Rubella (German Measles)

Pathophysiology
1. Infection by Togavirus: Rubella virus (ssRNA)
   - Spread through aerosolized droplets of infected pts.
   - Invades nasopharynx epithelium -> hematogenous spread
   - Replicates in RES -> secondary viremia (6-20d s/p infection)
     - Found in urine, CSF, lymph nodes, breast milk, blood, nasopharyngeal secretions, feces
   - Peak viremia -> rash
     - Virus shed 3-8d s/p infection -> 6-14d after rash onset (contagious)
   - Intrauterine infection:
     - Crosses placenta
     - Tissue necrosis from vasculitis, direct viral damage of tissue, chromosomal damage, reduced mitotic activity
     - Birth defects if infection during organogenesis (1st trimester)
2. Epidemiology
   - 50% of infected pts. asymptomatic
   - Up to 20% of US population susceptible
     - Outbreaks in colleges, military barracks, prisons
     - Usually pts. w/o immunizations: immigrants
   - 62% of US pts. >20yo
3. Morbidity/ mortality
   - Teratogenic (crosses placenta): birth defects, stillbirths, IUGR (1st trimester)
     - Part of ToRCH
       - Toxoplasmosis, Syphilis, Rubella, Cytomegalovirus, Herpes Simplex Virus
   - Encephalitis usually resolves w/o sequelae
   - Arthritis, thrombocytopenia usually resolve w/in days-mos

Diagnostics
1. Symptoms
   - Pt. may be asymptomatic
   - Hx of exposure:
     - 14-21d incubation period
   - Prodrome (1-5d prior to rash):
     - Unusual in young children
     - Eye pain w/lateral, upward movement
     - HA, myalgias, chills, sore throat, anorexia, N/V
   - Rash: pruritic w/adults
   - Sx of Meningoencephalitis (rare): lethargy, MS changes, irritability
     - 2-4d -1wk s/p rash onset
2. Physical exam
   - Maculopapular pink colored rash
     - Face/neck -> trunk, extremities (w/in 24hrs)
     - Fades face/neck (48hrs) -> trunk, extremities (w/in 72hrs): "3 day Measles"
     - Large areas of flushing w/in 24 hrs
2.1.07

- Fever (up to 38.5°C)
- Lymphadenopathy:
  - Tender (retroauricular, posterior cervical and postoccipital)
  - Appears at least 24 hrs prior to rash
- Mild splenomegaly
- Forchheimer spots (20%)
- Meningoencephalitis signs:
  - Meningeal signs
  - Hypotonia
  - Full anterior fontanelle
- Congenital effects
  - Sensorineural (uni/bilateral) hearing loss/deafness
  - Cataracts, glaucoma, pigmented retinopathy (salt-pepper macular changes)
  - PDA, VSD, pulmonary artery stenosis, MR, hypotonia
  - Jaundice, thyroid abnl, diabetes, anemia, thrombocytopenic purpura
  - "Blueberry muffin spots": abnormal dermal erythropoiesis

3. Diagnostic testing
- Labs
  - CBC: r/o leukopenia, thrombocytopenia (rare)
  - Serologic testing: ELISA, immunofluorescent assay
  - Viral culture (PCR): congenital disease (urine, CSF, nasopharynx)
    - May be abnl in immune compromised, recently vaccinated
  - LP: nl glucose, nl/elevated protein, 20-100WBC/mm³ (lymphocytosis)
  - beta hCG: in female pts. (r/o pregnancy if indicated)
- Other diagnostic testing
  - ECHO (congenital): r/o cardiac defects

4. Diagnostic imaging
- CXR (congenital): r/o pneumonitis, CHF if indicated
- Long bone XR (congenital): metaphyseal radiolucencies
- Head MRI (congenital): white matter changes, cortical atrophy (Panencephalitis)

Differential Diagnosis
1. Measles (Rubeola)
2. Roseola Infantum
3. Scarlet Fever
4. CMV / EBV infection
5. Erythema Infectiosum (Fifth Disease)
6. Contact Dermatitis
7. Syphilis
8. Kawasaki Disease
9. Other viral exanthems (enteroviruses)
10. Drug eruptions

Acute Treatment
1. Supportive care
2. Pruritis: Antihistamines (Diphenhydramine), oatmeal baths
3. Arthritis: rest, NSAIDs (not corticosteroids)
Disposition
1. Admit
   o Exposed/affected delivered infants, pts. w/serious complications
   o Pediatrics, Cardiology, Ophthalmology consults as indicated
2. Discharge
   o Stable pts. w/appropriate follow up

Further Management
1. Contact isolation
   o Congenitally acquired babies infectious for up to 1yr
     • Droplet precautions x7d; contact precautions x1yr
2. Further Diagnostic Testing
   o CBC
   o Lytes, BUN/Cr
   o Viral culture: nasopharyngeal swab/urine
     • Usually for epidemiologic tracking
3. Medications
   o IV fluids if needed
   o IVIG: severe thrombocytopenia (no corticosteroids)
4. Procedures
   o Vision/hearing testing for congenitally exposed
   o Phototherapy: jaundice
   o Surgical repair of cardiac abnl, cataracts, glaucoma

Follow Up Care
1. Follow up w/PCP as appropriate
   o Congenital disease pts.: frequently
     • Hearing/vision, developmental screening
     • Monitor for thyroid disease, DM
2. Prevention
   o Exclude children from school until 7d s/p rash
   o MMR vaccine: life-long immunity
     • Children: 12-15mos and 4-6yrs (no later than 11yo)
     • All at risk pts. w/o immunity (military, healthcare workers, non-pregnant women, HIV)
     • Avoid in pts. on corticosteroids (at least 1mo s/p cessation)
     • Allergic reaction to eggs, urticaria not contraindication
3. Pregnancy considerations
   o Avoid pregnancy w/in 3mos of receiving vaccine
   o Avoid pts. w/rubella, congenital disease w/in 1yr of life
   o Test for immunity at onset of pregnancy
     • Consider pregnancy termination
     • IVIG: if termination not option

References