

# Approach to Internal Medicine

A Resource Book for Clinical  
Practice

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## Respiratory Acidosis: Hypoventilation

### DIFFERENTIAL DIAGNOSIS

**CNS** (respiratory center depression)—brain stem injury (tumor, stroke), sleep apnea, obesity, medications (opioids)

#### RESPIRATORY

- **UPPER AIRWAY OBSTRUCTION**—epiglottitis, laryngospasm
- **LOWER AIRWAY OBSTRUCTION**—COPD, asthma, sleep apnea

### DIFFERENTIAL DIAGNOSIS (CONT'D)

- **DEAD SPACE VENTILATION**—infection, pleural effusion
- **NEUROMUSCULAR**—myasthenia gravis, Guillain-Barré syndrome, myopathy, ALS, hypophosphatemia, hypokalemia
- **CHEST WALL RESTRICTION**—kyphosis, scoliosis, ankylosing spondylitis

**PHYSIOLOGIC COMPENSATION**—secondary to metabolic alkalosis

**PATHOPHYSIOLOGY**

**DEFINITION OF RESPIRATORY ACIDOSIS**— $\text{PaCO}_2 > 40$  mmHg (or upper limit of normal), which is synonymous with hypoventilation

**INVESTIGATIONS****BASIC**

- **LABS**—CBC, lytes, urea, Cr, CK
- **IMAGING**—CXR
- **ABG**

**MANAGEMENT**

**ACUTE**—ABC,  $\text{O}_2$ , IV, non-invasive ventilation, intubation

**TREAT UNDERLYING CAUSE****Related Topics**

Approach to ABG (p. 95)

Metabolic Acidosis (p. 94)

Metabolic Alkalosis (p. 97)

**Respiratory Alkalosis: Hyperventilation****DIFFERENTIAL DIAGNOSIS**

**CARDIOPULMONARY**—hypoxia, pneumonia, early restrictive disease, mild HF, pulmonary embolism, mechanical ventilation

**NON-CARDIOPULMONARY**—fever, sepsis, CNS, anxiety, hyperthyroidism, drugs, pregnancy, liver failure

**PHYSIOLOGIC COMPENSATION**—secondary to metabolic acidosis

**PATHOPHYSIOLOGY**

**DEFINITION OF RESPIRATORY ALKALOSIS**— $\text{PaCO}_2 < 40$  mmHg (or lower limit of normal), which is synonymous with hyperventilation

**INVESTIGATIONS****BASIC**

- **LABS**—CBC, lytes, urea, Cr, AST, ALT, ALP, bilirubin, TSH, urinalysis,  $\beta\text{hCG}$  in women of reproductive age
- **IMAGING**—CXR, CT chest
- **ABG**

**SPECIAL**

- **SEPTIC WORKUP**—blood C&S, urine C&S
- **D-DIMER**—if suspect PE but low probability

**MANAGEMENT**

**ACUTE**—ABC,  $\text{O}_2$ , IV, sedation (use with great caution as patients may experience respiratory decompensation)

**TREAT UNDERLYING CAUSE**