



MEDICAL UNIVERSITY – PLEVEN
FACULTY OF MEDICINE
**DEPARTMENT OF INFECTIOUS DISEASES, EPIDEMIOLOGY,
PARASITOLOGY AND TROPICAL MEDICINE**

Lecture № 8

**INFECTIOUS DISEASES
WITH EXANTHEMA**

**MEASLES
RUBELLA
CHICKENPOX
SCARLET FEVER**

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Measles – definition

- **Acute infectious viral disease with:**
 - ❖ **respiratory symptoms,**
 - ❖ **conjunctivitis,**
 - ❖ **specific rash,**
 - ❖ **pathognomonic enanthema – Koplik's spots.**

Measles – etiology

- Causative agent – Morbillivirus – RNA-virus, member of Paramixoviridae family, unresisting in environment, unstable on disinfectants.

Measles – epidemiology

- **Source of infection – patient.**
- **Worldwide distribution.**
- **Anthroponosis.**
- **Respiratory route of transmission.**
- **Susceptibility – high, index of contagiousness >92%.** Common in children 2 to 12 years, uncommon in age >12 years.
- Sporadic cases, epidemic outbreaks, epidemics.
- Seasonal peak – winter-spring.
- Facilitating factors – poorness, low sanitary level, refusal immunizations.

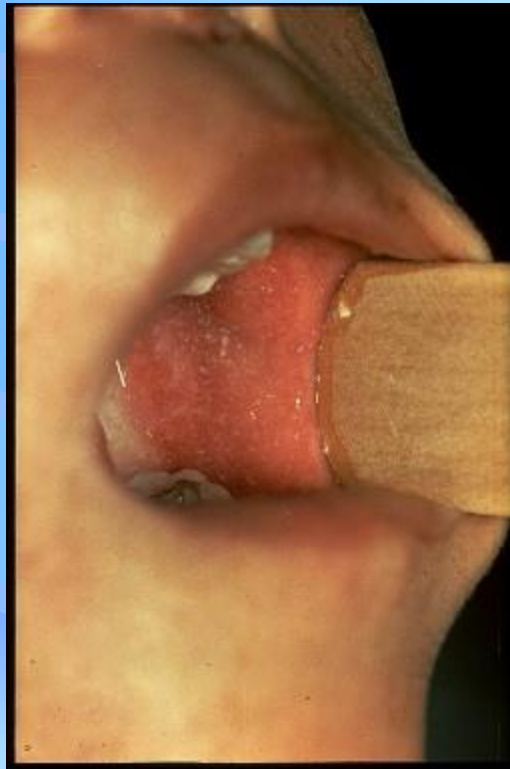
Measles – pathophysiology

- Portal of entry – mucosa of upper respiratory tract and conjunctivas, followed by:
- ❖ Primary viremia → lymph nodes – virus multiplies during the incubation period → secondary viremia → dissemination of virus to the epithelial cells of the skin and mucosa.
- Visceral involvement are immune mediated.

Measles – clinical manifestations

- **Incubation period** – 9-14 (up to 21) days.
- **Catarrhal stage** – acute onset by fever, dry cough, runny nose, sneezing, conjunctivitis, eventually photophobia. In the end of this stage **Koplik's spots** appear (1-2 days before appearing of rash and disappear 1-2 days after appearing of rash).

Measles – Koplik's spots



Measles – clinical manifestations

- **Exanthematic stage:**
- Maculo-papulous rash
- Appears first behind the ears, descendent spreading.
- Confluent
- Without itching.
- **Convalescent stage** – rash fades by brownish pigmentation.

Measles – rash



Measles – face



Measles – rash



Measles – clinical forms

- **Typical**
 - ❖ Mild
 - ❖ Moderate
 - ❖ Severe
- **Atypical**
 - ❖ Abortive
 - ❖ Measles in adults
 - ❖ Measles in pregnant women
 - ❖ Measles in immunocompromised.

Measles – complications

- **Respiratory** – subchordal laryngitis, pneumonia (primary – by morbillivirus, secondary – bacterial superinfection).
- Gastrointestinal – gastroenteritis, hepatitis.
- **Neurological** – aseptical meningitis, encephalitis, subacute sclerozing panencephalitis – to 15 years after acute disease.

Measles – laboratory findings

- Blood cells – leucopenia with neutropenia, lymphocytosis, monocytosis.
- If bacterial superinfection appears – leucocytosis with neutrophilia and left shift.
- Erythrocytes' sedimentation rate (ESR) – normal.

Measles – diagnosis

- **Clinically-epidemiological.**
- **Serological** – establishment of specific IgM antibodies in serum sample taken 2-3 days after appearing of rash – by ELISA.

Measles – management and treatment

- **Without etiologic treatment.**
- **Supportive treatment** – infusions of fluids (Glucosa 5%, Serum glucosae 5%), oxygenation.
- **Symptomatic** – expectorants, antipyretics
- **Vitamins** – B2, B6, C.
- **Treatment of complications.**

Measles – prophylaxis

- **Specific** – three vaccine (MMR) – in age of 13 months and 12 years.
- **Non specific** – gamma-globulin – to 6th day after contact!!!
- Isolation of the patient – 5 days; observation of contact people 14 days, after gamma-globulin – 21 days.

Rubella – definition

- **Acute infectious viral disease with:**
 - ❖ **specific rash,**
 - ❖ **enlarged sub-occipital lymph nodes**
 - ❖ **mild systemic manifestations.**

Rubella – etiology

- Causative agent – RNA-virus, member of Togaviridae family, unresisting in environment, unstable on disinfectants.

Rubella – epidemiology

- **Source of infection – patient**, including unapparent form.
- **Route of transmission – respiratory, vertical (trans-placental).**
- **The patient is contagious 3-4 days before and to 5 days after appearing of rash.**
- **Child with congenital rubella sheds virus to two years after birth.**
- **Susceptibility – high.**
- **Index of contagiousness – moderate.**

Rubella – pathophysiology

- Portal of entry – mucosa of upper respiratory tract and conjunctivas followed by:
- ❖ Primary viremia → lymph nodes – virus multiplies during the incubation period → secondary viremia → dissemination of virus to the epithelial cells of the skin, kidneys, joints, placenta, respiratory tract..
- Visceral involvement are immune mediated.

Rubella – clinical manifestations

- **Incubation period** – 14 days (12 to 23 days).
- Non obligate prodroms – low-grade fever, runny nose, cough, conjunctivitis, weakness.
- **Enlarged sub-occipital lymph nodes (symptom of Teodor)**
- **Rash** – maculo-papulous, appears behind the ears with descendent spreading; without itching, pigmentation desquamation.
- **Mild systemic manifestations** – mild to moderate fever, mild catarrhal symptoms.

Rubella – rash



Rubella – rash



Rubella – laboratory findings

- Blood cells – leucopenia with neutropenia, lymphocytosis, monocytosis, plasmocytosis. In mild forms – normal.

Rubella – complications

- **Arthritis.**
- **Central nervous system** – brain edema, aseptic meningitis, encephalitis.
- **Hemorrhagic syndrome** – due to autoimmune thrombocytopenic purpura.
- **Congenital-rubella syndrome** – depends of the term of pregnancy – anencephaly, microcephaly, cardiac abnormalities (trilogy or tetralogy of Phallot), deafness, blindness due to congenital cataract, retardation in growth due to long-bones' defects, thrombocytopenia, congenital diabetes, hepatosplenomegaly, low-birth weight.

Rubella – thrombocytopenic purpura



Rubella – congenital cataract



Rubella – diagnosis

- **Clinically-epidemiological** – symptom of Teodor, specific rash, contact.
- **Serological** – establishment of specific IgM antibodies in serum sample or rising of titer of specific antibodies in second serum sample taken 2 weeks after first sample– by ELISA.

Rubella – management and treatment

- **Without etiologic treatment.**
- **Supportive treatment** – infusions of fluids (Glucosa 5%, Serum glucosae 5%), oxygenation.
- **Symptomatic** – expectorants, antipyretics
- **Vitamins** – B2, B6, C.
- **Treatment of complications.**

Rubella – prophylaxis

- **Specific** – three vaccine (MMR) – in age of 13 months and 12 years.
- **Non specific** – gamma-globulin – to 6th day after contact!!!
- Isolation of the patient – 5 days; observation of contact people 12 days, after gamma-globulin – 21 days.

Chickenpox (varicella) – definition

- **Acute infectious viral disease with:**
 - ❖ **fever,**
 - ❖ **specific vesiculous pruritic rash.**

Chickenpox (varicella) – etiology

- Causative agent – DNA virus, member of Herpesviridae family. Pathogen for human and simian.

Chickenpox (varicella) – epidemiology

- Source of infection – patient. Without carrier!!!
- Worldwide distributed.
- Respiratory route of transmission; seldom by direct contact with vesicles' fluid; vertically during the pregnancy.
- Susceptibility – extremely high; index of contagiousness – up to 100%!!!
- Most frequent – in children age to 10 years.
- Life-long immunity!!!

Chickenpox (varicella) – pathophysiology

- Portal of entry – mucosa of upper respiratory tract – initial multiplying → blood – primary viremia → liver, spleen – major multiplying → blood – secondary viremia → to the skin – evolution of rash.

Chickenpox (varicella) – clinical manifestations

- Incubation period – most frequent 14 days (11 to 22 days).
- Acute onset with fever.
- In children immediately follows rash.
- In adolescents and adults – prodroms – headache, weakness, soar throat.
- Rash – begins on the face and quickly generalizes. More rash units on the trunk and face, less – on the extremities.
Evolution – macula → papule → vesicle → (pustule) → crust. More than one rash wave possible.

Chickenpox – vesicle



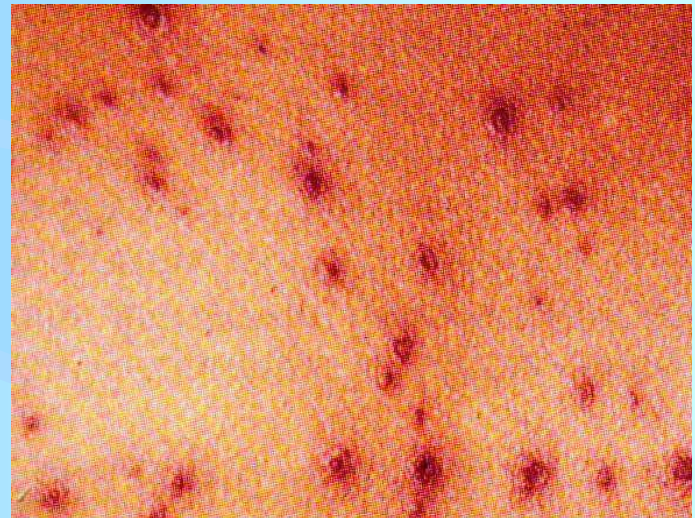
Chickenpox – polymorph rash



Chickenpox – rash



Chickenpox – polymorph rash



Chickenpox – rash



Smallpox



Chickenpox (varicella) – clinical forms

- According to severity – mild, moderate, severe.
- Severe forms are:
 - ❖ Pustulous varicella
 - ❖ Bullous varicella
 - ❖ Hemorrhagic varicella
 - ❖ Gangrenous varicella
 - ❖ Varicella in immuno-compromised
 - ❖ Progressive varicella – with visceral involvement.

Chickenpox (varicella) – laboratory findings

- Blood cells – leucopenia with neutropenia, lymphocytosis, monocytosis. If pustules appear – leucocytosis with neutrophilia and left shift.
- Erythrocytes' sedimentation rate – normal, in secondary bacterial infection – increased.

Chickenpox (varicella) – complications

- Secondary bacterial infection on the skin – **pustulization.**
- **Carditis**
- **Pneumonia** (**primary** – varicella-virus – symptoms appear early, severe course with acute respiratory failure; **secondary** – bacterial – symptoms appear later)
- **Encephalitis** – severe course
- **Cerebellitis** – affects cerebellum – ataxia and tremor; benign prognosis.

Chickenpox (varicella) – management and treatment

- Etiologic – acyclovir 5 to 7 days; dose: mild forms – 10 mg/kg/24 h per orally, moderate forms – 20 mg/kg/24 h per orally or intra-venously, severe forms – 30 mg/kg/24 h intra-venously.
- Symptomatic – antipyretics, antiseptic powder with menthol and anesthesin.
Without menthol spiritus!!!
- Vitamins – B2, B6, C.

Chickenpox (varicella) – prophylaxis

- Specific – live vaccine – USA, Germany, Austria, Canada, Italy, Israel, Swiss etc.
- Non specific – gamma-globulin – to 72nd hour after contact. Effectiveness is not sure. Incubation period prolongs to 28 days.
- Isolation of patient – to spontaneously removing of more of crusts.

Scarlet fever – definition

- **Acute infectious bacterial disease (one of forms of streptococcal infection) with:**
 - ❖ **fever**
 - ❖ **tonsillitis**
 - ❖ **specific erythematous rash,**
 - ❖ **desquamation.**

Scarlet fever – etiology

- Causative agent – **β -hemolytic streptococcus group A – *Streptococcus pyogenes*. Gram (+).**

Scarlet fever – epidemiology

- **Source of infection – patient** (to 10 days, seldom to 40 days); carrier (to 70 days).
- Epidemiological significance – mild and abortive (without rash) forms.
- **Route of transmission – respiratory.**
- **Index of contagiousness – 20-40%.** Common in children in age 2 to 10 years.

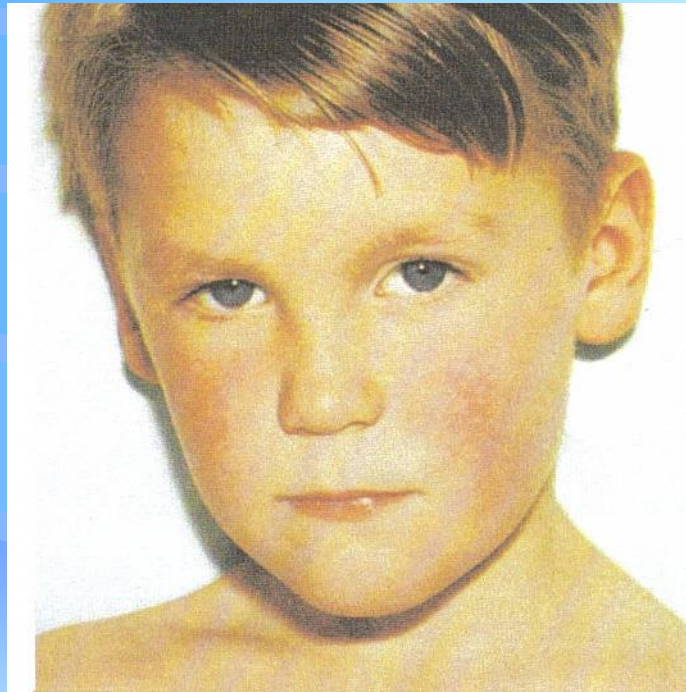
Scarlet fever – pathophysiology

- Portal of entry – mucosa of the throat. In extra-buccal scarlet fever – abraded skin.
- The agent is on the portal of entry where multiplies, causes inflammation and produces toxins and enzymes that influent into the circulation.
- Pyrogenic toxins A, B and C causes fever, damage of the vessels' walls, specific rash and hepatic and myocardial involvement.
- Immune processes – forming of antibodies against concrete tissues (kidneys, heart, joints). Appear immune complexes including streptococcal antigens and anti-streptococcal antibodies that cause immune-allergic complications.

Scarlet fever – clinical manifestations

1. **Incubation period** – 3-6 days (2 to 12 days).
2. **Acute onset** with fever, pain in the throat, vomiting.
 - **Scarlatinous face** – intensive red cheeks, pale perioral triangle.
 - **Intensive red throat.**
 - The tongue is whitely coated with prominent taste papilla and red margins – **“strawberry tongue”**.

Scarlet fever – face



Scarlet fever – “strawberry tongue”



Scarlet fever – clinical manifestations

3. **Rash** – appears 12 to 48 hours after increasing of the temperature.

- **Erythematous pseudo-confluent rash.**
- Dry, rough, goose-flesh skin.
- Syndrome of capillary-toxicosis:
 - ❖ Symptom of Hecht – after pinching on the chest petechia appear.
 - ❖ Symptom of Pastia – linearly located petechia in axils, elbows and inguinal regions.
 - ❖ Symptom of Rumpel-Leede – after measuring of blood pressure on the place of pressure petechia appear.

Scarlet fever – rash



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Scarlet fever – rash



Scarlet fever – rash



Scarlet fever – desquamation of the rash



Scarlet fever – clinical manifestations

4. Other symptoms:

- Tachycardia
- Hepatomegaly
- Seldom mild jaundice
- Mildly enlargement of cervical lymph nodes is possible.
- **“Raspberry tongue” – in 3-4th days the coat disappear and the tongue becomes intensive red with prominent taste papilla.**

5. After 5-7 days the temperature normalizes, the rash disappears, the tongue and throat normalize.

6. **After 7-8 days desquamation of the skin appears.**

Scarlet fever – “red berry tongue”



Scarlet fever – laboratory findings

- Blood cells:
 - ❖ leucocytosis;
 - ❖ neutrophilia with left shift, lymphopenia;
 - ❖ after 3rd day – marked eosinophilia.
- Moderately increased erythrocytes' sedimentation rate.
- Slightly elevated serum bilirubin and aminotranspherases' levels; eventually elevated urea and creatinine' levels.
- In urine – proteinuria, in sediment – erythrocytes, leucocytes, casts.

Scarlet fever – clinical forms

1. According to severity:

- mild,
- moderate,
- severe – toxic and septic.

2. According to portal of entry:

- bucal,
- extrabucal.

Scarlet fever – complications

1. Early:

- Peritonsillar abscess
- Bacterial regional lymphadenitis
- Phlegmon of the mouth
- Bacterial otitis
- Sinuitis
- Mastoiditis
- Bacterial meningitis
- Bacterial pneumonia
- Interstitial nephritis
- Septic arthritis
- Toxic hepatitis
- Myocarditis
- Brain edema with encephalopathy.

Scarlet fever – complications

2. Late – after 10th day:

- Acute scarlatinous glomerulonephritis.
- Acute scarlatinous myocarditis.
- Acute scarlatinous sinovitis (rheumatoid).

Scarlet fever – diagnosis

- **Clinically-epidemiological.**
- **Microbiological** – pharyngeal swab → culture and isolation of β -hemolytic streptococci on media.

Scarlet fever – management and treatment

- **Etiologic:** antibiotic of choice – penicillin G per orally 5 to 10 days. In more severe cases – intravenously.
- Alternative – macrolides, trimetoprim/sulphamethoxazol.
- In allergy or lack of effect – cephalosporin 3rd generation (Ceftriaxon).
- **Supportive:** infusions of glucose and saline fluids, vitamins – B2, B6, C.
- **Symptomatic** – antipyretics.

Scarlet fever – prophylaxis

- There is not specific prophylaxis.
- **Isolation of patient – 10 days.**
- **Observation of contacts – 12 days.**

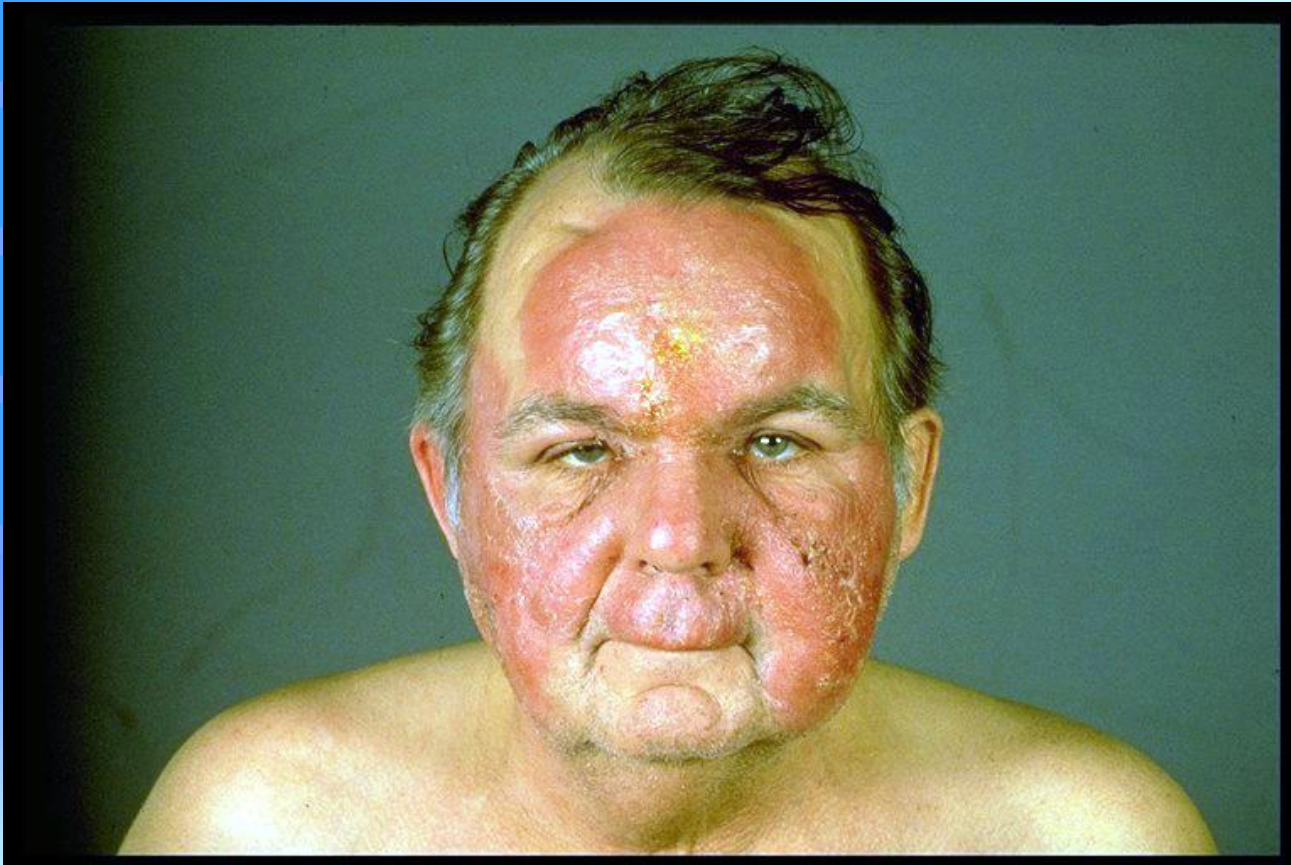
Erysipelas – other form of streptococcal infection

- **Causative agent – β -hemolytic streptococcus group A – Streptococcus pyogenes. Gram (+).**

Erysipelas



Erysipelas



Erysipelas



Erysipelas



Erysipelas



Elephantiasis



**THANK YOU
FOR ATTENTION !**