Rubella and Rubella Vaccine

Epidemiology and Prevention of Vaccine-Preventable Diseases

National Immunization Program
Centers for Disease Control and Prevention

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Note to presenters:

Images of vaccine-preventable diseases are available from the Immunization Action Coalition website at http://www.vaccineinformation.org/photos/index.asp

Rubella

• From Latin meaning "little red"
• Discovered in 18th century - thought to be variant of measles
• First described as distinct clinical entity in German literature
• Congenital rubella syndrome (CRS) described by Gregg in 1941

Rubella Virus

• Togavirus
• RNA virus
• One antigenic type
• Rapidly inactivated by chemical agents, ultraviolet light, low pH, and heat

Rubella Pathogenesis

• Respiratory transmission of virus
• Replication in nasopharynx and regional lymph nodes
• Viremia 5-7 days after exposure with spread to tissues
• Placenta and fetus infected during viremia

Rubella Clinical Features

• Incubation period 14 days (range 12-23 days)
• Prodrome of low-grade fever
• Maculopapular rash 14-17 days after exposure
• Lymphadenopathy in second week
Rubella Complications

<table>
<thead>
<tr>
<th>Complication</th>
<th>Adult Female</th>
<th>Children</th>
<th>Thrombocytopenic Purpura</th>
<th>Encephalitis</th>
<th>Neuritis</th>
<th>Orchitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arthralgia or arthritis</td>
<td>up to 70%</td>
<td>rare</td>
<td>1/3,000 cases</td>
<td>rare</td>
<td>rare</td>
<td>rare</td>
</tr>
</tbody>
</table>

Epidemic Rubella – United States, 1964-1965

- 12.5 million rubella cases
- 2,000 encephalitis cases
- 11,250 abortions (surgical/spontaneous)
- 2,100 neonatal deaths
- 20,000 CRS cases
  - deaf - 11,600
  - blind - 3,580
  - mentally retarded - 1,800

Congenital Rubella Syndrome

- Infection may affect all organs
- May lead to fetal death or premature delivery
- Severity of damage to fetus depends on gestational age
- Up to 85% of infants affected if infected during first trimester

Congenital Rubella Syndrome

- Deafness
- Cataracts
- Heart defects
- Microcephaly
- Mental retardation
- Bone alterations
- Liver and spleen damage

Rubella Laboratory Diagnosis

- Isolation of rubella virus from clinical specimen (e.g., nasopharynx, urine)
- Positive serologic test for rubella IgM antibody
- Significant rise in rubella IgG by any standard serologic assay (e.g., enzyme immunoassay)

Rubella Epidemiology

- Reservoir: Human
- Transmission: Respiratory
- Subclinical cases may transmit
- Temporal pattern: Peak in late winter and spring
- Communicability: 7 days before to 5-7 days after rash onset
- Infants with CRS may shed virus for a year or more
**Rubella Case Definition**

- Acute onset of generalized maculopapular rash, and
- Temperature of >99°F (37.2 °C), if measured, and
- Arthralgia or arthritis, lymphadenopathy, or conjunctivitis

**Rubella Outbreak Control Guidelines**

- Laboratory diagnosis of rubella and CRS
- Step-by-step guidelines on evaluation and management of outbreak
- Rubella prevention and control among women of childbearing age
- Rubella and CRS surveillance

*MMWR 2001;50(RR-12)*
Rubella Vaccine

Vaccine | Trade Name | Licensure
---|---|---
HPV-77:DE5 | Meruvax | 1969
HPV-77:DK12 | Rubelogen | 1969
GMK-3:RK53 | Cendevax | 1969
RA 27/3* | Meruvax II | 1979

*Only vaccine currently licensed in U.S.

Rubella Vaccine

- Composition: Live virus (RA 27/3 strain)
- Efficacy: 95% (Range, 90%-97%)
- Duration of Immunity: Lifelong
- Schedule: ≥1 Dose
- Should be administered with measles and mumps as MMR or with measles, mumps and varicella as MMRV

Rubella Vaccine (MMR) Indications

- All infants >12 months of age
- Susceptible adolescents and adults without documented evidence of rubella immunity
- Emphasis on nonpregnant women of childbearing age, particularly those born outside the U.S.

Rubella Immunity

- Documentation of one dose of rubella-containing vaccine on or after the first birthday
- Serologic evidence of immunity
- Birth before 1957 (except women of childbearing age)

Rubella Immunity

- Birth before 1957 is not acceptable evidence of rubella immunity for women who might become pregnant
- Only serology or documented vaccination should be accepted

MMR Adverse Reactions

- Fever: 5%-15%
- Rash: 5%
- Joint symptoms: 25%
- Thrombocytopenia: <1/30,000 doses
- Parotitis: rare
- Deafness: rare
- Encephalopathy: <1/1,000,000 doses
Rubella Vaccine Arthropathy

- Acute arthralgia in about 25% of susceptible adult women
- Acute arthritis-like signs and symptoms occurs in about 10%
- Rare reports of chronic or persistent symptoms
- Population-based studies have not confirmed association

MMR Vaccine Contraindications and Precautions

- Severe allergic reaction to vaccine component or following a prior dose
- Pregnancy
- Immunosuppression
- Moderate or severe acute illness
- Recent blood product

Vaccination of Women of Childbearing Age

- Ask if pregnant or likely to become so in next 4 weeks
- Exclude those who say "yes"
- For others
  - explain theoretical risks
  - vaccinate

Vaccination in Pregnancy Study 1971-1989

- 321 women vaccinated
- 324 live births
- No observed CRS
- 95% confidence limits 0%-1.2%

National Immunization Program
Contact Information

- Telephone 800.CDC.INFO
- Email nipinfo@cdc.gov
- Website www.cdc.gov/nip