Bronchopulmonary Dysplasia

Characteristics

- Need for supplemental oxygen at 36 weeks postmenstrual age, with radiographic changes on chest x-ray (bilateral, diffuse hazy lungs; interstitial thickening; increased lung inflation).
- Symptoms: tachypnea, increased work of breathing, chronic wheeze or cough, oxygen dependence, +/- ventilator dependence, hypercarbia with compensated respiratory acidosis.
- Course characterized by acute exacerbations of respiratory distress.
- Overall incidence is unchanged due to increased survival of extremely premature infants. (~7500 new cases/year) but is decreased with surfactant and early extubation to NCPAP.
- Risk factors: premature birth, respiratory failure, O_2 supplementation, mechanical ventilation, air leaks, pulmonary edema, PDA ligation, infection causing lung injury, lung hypoplasia.

Treatment

- Oxygen (see home oxygen topic sheet).
- Fluid restriction and diuretics:
  - Use of diuretics is reserved for severe BPD and evidence of diuretic responsive disease.
  - Furosemide, chlorothiazide, spironolactone (see medication sheet for dosing).
  - May need KCl or NaCl supplements to correct electrolyte deficiencies.
  - Chronic furosemide use improves both oxygenation and lung compliance, but has not decreased length of hospital stay or need for oxygen therapy.
- Inhaled bronchodilators or corticosteroids (see medication sheet for dosing).
  - Only for infants that show evidence of reversible airway obstruction.
  - Only patients that have a family history of asthma and have episodic attacks similar to asthma have been shown to have any benefit from inhaled steroids.
- RSV immunoprophylaxis; influenza and pneumococcus vaccinations.
- Higher caloric intake needed to account for increased work of breathing, as well as ongoing tissue repair and tissue deposition; due to fluid restrictions, these patients may need fortified feeds to maintain an adequate growth rate.

Monitoring

- Monitor O_2 saturations, resting respiratory rate and effort, presence of retractions, and color.
- Watch for adequate weight gain (15-30 g/day).
  - If inadequate, may be due to insufficient caloric intake or hypoxemia.
- Watch for excessive fluid retention (tachypnea, retractions, rales, excessive weight gain, enlarged liver, poor feeding, O_2 saturation <92%).
- Watch neurodevelopment closely.

Outcomes

- 50% with CLD require rehospitalization in the first year, and 37% in the second year of life.
- More prone to: frequent lower respiratory tract illnesses, feeding difficulties, growth failure, rehospitalization during infancy.
- Despite treatment, approximately 10% of these children die in the first year of life.
- Increased risk for cognitive, motor, and language impairment, hearing loss, and poor academic performance.
- Lung function generally remains reduced until adolescence, at which point it approaches normal for age; in some, pulmonary function will again deteriorate in adulthood.
- Children with CLD are more likely to develop asthma and require bronchodilator therapy.