



EXANTHEMATOUS INFECTIOUS DISEASES IN PEDIATRICS

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EXANTHEMATOUS DISEASES

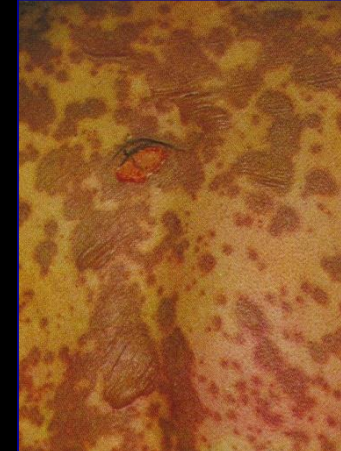
INFECTION

RASH

NON-INFECTIOUS



Measles



Drug reaction

Recognition of infectious rash is very important for the patient, those who have been in contact with the patient, and public health.

IMPORTANT ISSUES IN THE DIAGNOSIS OF INFECTION RELATED EXANTHEMATOUS DISEASES

1. **Exposure:** Have you been in contact with a patient with a rash in the last 1-2 weeks in the history?
2. **Previous rash disease:** Have you been a rash disease in the past?
3. **Vaccination history**
4. **The presence and features of the prodromal period**
5. **Characteristics of the rash:** Onset site, maculopapular or maculopapular...
6. **Presence of pathognomonic findings**
7. **Diagnostic laboratory tests:** Measles IgM and IgG

DISEASES THAT CAUSE MACULOPAPULAR RASH

Measles

Rubella

Scarlet fever

Roseola infantum

Erythema infectiosum



Staphylococcal toxic shock syndrome

Typhus

Meningococccemia

Toxoplasmosis

Cytomegalovirus infection

Infectious mononucleosis

Enteroviral infections

Toxic erythema

Drug rashes

Kawasaki disease

DISEASES THAT CAUSE PAPULOVESICULAR RASH

Chickenpox



Smallpox

Monkeypox

Eczema herpeticum

Eczema vaccinatum

Coxsackie virus infections

Rickettsial pox

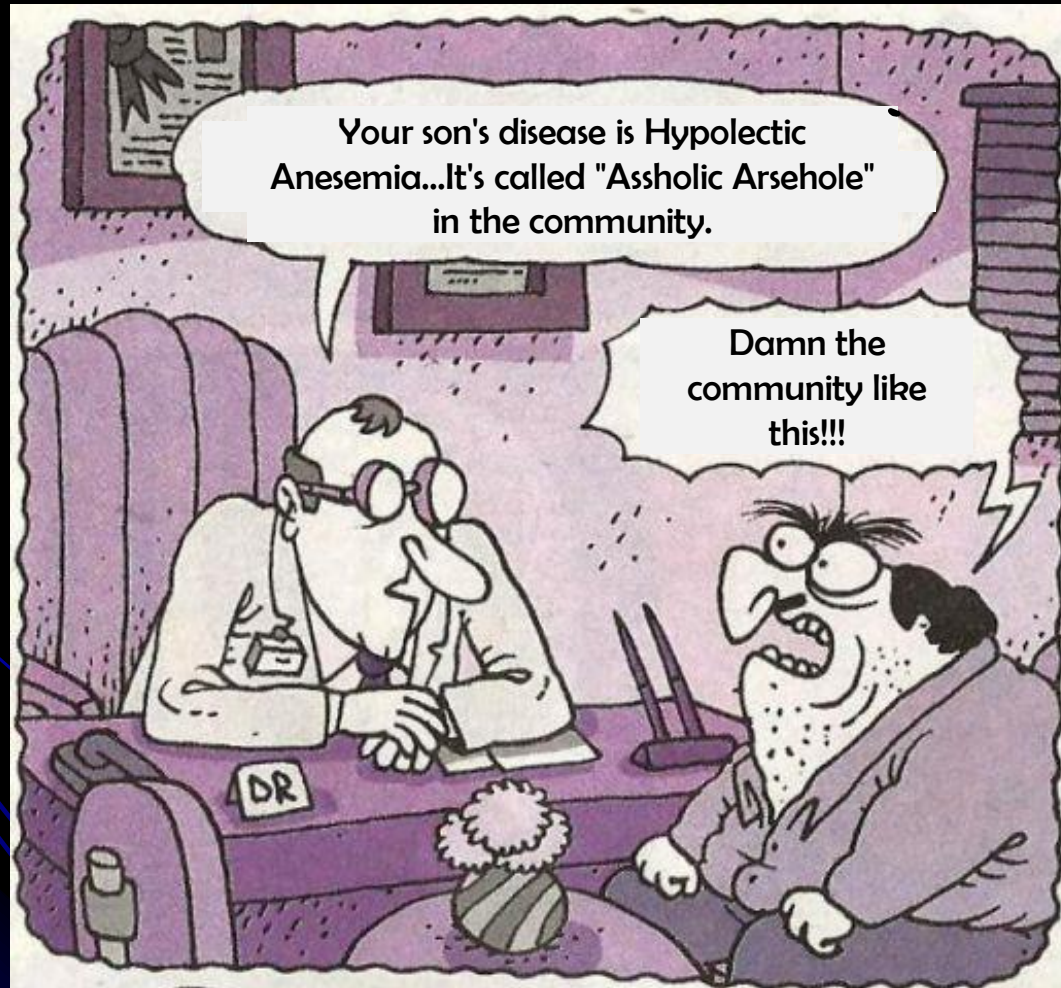
Impetigo

Insect bite

Dermatitis herpetiformis

EXANTHEMATOUS DISEASES

To be able to Tell in the Community's Language...



HISTORICAL NOMINATION OF INFECTIOUS DISEASES WITH MACULOPAPULAR RASH

- ❑ Six separate childhood exanthems were defined in the late 19th, early part of the 20th Century. These were named in the order they were discovered and are outlined.
- ❑ The term fourth disease or Filatov-Dukes disease is thought to be a variant of scarlet fever and is no longer used.

<i>Number</i>	<i>Disease</i>
<i>First</i>	Measles (Rubeola)
<i>Second</i>	Scarlet fever
<i>Third</i>	Rubella (German measles)
<i>Forth</i>	Filatov-Dukes disease
<i>Fifth</i>	Erythema infectiosum
<i>Sixth</i>	Roseola infantum, Exanthem subitum

MEASLES

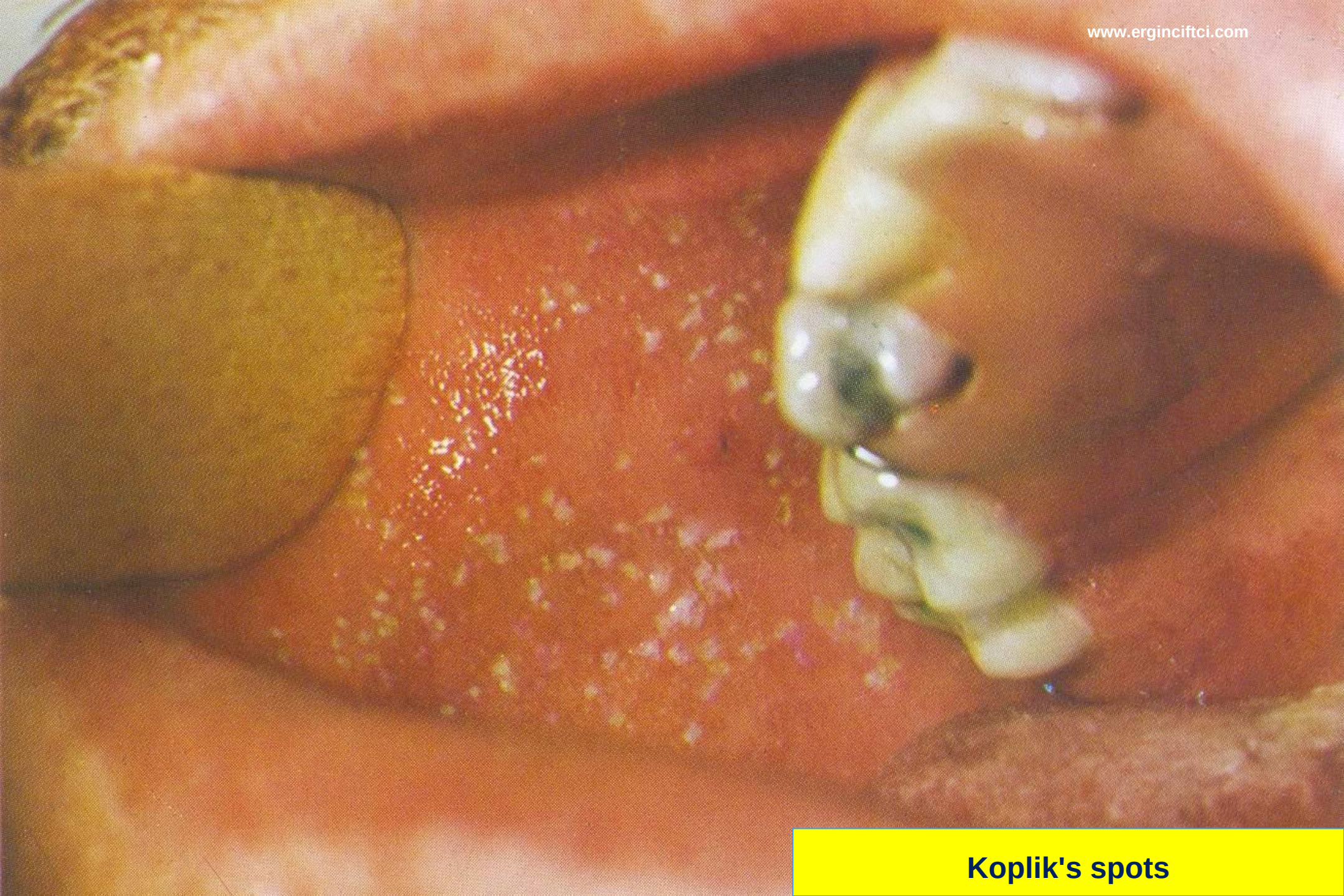
CAUSATIVE AGENT	It is an RNA virus of the Paramyxoviridea family
COMMON AGE	<15 Years
TRANSMISSION	Droplets (Virus uses CD150 and PVRL4 receptors)
INCUBATION PERIOD	8-12 days
PRODROME	Fever, dry cough, rhinorrhea, conjunctivitis, photophobia, Koplik spots



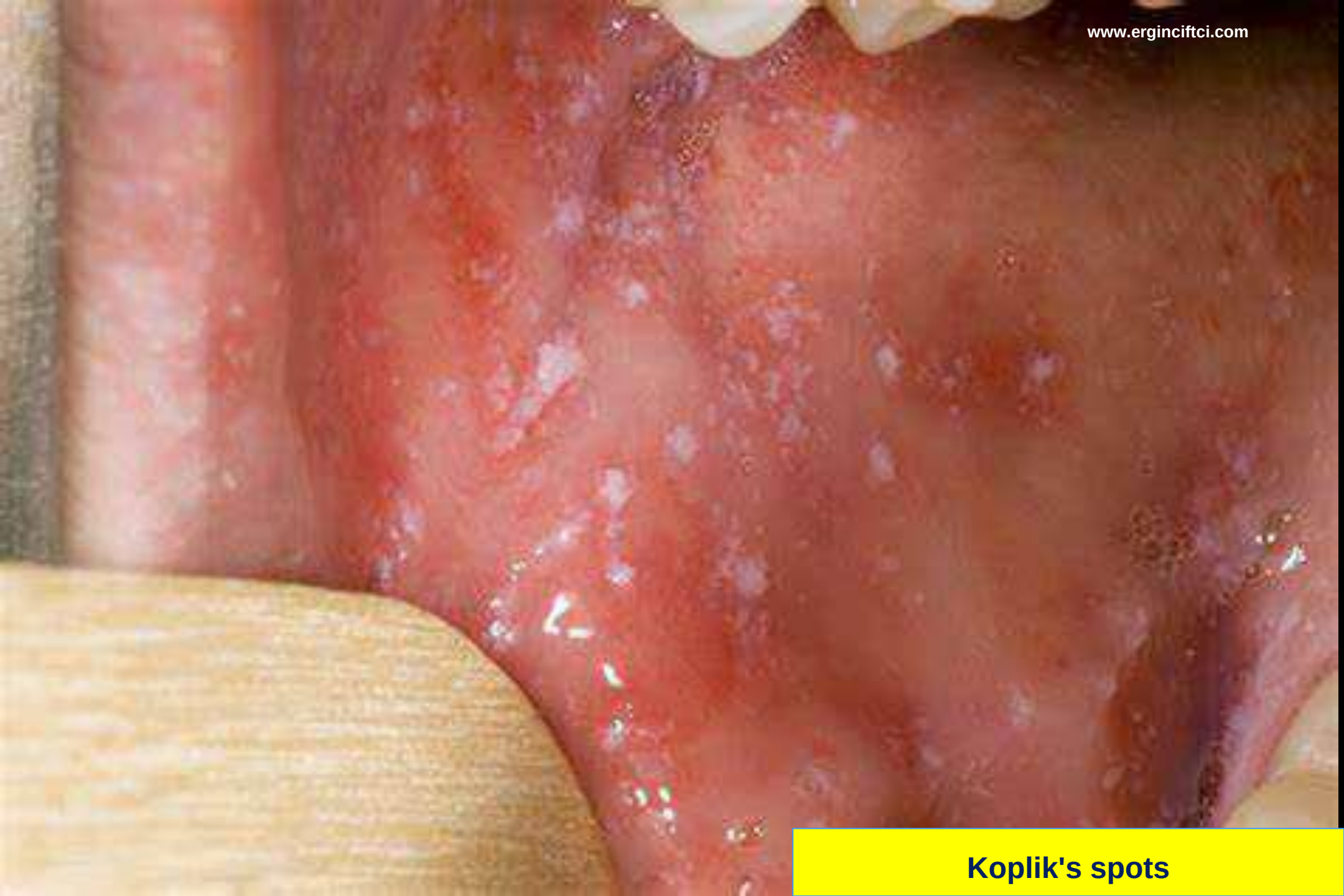
Conjunctivitis



Photophobia



Koplik's spots



Koplik's spots

MEASLES

RASH

Begins on forehead, hairline, behind ears, upper neck.

Spreads to face, neck, trunk and extremities.

It has spread to the whole body on the third day.

Lesions may merge with each other, except those on the extremities.

It fades in the same order it started.

Mild desquamation is seen as it fades.

Leaves brownish pigmentation in place.

Rashes on hands and feet do not desquam.

FIRST DAY

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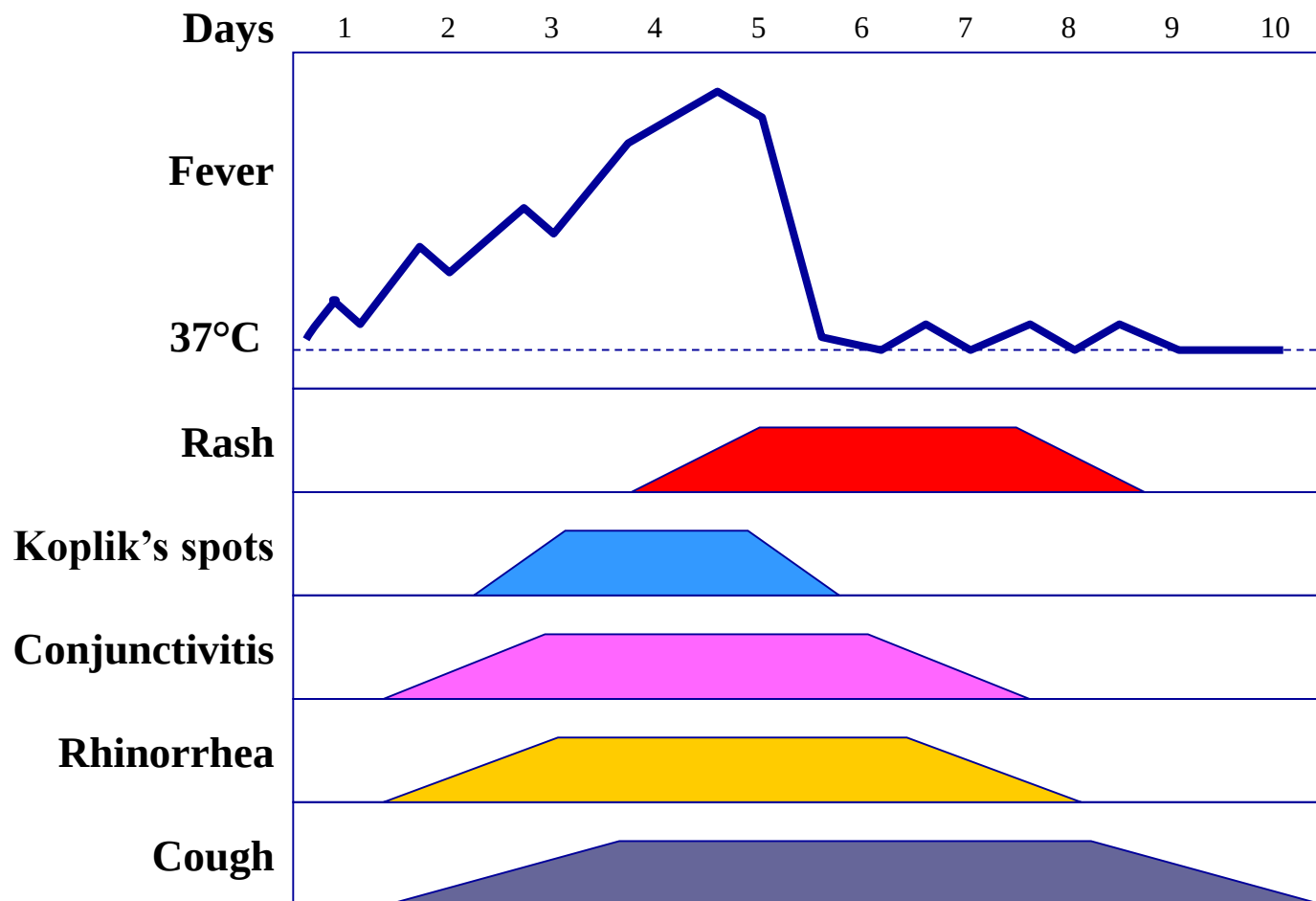
SECOND DAY



THIRD DAY



MEASLES



MEASLES

Complications

- ❑ Otitis media
- ❑ Pneumonia
- ❑ Croup
- ❑ Tracheitis
- ❑ Bronchiolitis obliterans
- ❑ Diarrhea
- ❑ Encephalitis (1-3/1000)
- ❑ Subacute sclerosing panencephalitis (SSPE) (1/100.000)

MEASLES

Current Status

Kızamık 2018'de 142 bin can aldı (En fazla ölüm; aşılanmayan 5 yaş altı çocuklarda)

Dünya Sağlık Örgütü tarafından açıklanan rakamlara göre 2018 yılında kızamıktan ölenlerin sayısı 142 bin kişi. Dünya Sağlık Örgütü, kızamıktan ölenlerin çoğunun aşılanmayan beş yaş altı çocuklar olduğunu açıkladı.

ntv.com.tr 06.12.2019 - 11:29



Türkiye'de 2019'un ilk 8 ayında 2 bin 391 kızamık olgusu bildirildi

Kızamık vaka sayısının dünya çapında 2018 yılına oranla üç kat arttığını açıklayan Dünya Sağlık Örgütü küresel kızamık salgını uyarısı yaptı. Kızamığın, yılda 89.780 kişinin ölümünden sorumlu olduğunu belirten Dr. Özden Türel, bu durumun en önemli nedeninin hızla artan aşı karışıklığı olduğunu söyledi. Türkiye'de 2019'un ilk 8 ayında 2.391 kızamık olgusu bildirildiğini söyleyen Dr. Okan Derin, "Kızamık da diğer aşı ile korunulabilen hastalıklar gibi toplumun zayıf düşmesini bekleyen sinsî bir düşman gibi kapımızda" dedi

04 Eylül 2019

NTV

TÜLAY KARABAĞ



MEASLES

INFECTIOUS PERIOD	Begins 3 days before rash Lasts up to 4-6 days of rash
PREVENTION	Active immunization: Live measles vaccine MMR at 9th, 12th months and 48th months Protective if given within the first 72 hours after contact Passive immunization: Immunglobuline IMIG Protective if given within the first 6 days of exposure Pregnants, immunocompromised 0.25 mL/kg (for immunocompromised (0.5 mL/kg) up to 15 mL IVIG 400 mg/kg
TREATMENT	Supportive (Paracetamol or Ibuprofen) Vitamine A ≥12 months 200 000 U/day 6-11 months 100 000 U/day <6 months 50 000 U/day 2 days If there is evidence of vitamin A deficiency, a third dose is given after 2-4 weeks.

SCARLET FEVER

CAUSATIVE AGENT	Group A beta-hemolytic streptococcus (<i>Streptococcus pyogenes</i>)
COMMON AGE	5-15 Years
TRANSMISSION	Droplets, foods
INCUBATION PERIOD	1-7 days (average 2-4 days)
PRODROME	High fever, sore throat, abdominal pain, vomiting

SCARLET FEVER

RASH

ENANTHEMA

Tonsils: Hyperemic, hypertrophic, exuding

Pharynx: Edema, hyperemic

Tongue: Strawberry tongue (white and red)

Soft palate: Petechiae

EXANTHEMA

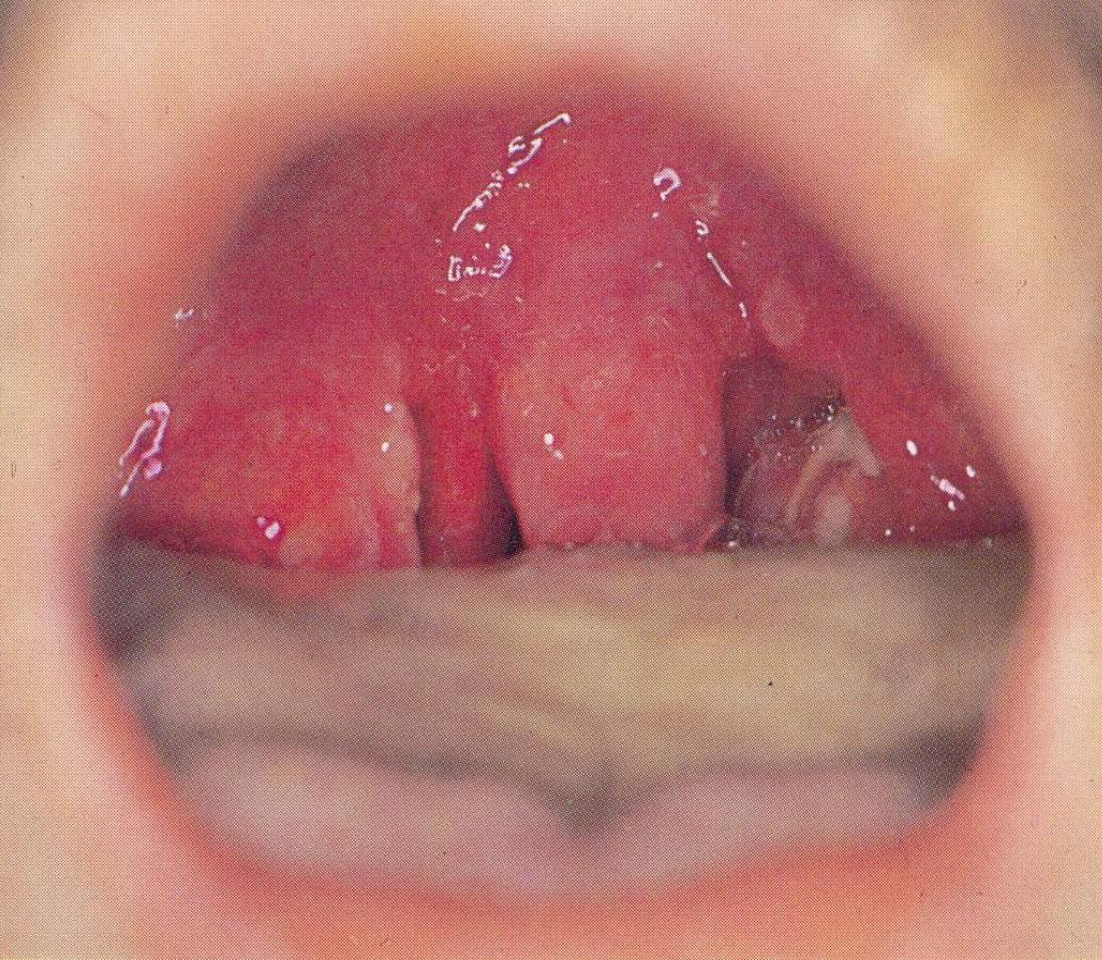
Macular rash with small papules

Goose skin or Sandpaper-like appearance

Peroral pallor

Pastia lines

Healing with desquamation



Pharyngitis, palatal petechiae

Pharyngitis, exudative tonsillitis





White strawberry tongue

Red strawberry tongue





Circumoral pallor

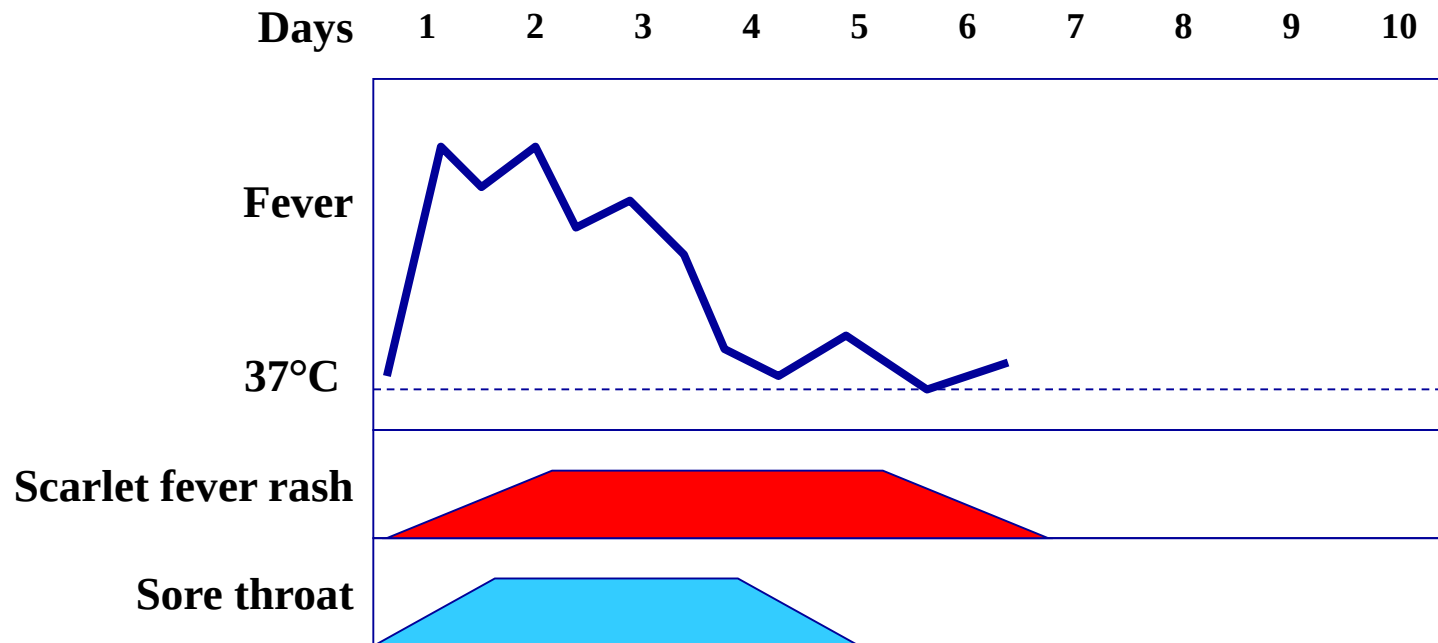
Goose skin or Sandpaper-like rash



Pastia's lines



Desquamation



SCARLET FEVER

Complications

EARLY PERIOD

- ☐ Cervical lymphadenitis
- ☐ Peritonsillar abscess
- ☐ Retropharyngeal abscess
- ☐ Acute otitis media
- ☐ Acute sinusitis
- ☐ Bronchopneumonia
- ☐ Meningitis
- ☐ Brain abscess
- ☐ Septic arthritis
- ☐ Osteomyelitis
- ☐ Endocarditis
- ☐ Cellulitis
- ☐ Necrotizing fasciitis
- ☐ Bacteremia
- ☐ Streptococcal toxic shock syndrome

LATE PERIOD

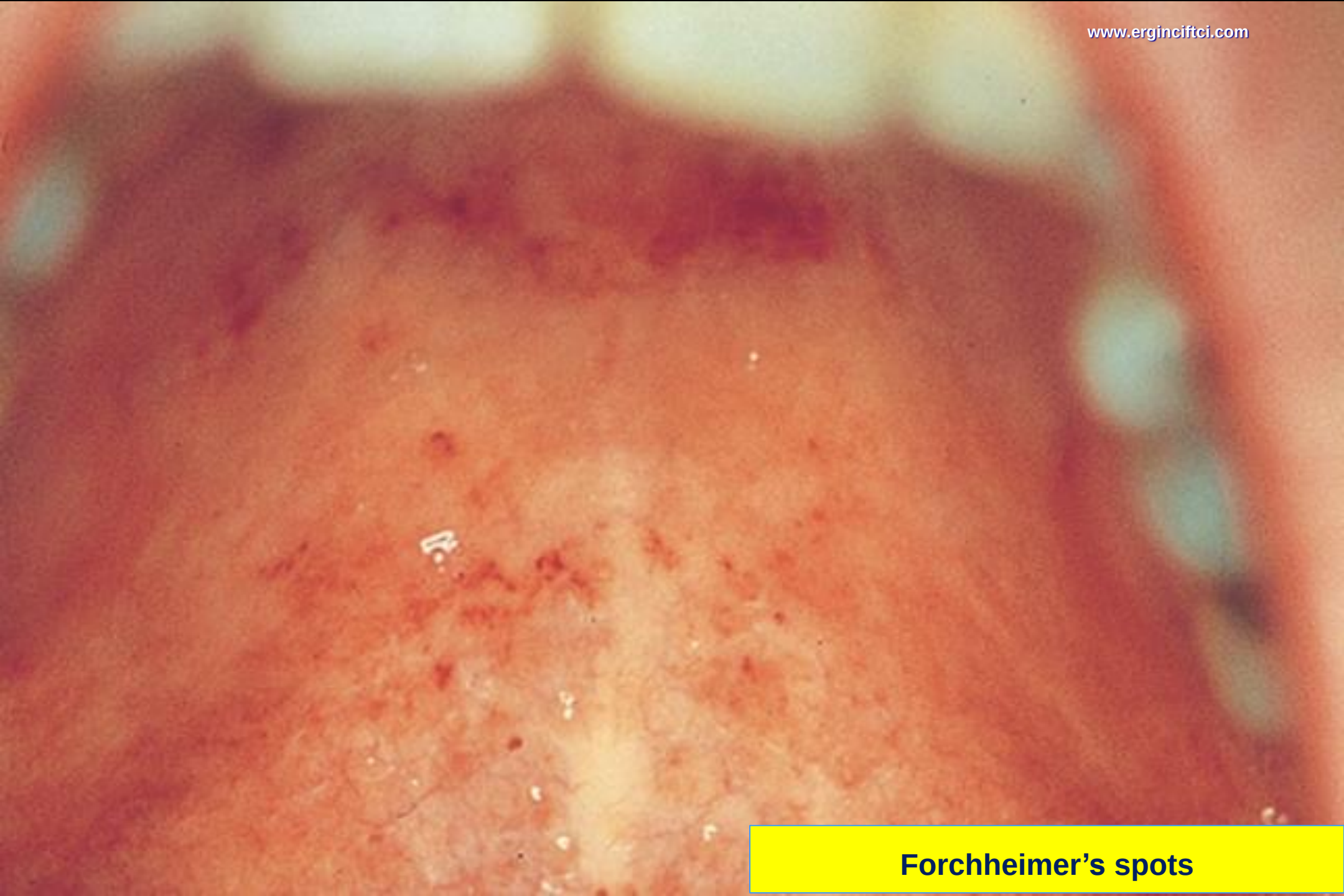
- ☐ Acute rheumatic fever
- ☐ Poststreptococcal reactive arthritis
- ☐ Poststreptococcal glomerulonephritis
- ☐ PANDAS
(Pediatric Autoimmune Neuropsychiatric Disorders
Associated with Streptococcal Infections)

SCARLET FEVER

DIAGNOSIS	Clinical findings Rapid strep A antigen test Throat culture																								
INFECTIOUS PERIOD	Highest during acute infection. It then subsides and lasts for weeks. With appropriate antibiotic treatment, not contagious after 24 hrs																								
TREATMENT	<table><tr><th>Antibiotic</th><th>Dose</th><th>Daily dose</th><th>Route</th><th>Duration</th></tr><tr><td>Benzathine penicillin G</td><td>600 000 U (≤27 Kg) 1 200 000 U (>27 Kg)</td><td>1</td><td>IM</td><td>Once</td></tr><tr><td>Penicillin V</td><td>250 mg (400 000 U)/dose (≤27 Kg) 500 mg (800 000 U) /dose (>27 Kg)</td><td>2-3</td><td>Oral</td><td>10 days</td></tr><tr><td>Amoxicillin</td><td>50 mg/kg/dose (max 1000 mg/dose) 25 mg/kg/dose (max 500 mg/dose)</td><td>1 2</td><td>Oral</td><td>10 days</td></tr></table>					Antibiotic	Dose	Daily dose	Route	Duration	Benzathine penicillin G	600 000 U (≤27 Kg) 1 200 000 U (>27 Kg)	1	IM	Once	Penicillin V	250 mg (400 000 U)/dose (≤27 Kg) 500 mg (800 000 U) /dose (>27 Kg)	2-3	Oral	10 days	Amoxicillin	50 mg/kg/dose (max 1000 mg/dose) 25 mg/kg/dose (max 500 mg/dose)	1 2	Oral	10 days
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RUBELLA

CAUSATIVE AGENT	It is an RNA virus from the Togaviridae family.
COMMON AGE	5-14 Years
TRANSMISSION	<i>Postnatal rubella</i> transmitted by droplets <i>Congenital rubella</i> transmitted transplacentally
INCUBATION PERIOD	14-21 days
PRODROME	Often, a prodromal period cannot be noticed Rarely, 1-5 days of prodrome symptoms may be present. Mild fever, headache, malaise, mild rhinorrhea and conjunctivitis without photophobia Lymphadenopathies may be noticed at least 24 hours before the rash Retroauricular, suboccipital, and posterior cervical LAP Pink enanthemas (Forchheimer's spots) can be on the soft palate



Forchheimer's spots



Suboccipital lymph nodes



Posterior auricular lymph nodes

FIG 1. Photograph of a 2-year-old boy with rubella showing bilateral suboccipital lymph nodes and a maculopapular rash on the back. One of the lymph nodes is indicated by a white arrow

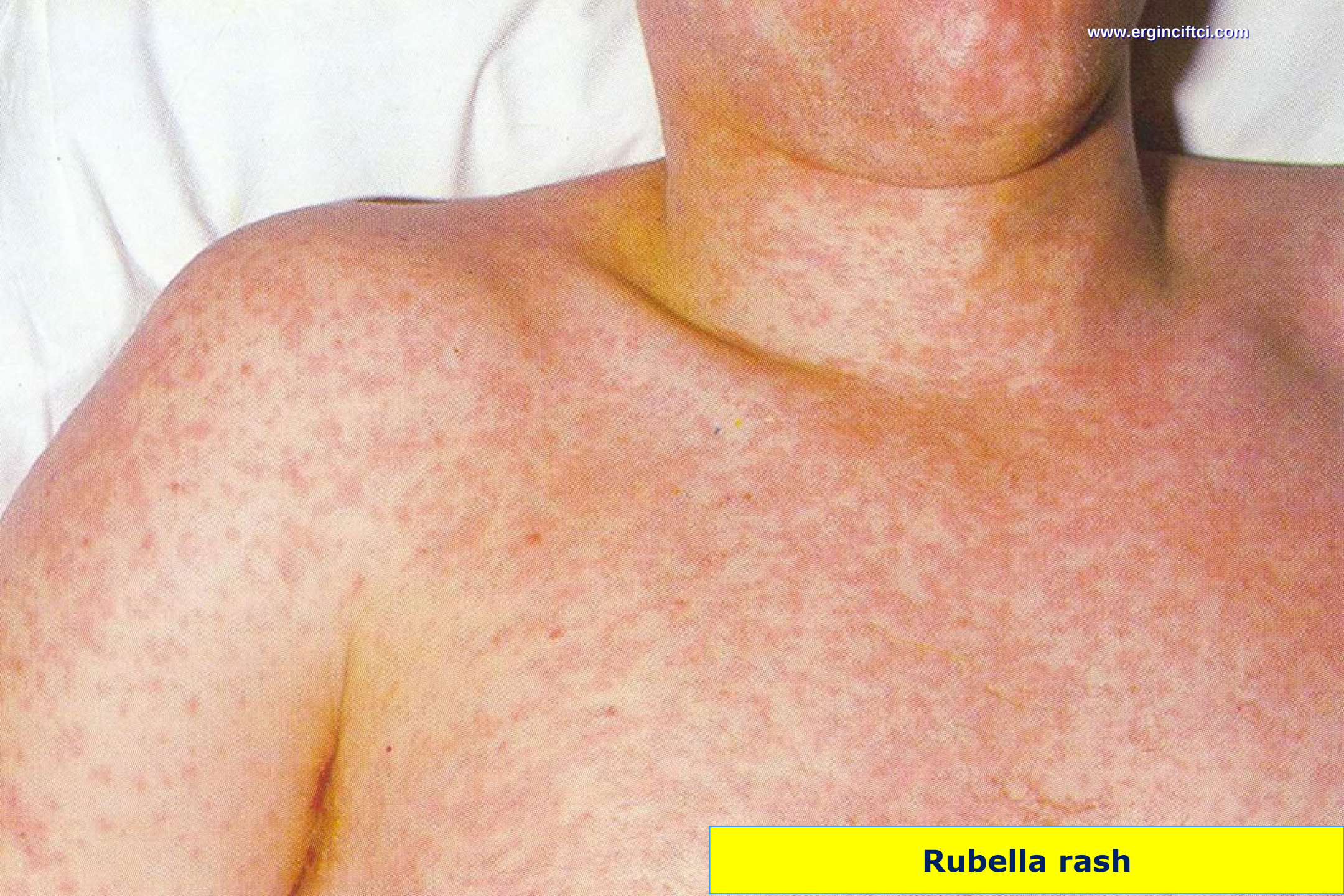
RUBELLA

RASH

The rash starts from the face area.
However, while rash appear on the trunk,
the facial lesions disappears.
Maculopapular rash spread all over the body in 24 hours.
The rash resembles a scarlet rash on the second day,
especially on the trunk.
On the third day, the rash completely disappear.
Usually, there is no high fever.

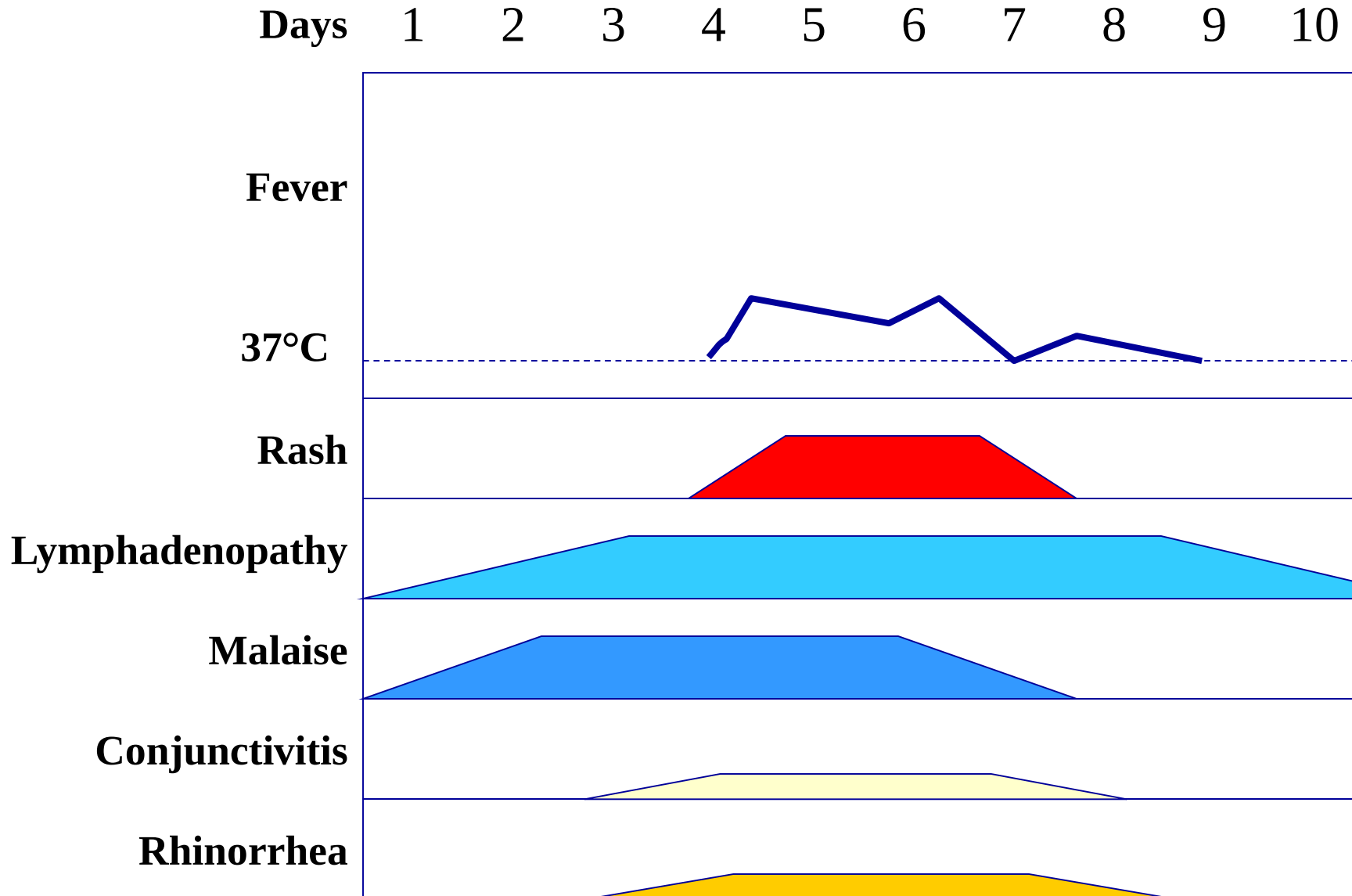


Rubella rash



Rubella rash

RUBELLA



RUBELLA

Complications

- ❑ Encephalitis (1/6000)
- ❑ Thrombocytopenia
- ❑ Arthralgia, arthritis
- ❑ Progressive rubella panencephalitis
- ❑ **Congenital rubella syndrome**

RUBELLA

Congenital Rubella Syndrome

The period of pregnancy is important

Infection in the first trimester increases the fetal damage

The first trimester

70%

In the first 11 weeks

90%

At the end of the first trimester

10-20%

At 17th week

Risk is very small

RUBELLA

Congenital Rubella Syndrome

- ❑ Intrauterine growth retardation (IUGR)
- ❑ Cataract
- ❑ Microphthalmia
- ❑ Congenital heart disease (PDA, pulmonary stenosis)
- ❑ Myocarditis
- ❑ Sensorineural deafness
- ❑ Meningoencephalitis
- ❑ Skin lesions (Blueberry muffins)
- ❑ Pneumonia
- ❑ Hepatitis
- ❑ Anemia
- ❑ Thrombocytopenia
- ❑ Bone lesions (Celery stalk)
- ❑ Mental and motor retardation

RUBELLA



Cataract

RUBELLA



Blueberry muffins

RUBELLA



Celery stalk

RUBELLA

Diagnosis

Pregnant

Rubella IgM and IgG

Prenatal

Virus culture (Amnion fluid)

Rubella IgM (Cordon blood)

Postnatal

Rubella IgM

Virus culture (Throat swabs, urine, tissue)

Treatment

None

Prevention

Pre-pregnancy vaccine

At least 1 month should be waited for pregnancy
after vaccination.

RUBELLA

INFECTIOUS PERIOD	<i>Postnatal rubella</i> Begins 7 days before rash Lasts up to 7 days after the rash appears <i>Congenital rubella</i> The newborn can spread the virus with nasopharyngeal secretions and urine for up to 1 year.
PREVENTION	Active immunization: Live rubella vaccine (in the form of MMR) Passive immunization: Immunglobuline (for pregnant women)
TREATMENT	Supportive (Paracetamol or Ibuprofen)

FIFTH DISEASE

Erythema Infectiosum

CAUSATIVE AGENT	Parvovirus B19
COMMON AGE	5-15 Years
TRANSMISSION	<i>Postnatal infection</i> droplet and percutaneous contact with blood <i>Congenital infection</i> transplacental
INCUBATION PERIOD	4-28 days (average 16-17 days)
PRODROME	It is usually mild Mild fever (15-30%), headache, arthralgia, myalgia

FIFTH DISEASE

Erythema Infectiosum

RASH

Erythema of the cheeks (Slapped cheek appearance)
Lacy maculopapular rash (on the arms, trunk, buttocks and legs)
Disappearance and reappearance of rashes
(heat, exercise, sunlight, etc.)



"Slapped cheek" rash



Fifth disease "Lacy" rash

FIFTH DISEASE

Erythema Infectiosum

Complications

- ❑ Arthritis
- ❑ Chronic anemia (in those with immunodeficiency)
- ❑ Aplastic crisis (in chronic hemolytic anemia)
- ❑ Aseptic meningitis
- ❑ Hemophagocytic syndrome
- ❑ Thrombocytopenic purpura
- ❑ **Intrauterine infection**

FIFTH DISEASE

Erythema Infectiosum

Complications

Intrauterine infection

Abortus

Severe anemia

Hydrops fetalis

Heart failure

Other than that, it does not cause defect

Diagnosis

Serology and PCR (pregnant's blood, fetal blood, amniotic fluid)

Treatment

Intrauterin blood tranfusion may be required

FIFTH DISEASE

Erythema Infectiosum

Complications



Hidrops Fetalis



FIFTH DISEASE

Erythema Infectiosum

INFECTIOUS PERIOD	Contagious before the rash appears Not contagious after rash begins Patients with aplastic crisis contagious for 1 week
TREATMENT	Supportive (Paracetamol or Ibuprofen) IVIG (In immunocompromised patients with anemia)

SIXTH DISEASE

Roseola infantum (Exanthema subitum)

CAUSATIVE AGENT	Human Herpesvirus-6 and 7
COMMON AGE	6-36 months
TRANSMISSION	Transmitted by close contact with the secretions of asymptomatic individuals 3/4 of healthy adults carry the virus
INCUBATION PERIOD	5-15 days (average 10 days)
PRODROME	High fever lasting 3-5 days, irritability Febrile convulsion
CLINICAL PICTURE	Fever without rash Febrile convulsion Exantematous disease (Roseola infantum or Exanthema subitum)

SIXTH DISEASE

Roseola infantum (Exanthema subitum)

RASH

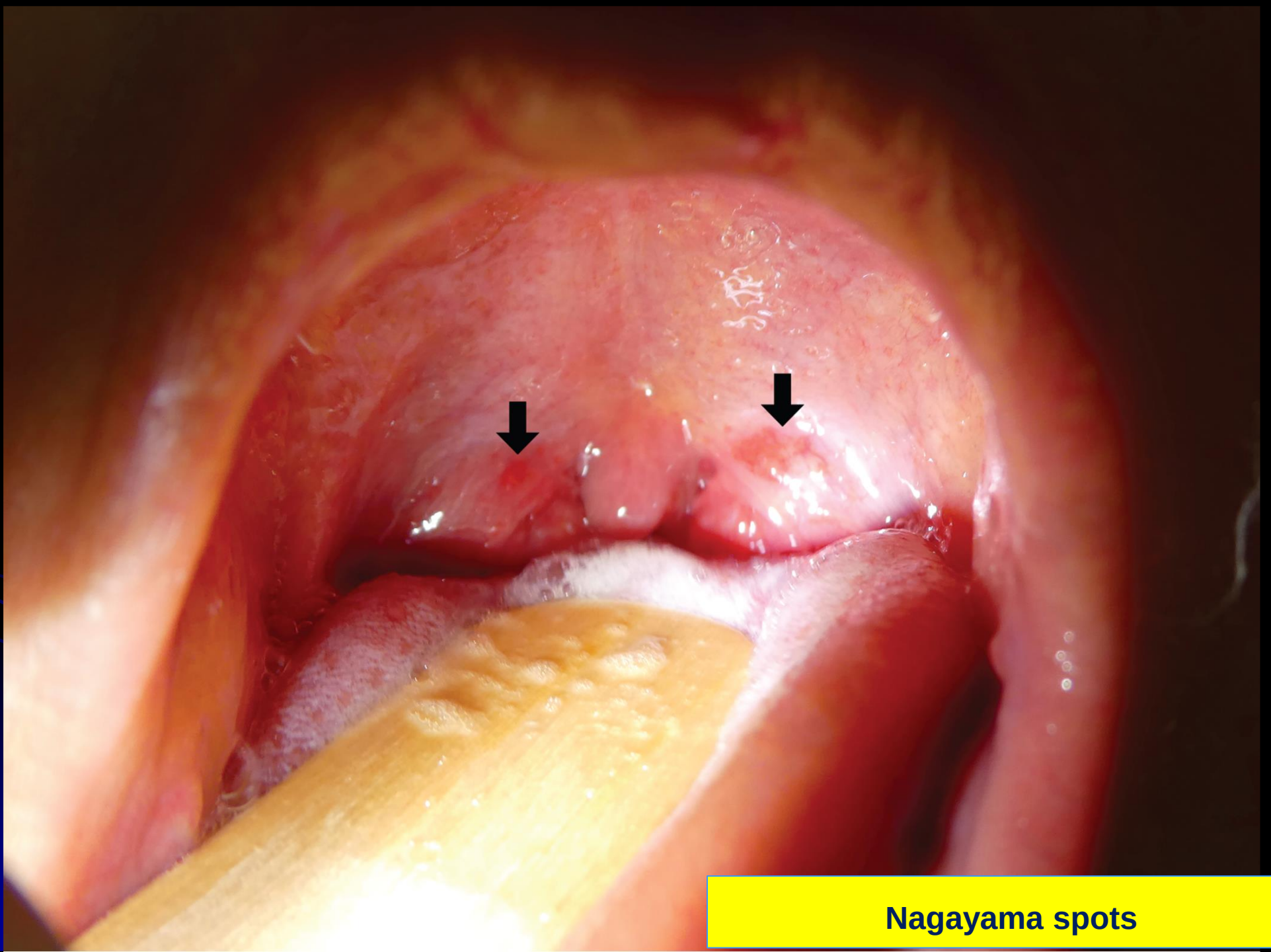
When the fever falls, a rash appears

It is maculopapular

Starts from the trunk and spreads

It is short-lived (may take 1-3 days)

In Asian countries, ulcers can be seen at the uvulopalatoglossal junction (**Nagayama** spots)



Nagayama spots



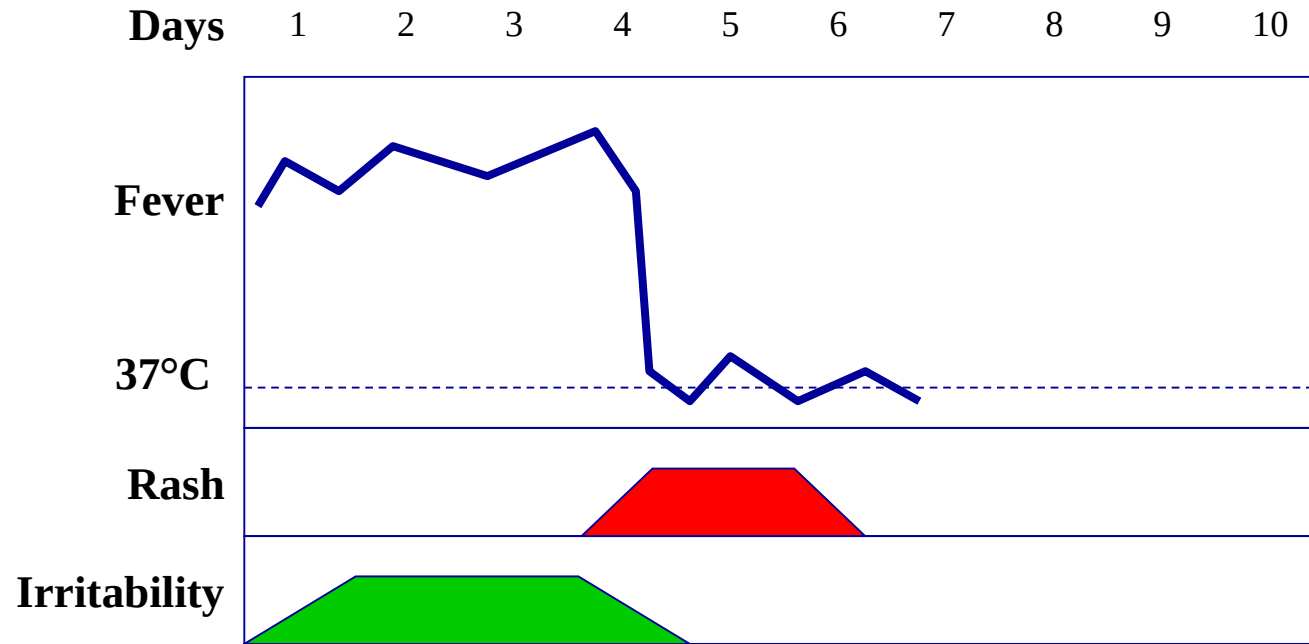
Sixth disease rash



Sixth disease rash

SIXTH DISEASE

Roseola infantum (Ekzantem subitum)



SIXTH DISEASE

Roseola infantum (Exanthema subitum)

Complications

- ❑ Hepatitis
- ❑ Encephalitis
- ❑ Pneumonia
- ❑ Hemophagocytic syndrome

SIXTH DISEASE

Roseola infantum (Exanthema subitum)

INFECTIOUS PERIOD	Contagious permanently
TREATMENT	Supportive (Paracetamol or Ibuprofen) Antiviral therapy unnecessary

CHICKENPOX

CAUSATIVE AGENT	Varicella-Zoster virus
COMMON AGE	<15 Years
TRANSMISSION	<i>Postnatal infection</i> transmitted by droplet and direct contact. <i>Congenital infection</i> transplacental transmission
INCUBATION PERIOD	10-21 days (average 14-16 days)
PRODROME	Mild fever, malaise, loss of appetite before 24 hours from rash

CHICKENPOX

RASH

The rash starts from the trunk and face and spreads to the whole body
Rash is also seen on the scalp
It is in the form of papule, vesicle and crusty lesions
Lesions continue to appear for 3 days
It form painful lesions in the mouth and genital area
Lesions are itchy
The fever may be high during the exanthematous period.

CHICKENPOX



Polimorph rash

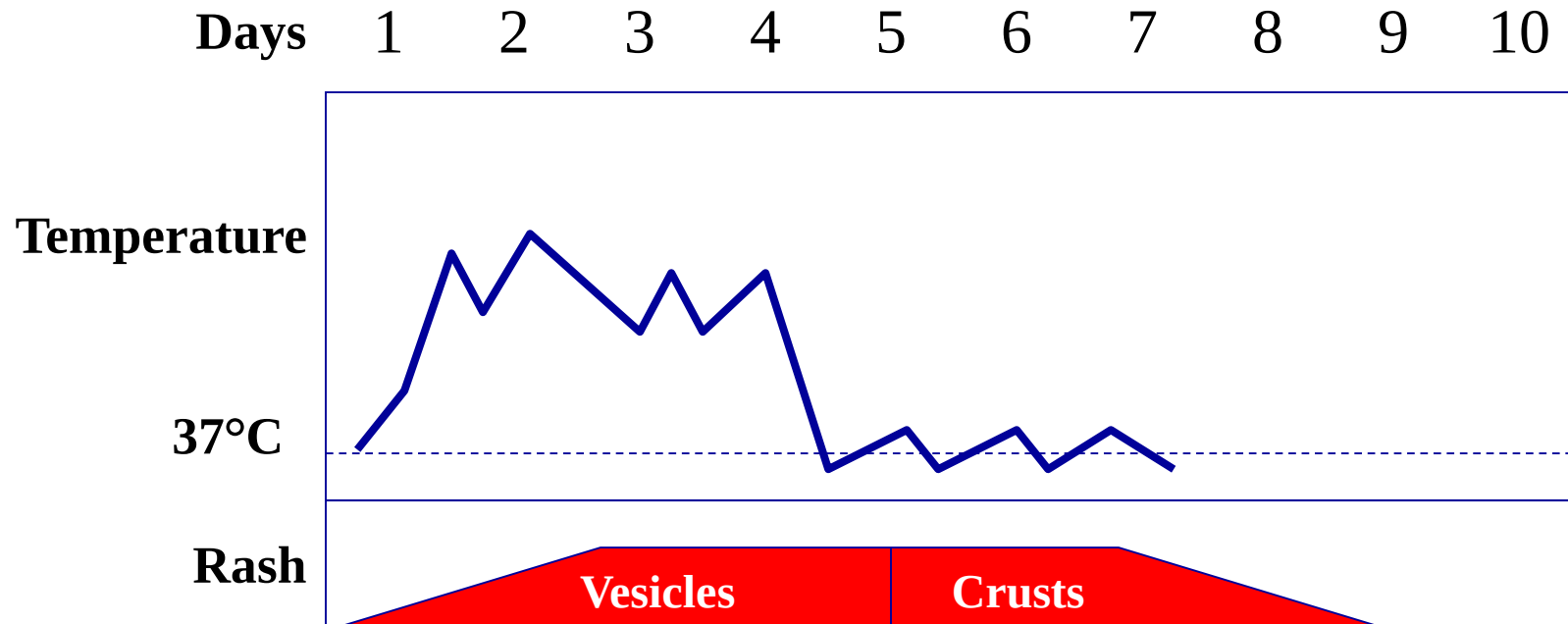


Oral chickenpox lesions



Severe chickenpox rash

CHICKENPOX



CHICKENPOX

Complications

- ❑ Secondary skin infections
- ❑ Pneumonia
- ❑ Hepatitis
- ❑ Arthritis
- ❑ Thrombocytopenia
- ❑ Reye's syndrome
- ❑ Encephalitis, meningitis, cerebellar ataxia
- ❑ Herpes zoster
- ❑ Congenital varicella syndrome



Herpes zoster



Herpes zoster

CHICKENPOX

Complications

PREGNANCY PERIOD

The first 20 weeks



Congenital varicella syndrome

The last 20 weeks



Herpes zoster
in infancy or childhood

5 days before delivery
2 days after delivery



Severe varicella infection
in newborn

Depends on mother's chickenpox immunity

Embryopathy risk $\leq 2\%$

CHICKENPOX

Complications

Skin	Cicatricial lesions, hypopigmentation, bullous lesions
Extremities	Hypoplastic limbs, muscular atrophy/denervation Finger anomaly/absence
Eyes	Chorioretinitis, microphthalmia, anisocoria
CNS	Cortical atrophy, encephalitis, mental retardation, convulsion
GIS	Esophageal dilatation/reflux
Urinary system	Hydronephrosis/hydroureter

CHICKENPOX

Complications



Cicatricial scarring



Extremity anomaly

CHICKENPOX

INFECTIOUS PERIOD	Begins 1-2 days before rash Lasts until all the vesicles have crusted
PREVENTION	Active immunization: Varicella vaccine. Live-attenuated vaccine. Single dose is administered at the age of 12 months. 2nd dose can be given at 4-6 years old. After chickenpox exposure, can be given in the first 3-5 days. Passive immunization: Varicella-zoster immune globulin (VZIG) After chickenpox exposure, should be given VZIG within the first 10 days. IVIG 400 mg/kg
TREATMENT	Paracetamol or Ibuprofen (Aspirin is contraindicated! Reye syndrome) Acyclovir ≥13 years old children - People who are infected by household transmission - Severe clinical illness - Chronic skin or lung disease - Receiving long-term salicylate therapy - Using aerosol steroids - Immunodeficiency

YOU'RE GOING
TO GET THE
MEASLES!

FORTUNE
TELLER



EXANTHEMATOUS DISEASES

Causative Agent

Measles: It is an RNA virus of the Paramyxoviridea family

Scarlet Fever: Group A beta-hemolytic streptococcus (*Streptococcus pyogenes*)

Rubella: It is an RNA virus from the Togaviridae family.

Fifth Disease: Parvovirus B19 (DNA virus)

Sixth Disease: Human Herpesvirus-6 and 7 (DNA virus)

Chickenpox: Varicella-Zoster virüs (DNA virus)



Koplik's spots



Red strawberry tongue



Forchheimer's spots



Nagayama's spots



Oral chickenpox lesions

EXANTHEMATOUS DISEASES

Incubation Period

Measles: 8-12 days

Scarlet Fever: 1-7 days (average 2-4 days)

Rubella: 14-21 days.

Fifth Disease: 4-28 days (average 16-17 days)

Sixth Disease: 5-15 days (average 10 days).

Chickenpox: 10-21 days (average 14-16 days)



Koplik's spots



Red strawberry tongue



Forchheimer's spots



Nagayama's spots



Oral chickenpox lesions

EXANTHEMATOUS DISEASES

Prodrome

Measles: Fever, dry cough, rhinorrhea, conjunctivitis, photophobia, Koplik spots

Scarlet Fever: High fever, sore throat, abdominal pain, vomiting

Rubella: Mild fever, headache, malaise, mild rhinorrhea and conjunctivitis without photophobia, Lymphadenopathies may be noticed at least 24 hours before the rash
Retroauricular, suboccipital, and posterior cervical LAP, Forchheimer's spots

Fifth Disease: It is usually mild, mild fever (15-30%), headache, arthralgia, myalgia

Sixth Disease: High fever lasting 3-5 days, irritability, febrile convulsion

Chickenpox: Mild fever, malaise, loss of appetite before 24 hours from rash



Koplik's spots



Photophobia



Conjunctivitis



Forchheimer's spots



Posterior auricular
lymph nodes

EXANTHEMATOUS DISEASES

Infectious Period

Measles: Begins 3 days before rash, lasts up to 4-6 days of rash

Scarlet Fever: Highest during acute infection, it then subsides and lasts for weeks.
With appropriate antibiotic treatment, not contagious after 24 hrs.

Rubella: Begins 7 days before rash, lasts up to 7 days after the rash appears
The newborns with congenital rubella can spread the virus with nasopharyngeal secretions and urine for up to 1 year.

Fifth Disease: Contagious before the rash appears, not contagious after rash begins
Patients with aplastic crisis contagious for 1 week

Sixth Disease: Contagious permanently

Chickenpox: Begins 1-2 days before rash, lasts until all the vesicles have crusted



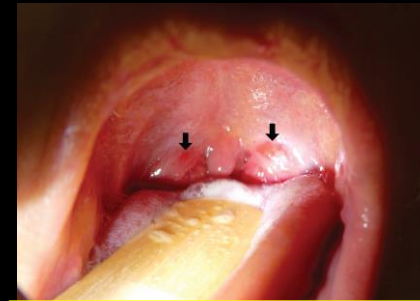
Koplik's spots



Red strawberry tongue



Forchheimer's spots



Nagayama's spots



Oral chickenpox lesions

EXANTHEMATOUS DISEASES

Treatment

Measles: Vitamin A

Scarlet Fever: Penicillin

Rubella: None

Fifth Disease: None, IVIG in some cases

Sixth Disease: None

Chickenpox: Acyclovir



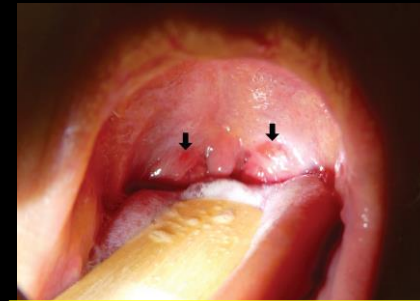
Koplik's spots



Red strawberry tongue



Forchheimer's spots



Nagayama's spots



Oral chickenpox lesions

EXANTHEMATOUS DISEASES

Vaccine

Measles: MMR vaccine, MMRV vaccine

Protective if given within the first **72 hours** after contact

Scarlet Fever: None

Rubella: MMR vaccine, MMRV vaccine

Fifth Disease: None

Sixth Disease: None

Chickenpox: Varicella vaccine

After chickenpox exposure, can be given in the first **3-5 days**.



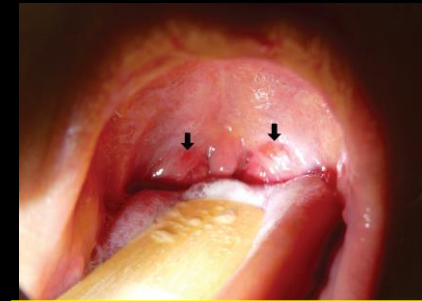
Koplik's spots



Red strawberry tongue



Forchheimer's spots



Nagayama's spots



Oral chickenpox lesions

EXANTHEMATOUS DISEASES

Immunglobulin for Prevention

Measles: Yes. Protective if given within the first **6 days** of exposure

Scarlet Fever: None

Rubella: Yes (Only for pregnant)

Fifth Disease: None

Sixth Disease: None

Chickenpox: IVIG, VZIG (For immunocopromised children and adults)

Protective if given within the first **10 days** of exposure



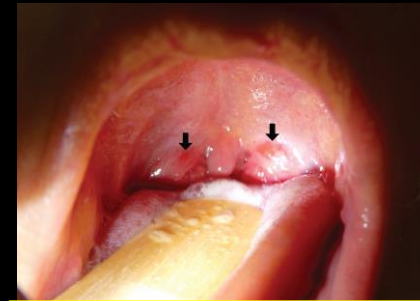
Koplik's spots



Red strawberry tongue



Forchheimer's spots



Nagayama's spots



Oral chickenpox lesions