RESPIRATORY SYNCYTIAL VIRUS
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RSV:
• This is what a baby with RSV looks like:

RSV:
• Here is what they sound like:

http://www.youtube.com/watch?v=RFwr_zbgJII

RESPIRATORY SYNCYTIAL VIRUS:
Objectives of this talk:
By the end of this talk, residents will have a better sense of the following:
• Virology
• Epidemiology
• Pathogenesis
• Complications & Long term Effects
• Diagnosis
• Therapy & Prevention

RSV: INTRODUCTION
• RSV is responsible for outbreaks of lower respiratory tract disease in young children.
• Bronchiolitis & pneumonia from RSV are frequent causes of hospitalization.
• Recent confirmation of the significance of RSV in causing respiratory tract illness throughout life.
• Therapy & prevention based on increased understanding of the virus & host response.

RSV: VIROLOGY:
• RSV is ssRNA virus, NP inoculation, spread by direct contact/aerosol droplets, survives for hours on hands.
• Viral shedding usually 3-8 days (range 2d – 4w) (long); incubation period 4-6 days (short).
• Two major groups: A & B
• A strain predominant, the two strains circulate.
• Strain variation does not significantly affect the clinical severity.
• Stable in hospital environment: recovered from countertops & rubber gloves.
**RSV: EPIDEMIOLOGY:**

- November – April (peak in January/February)
- Almost all kids infected by 2 y (majority as URI)
- Most common cause of LRTI in kids < 1 y
- Risk factors for more severe disease: < 12w, daycare, underlying lung/CV/neurologic disease, ex-premie (<37w), immunodeficiency, secondhand smoke, family history of asthma [1]
- Majority of kids with RSV have URI only, small % have LRTI
- Present worldwide, yearly epidemics.

**RSV: PATHOGENESIS**

- Ocular, nasal contact with infected secretions.
- Upper airway: cough & rhinorrhea.
- 50% primary infection spreads to lower tract.
- Bronchiolitis: Infects epithelial cells lining respiratory mucosa – inflames bronchioles
- Edema, excess mucus, cell sloughing → small airway obstruction/atelectasis, bronchospasm
- Hyperinflation.
- Interstitial infiltrates: Pneumonia vs atelectasis.

**RSV: CLINICAL FEATURES**

- 1-3d of URI prodrome → worse cough, resp distress, tachypnea, post-tussive emesis, wheeze
- Eventually can lead to dehydration, cyanosis, lethargy, apnea
- Exam – retractions, wheezing, course/slow rates, grunting, pulse ox < 95%
- Associated findings: dehydration, otitis media, serious bacterial infection (PNA, UTI)

**RSV: CLINICAL MANIFESTATIONS**

- High risk infants:
  - Preterm infants
  - Chronic lung disease
  - Congenital Heart disease
  - Immunocompromised
  - Neurological disorders
  - Multiple congenital Anomalies

**RSV: CLINICAL MANIFESTATIONS: CHILDREN & ADULTS**

- Repeated infections: milder, localized to URT.
- LRTI uncommon, may be followed by airway hyperactivity.
- Immunocompromised: BMT: severe, fatal disease

**DIFFERENTIAL DIAGNOSIS**

- Non-RSV bronchiolitis
- Asthma
- Viral upper respiratory infection
- Inhaled foreign body
- Pneumonia
- Cystic fibrosis
- Pertussis
- Croup
**DIAGNOSIS:**

- Young Children:
  - Season
  - Typical history
  - Physical examination including pulse ox
- Children & Adults:
  - Signs & Symptoms are less specific.
  - Chest x ray nonspecific
  - Chest X rays:
    - Hyperinflation
    - Peribronchial thickening
    - Increased interstitial markings
    - Consolidation, Atelectasis

**RSV: DIAGNOSIS**

In children with mild disease, definitive diagnosis may not be necessary
In hospitalized patients & those with severe disease, an accurate diagnosis may limit further lab evaluation and antibiotic use.
Infants: nasal wash is most effective
Children & adults: Swab from nasal turbinates + pharynx

**RSV: THERAPY**

- Usually a self-limited disease; supportive care (nasal suctioning, vaporizer) and hydration
- Criteria for admission: hypoxic/apneic/tachypneic, dehydrated, underlying CV/Pulm dz, high risk, parent discomfort with home care, non-reliable to follow-up
  - <1m usually admitted for observation
  - 50% respond to bronchodilators (unable to predict who will respond)
- Therapy NOT routinely used: oral steroids (if family history or repeat wheezer), inhaled steroids, inhaled epi, oral/IM decadron
- Ribavirin only used in immunocompromised
- Antibiotics only if suspected comorbid otitis, pneumonia, UTI
- Prevention: Synagis monthly injections for those that qualify* see last 2 slides

**COMPLICATIONS & LONG TERM EFFECTS:**

- Acute:
  - Respiratory Failure
  - Apnea
  - Secondary bacterial infection
- Long Term Effects:
  - Reactive Airway Disease?

**RSV AND ASTHMA**

**COMPLICATIONS OF RSV**

- Asthma in Infancy is an Important Risk Factor for Asthma/Seasonal RSV Infection in the 1st year of life
- Children admitted with RSV in the 1st year of life
- Risk of asthma was 2.3 times higher if chest x ray was positive with evidence of lung edema

*Children at Increased Risk of Severe RSV Infection*
COMPLICATIONS OF RSV

- Not just a pediatric problem
- Persistent RSV may play a role in progression of COPD
- Quarterly sputum samples persistently RSV (+) in 74 patient with COPD
- 18/74 had RSV detected >50% of the time
- More airway inflammation
- Faster FEV1 decline over 2 year observation period

RSV PREVENTION: VACCINES

- A variety of approaches to vaccine development have been studied
- Types of candidate vaccines include inactivated, live attenuated & subunit vaccines
- Successful immunization against RSV may require different individualized approaches
- Development of an effective vaccine remains a challenge
- Maternal immunization may be protective, but not for LBW infants

SYNAGIS CRITERIA

- 2012-2013 Synagis (palivizumab) Criteria
- Requirements
  - Infants who are born during the RSV season
  - Infants younger than 3 months of age at the start of the RSV season
  - Infants born at 32 to less than 35 weeks GA (32 weeks, 0 days through 34 weeks, 6 days)
  - Infants born at 28 weeks of GA or earlier (If younger than 12 months of age)
  - Infants born before 32 weeks GA (31 weeks, 6 days or less)
  - Infants who are born at ≥29 weeks of GA and who are ≤6 months of age at the start of the RSV season
  - Infants who have had chronic lung disease (CLD) who meet one of the following criteria:
    - Infants born before 32 weeks GA (31 weeks, 6 days or less) and who are ≤6 months of age at the start of the RSV season
    - Infants born at ≥29 weeks of GA and who are ≤6 months of age at the start of the RSV season
    - Infants born at ≥29 weeks of GA and who are >6 months of age and have received medical therapy for CLD within 6 months of age
  - Infants who received medical therapy (O2, bronchodilator, diuretic or chronic corticosteroid therapy) for CLD within 6 months of age
  - Infants who have been diagnosed with congenital heart disease
  - Infants who have had persistent RSV disease
  - Infants who are likely to have an increased risk of exposure to RSV
  - Infants who are being treated for CLD who are >6 months of age

RSV VAX

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