: transcellular shift, bicarbonaturia -> direct increase in excretion, and decreased K+ reabsorption by collecting duct due to H+ exchange
  - Decreases 0.3nmol/L for each 0.1 unit increase in pH
- Phosphate:
  - Hypophosphatemia acutely (increased cellular uptake)
  - Hyperphosphatemia chronically (decreased urinary excretion from PTH resistance)
- Calcium
  - Hypocalcemia (PTH resistance)
- Lactate
  - Increased pyruvate from increase phosphofructokinase activity (glycolysis) -> increased lactate

Other systems:
- CNS: vertigo, dizziness, anxiety, euphoria, hallucinations, absence seizures
- Peripheral neurologic: due to hypocalcemia
- Cardiovascular: arrhythmia secondary to electrolytes, coronary vasospasm, decreased O2 offloading by hemoglobin
- Pulmonary: vasodilatation, lung injury
- GI: nausea, vomiting, GI motility changes, decreased splanchnic perfusion

Treatment:
- Treat underlying cause