**Measles (Rubeola)**

**Pathophysiology**
1. Infection spread by respiratory droplets
   - Enters respiratory epithelium (CD46) -> regional lymph nodes/replicates
     - Incubation period: 7-12d
     - Communicable just before prodrome till 4d after rash appears
   - Viremia -> endothelial cell infection (Koplik spots) -> epithelial cell infection (rash)
   - Infects monocytes causing immunosuppression
     - Increased risks of severe bacterial pneumonia, Otitis Media
   - Life-long immunity s/p infection
   - See Vaccination schedules
     - Vaccination effectiveness in <1yo may be reduced by maternal antibodies
2. Epidemiology
   - 50 million cases worldwide/yr; 1 million deaths/yr
     - Returning in pockets of underimmunization
     - Up to 30% of adults may be at risk
   - Infectivity rate of 76%
3. Morbidity/mortality
   - Dehydration (diarrhea), pneumonia, croup, hepatitis, vit A deficiency, myocarditis, blindness
   - Acute encephalitis (0.1%, permanent brain damage, 10% mortality)
   - Delayed encephalitis in pts. w/lymphoid malignancies (usually fatal)
   - **Subacute sclerosing panencephalitis (SSPE):** rare degenerative, chronic disease
     - Behavioral, MS changes, seizures
     - Incubation period: 10.8 yrs (mean)

**Diagnostics**

1. **Symptoms**
   - Prodrome: cough, coryza, conjunctivitis
     - Fever (>101°F, may last 7-10d), photophobia, malaise
     - Increase in severity until 3-4d prior to rash
   - Sx resolution in 7-10d
2. **Physical exam**
   - **Koplik spots:** blue/white macules w/red base on premolar buccal mucosa
     - Pathognomonic; sloughs as rash appears
     - Last: 2-4d; appear: 24-48hrs prior to rash
   - Erythematous maculopapular rash: face/ears -> trunk/extremities (w/in 24-36hrs)
     - Maximum at 3d; includes palms/soles
     - Fades to yellow-brown lesions in 5-10d (head downward)
     - May desquamate s/p 1wk; spares palms/soles
     - Severity of disease is directly related to extent and confluence of rash
   - Generalized LAD, hepatomegaly, appendicitis
   - Lymphadenopathy at angle to jaw and posterior cervical region
3. Diagnostic testing
   o Labs
     ▪ LFTs: if hepatitis suspected
     ▪ LP: r/o meningitis if indicated
     ▪ IgM up to first 72 hours of rash appearance
       • Repeat in 72 hours if still strong suspicion
       • Consider using CDC or state lab
   o Diagnostic imaging
     ▪ CXR: r/o pneumonia

Differential Diagnoses
   1. RMSF
   2. Toxic shock
   3. Kawasaki
   4. Rubella
   5. Roseola
   6. Fifth Disease
   7. Meningococcemia
   8. Drug eruptions

Acute Treatment
   1. Supportive care
      o Maintain adequate hydration
      o Consider IgG if pregnant, <1yo, immunocompromised
        ▪ Consult infectious disease or gynecology
   2. Vitamin A supplements
   3. Measles vaccination
   4. Empiric antibiotics if secondary infection only
   5. Ribavirin (experimental): severe cases, immunocompromised, SSPE
   6. Report all/suspected cases, adverse vaccine reactions to CDC/local health department

Disposition
   1. Admit
      o Pts. w/severe disease, secondary complications

Further Management
   1. Treat secondary complications as indicated
   2. Airborne precautions
      o Up to 4d after rash starts in normal pts.
      o Entire disease for immunocompromised pts.
   3. Diagnostic Testing
      o Contact CDC/local health department if IgM assay is positive

Follow Up Care
   1. Vaccine prophylaxis/IgG in exposed susceptible/immunocompromised
      o Give w/in 6d of exposure
      o See Acute Treatment
   2. Healthcare workers should not work from 5-21d after exposure
3. Follow up with PCP as appropriate

4. Prevention
   - Measles immunization as part of MMR series
   - Refer to detailed MMR immunization information for details

References

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