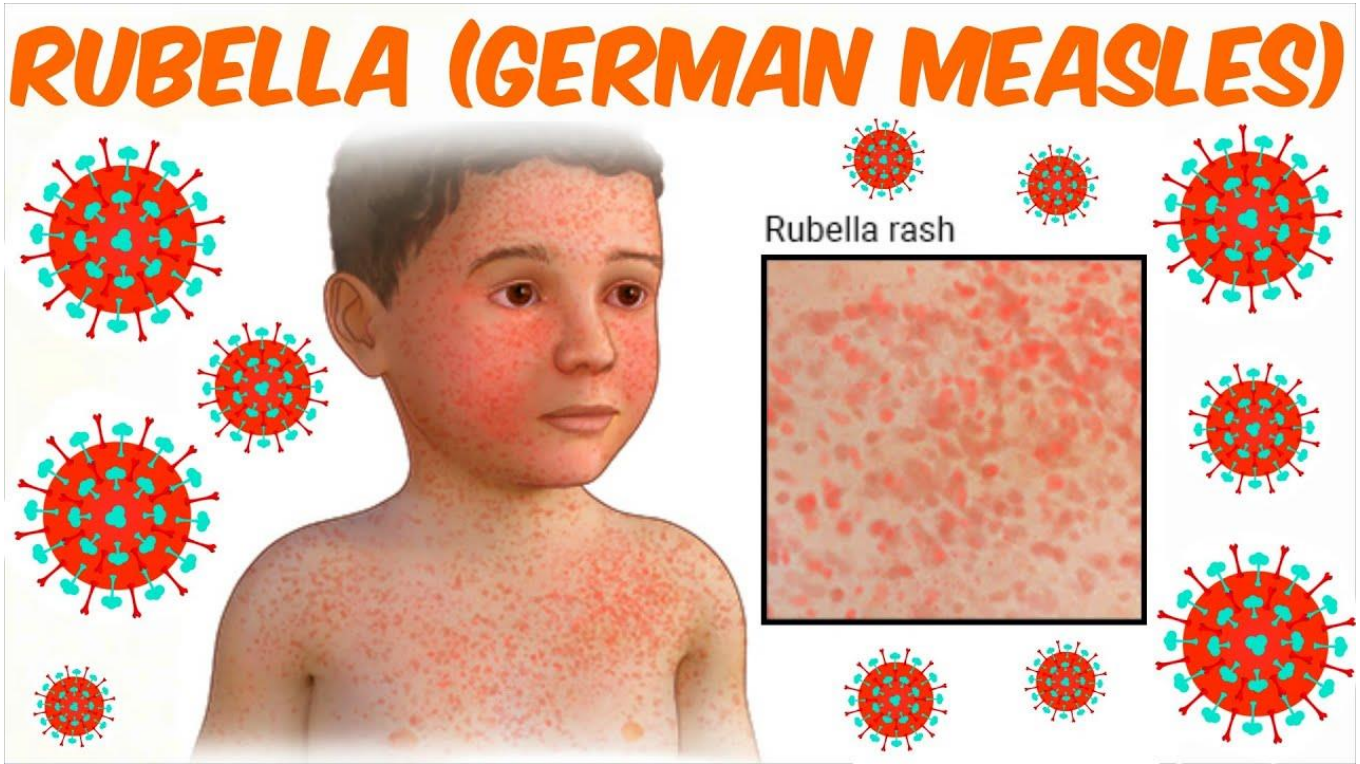
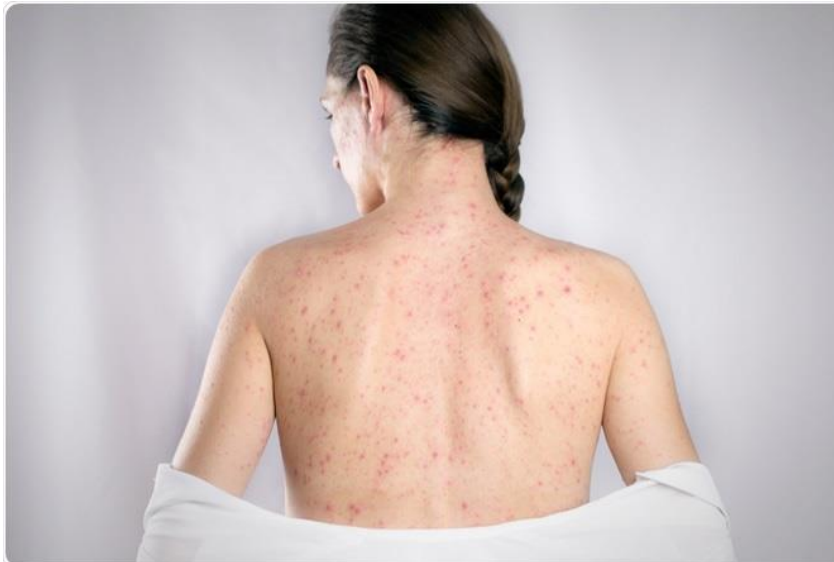
RUBELLA (GERMAN MEASLES)



Rubella is an acute viral infection of children and adults that characteristically includes rash, fever, and lymphadenopathy and has a broad spectrum of other possible manifestations.



A high percentage of rubella infections in both children and adults are subclinical. In addition, the illness can resemble a mild attack of measles (rubeola) and can cause arthritis, especially in adults. Rubella was formerly known as *German measles* because it was first distinguished clinically from rubeola in Germany, where it generated much medical interest in the mideighteenth and early nineteenth centuries. Rubella during pregnancy can lead to fetal infection, with the production of a significant constellation of malformations (*congenital rubella syndrome*) in a high proportion of infected fetuses. Rubella virus was first isolated in cell culture just before the last pandemic of the disease began in 1962.

ETIOLOGIC AGENT

Rubella virus, *a togavirus*, is the only member of the *Rubivirus* genus and is closely related to the alphaviruses.

Unlike these agents, however, it does not require a vector for transmission.

Moreover, there is no RNA sequence homology between rubella virus and the alphaviruses.

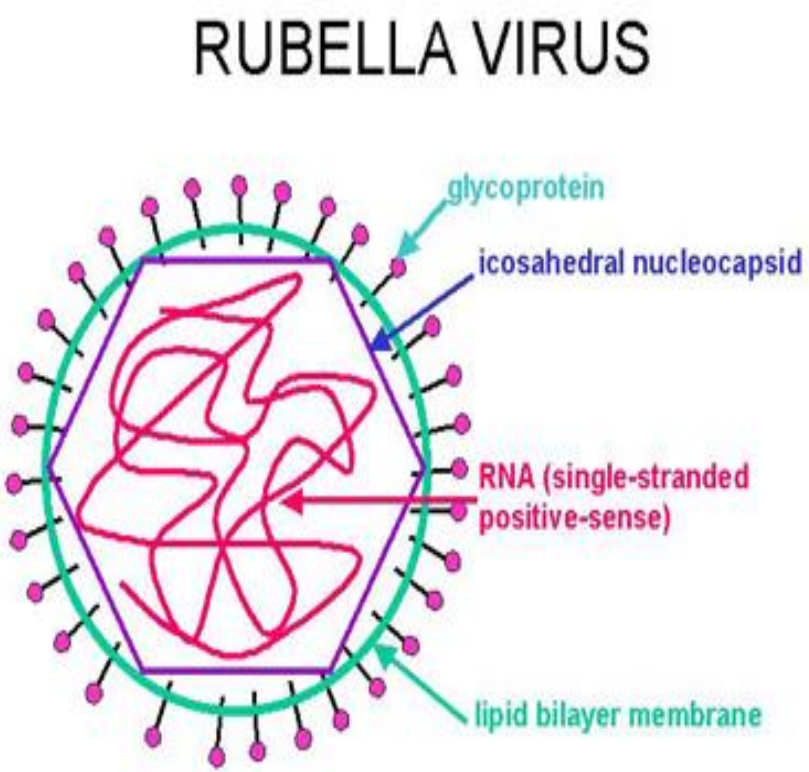
The virus is sensitive to ether, inactivated at a temperature of 56 ° for an hour.

It is characterized by relative thermolability, remains viable at minus 60 ° C and below.

The rubella virion is composed of an inner icosahedral capsid of RNA and protein that is surrounded by a lipidcontaining envelope with glycoprotein spikes and a diameter of ~60 nm.

The structural proteins associated with rubella virus are E1 and E2 (transmembrane envelope glycoproteins) and C (the capsid protein that surrounds the viral RNA).

Only one serotype has been identified.



EPIDEMIOLOGY

According to the World Health Organization,
57% of countries included rubella vaccine in their national programs in 2003, but rubella continues to be endemic in many areas of the world.

Rubella refers to anthroponotic infections, is found everywhere. It is transmitted mainly by airborne droplets, sometimes by contact and transplacental route.

The source of infection is the patient, which is dangerous not only during the period of pronounced clinical manifestations of rubella, but also in the incubation
period, and in the period of convalescence.
In epidemiological terms, healthy virus carriers are also dangerous.

PATHOGENESIS

The virus is transmitted by airborne droplets. Penetrating into the body through the mucous membrane of the upper respiratory tract, the virus primarily multiplies in the lymph nodes, from where it enters the blood during the incubation period (a week after infection).
A rash appears after 2 weeks.
A week after the rash appears, the virus disappears from the blood.
In response to the circulation of the virus in the blood, virus-neutralizing antibodies appear

Despite high titers of specific neutralizing antibodies, infants with congenital rubella may excrete rubella virus from the respiratory tract and in the urine until the age of 2 years.

This excretion raises important issues related to infection control in hospital and daycare settings.

Persons recently immunized with live attenuated rubella vaccine do not transmit the vaccine virus to others, although low titers of rubella virus may be detected transiently in the pharynx.

CLASSIFICATION

A. Acquired rubella:

1. **Typical:**
   - **mild,**
   - **moderate,**
   - **severe;**
2. **Atypical without rash;**
3. **Inapparat (subclinical).**

B. Congenital rubella:

1. **cataract;**
2. **heart disease;**
3. **deafness;**
4. **myriad other defects**

КЛИНИКА

Its incubation period is
18 days on average, with a range of 12–23 days
Infection acquired after birth usually results in an
extremely mild or subclinical illness.

CLINICAL MANIFESTATIONS

Postnatally Acquired Rubella

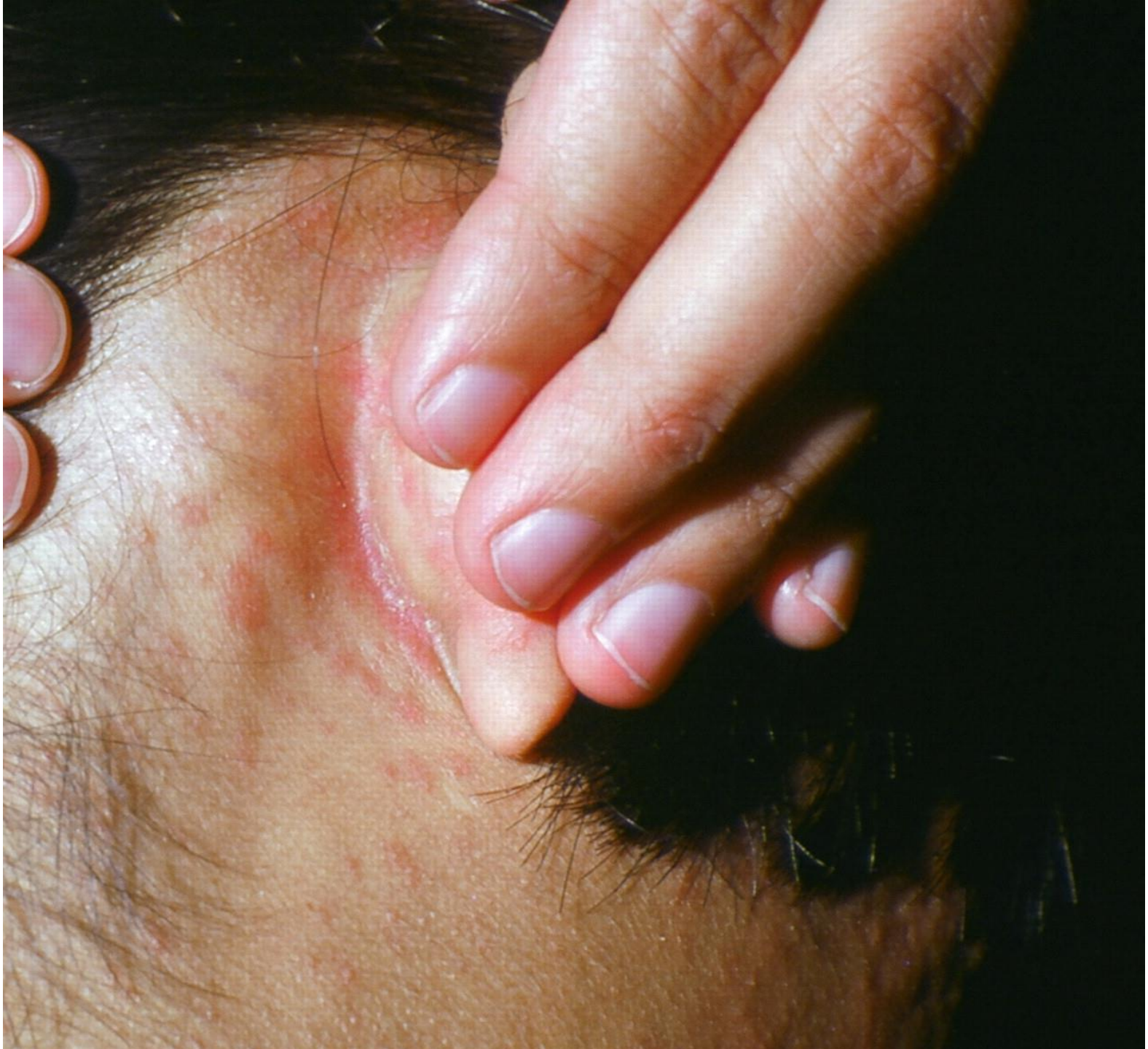
A prodromal phase is uncommon in children; adults may have more severe disease, with a brief prodrome of malaise, fever, and anorexia.

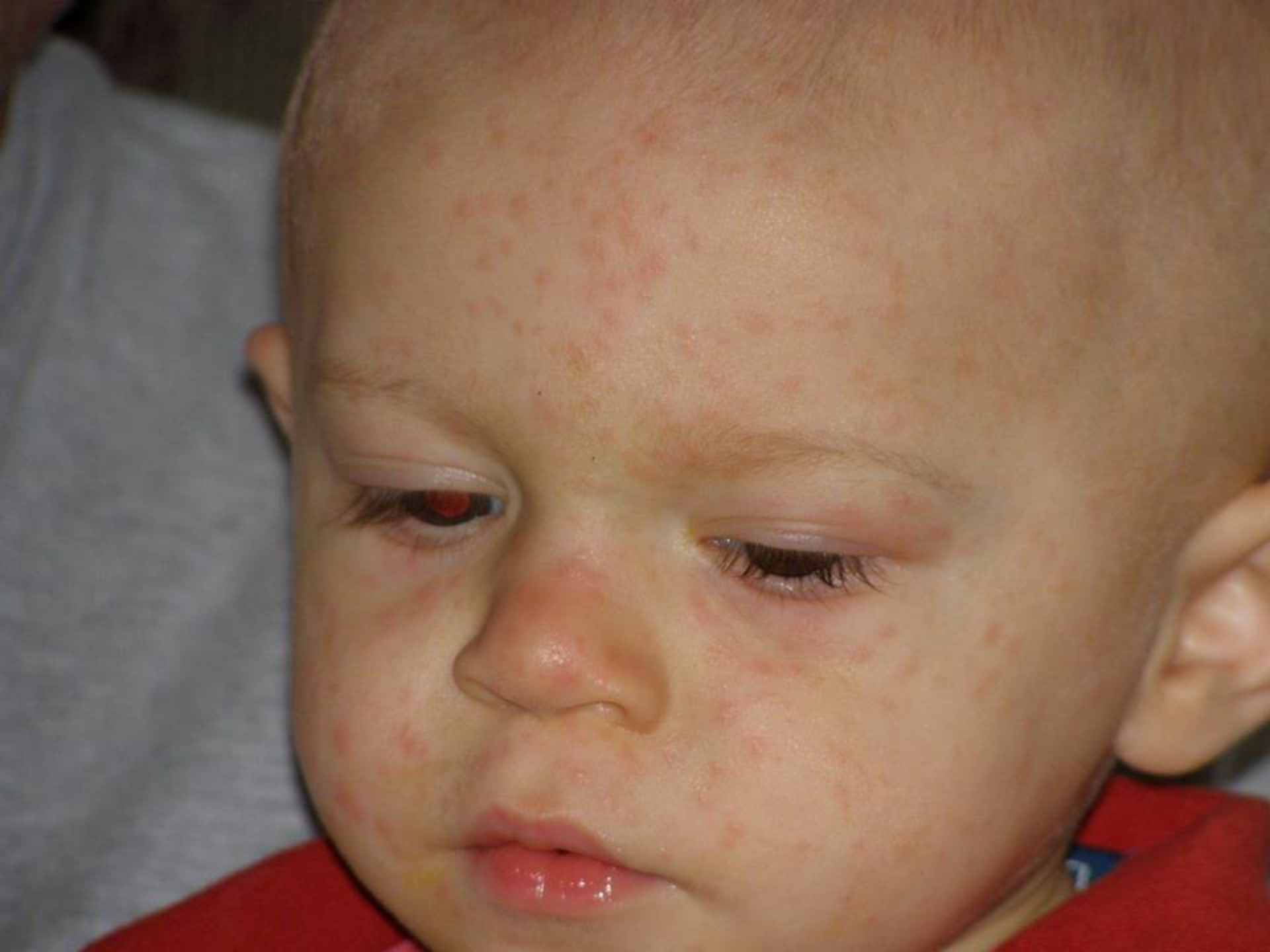
The foremost symptoms of postnatally acquired rubella include posterior auricular, cervical, and suboccipital lymphadenopathy; fever; and rash.

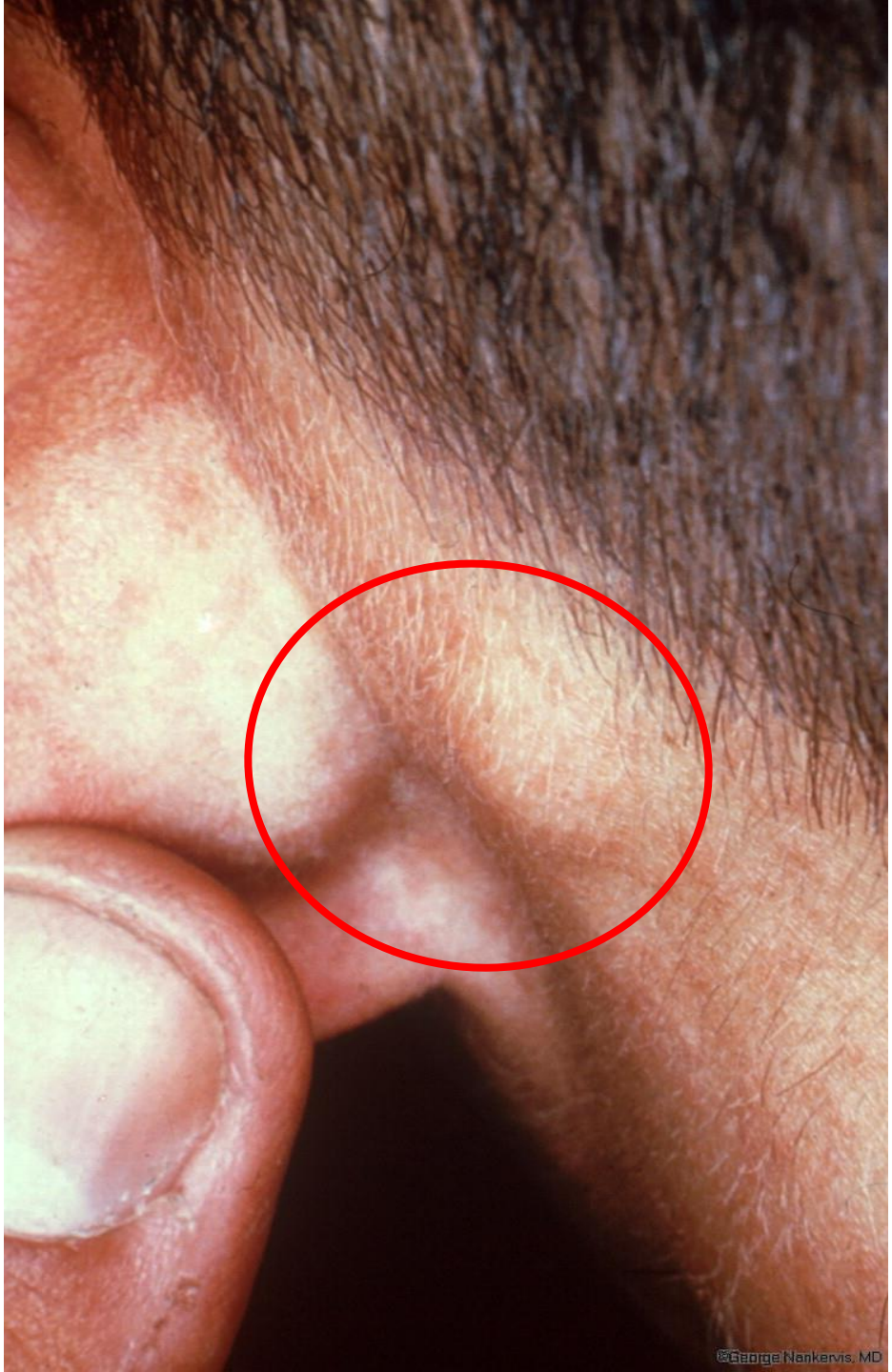
The rash often begins on the face and spreads down the body. It is maculopapular but not confluent, is sometimes accompanied by mild coryza and conjunctivitis, and generally lasts for 3–5 days.

A petechial enanthem on the soft palate, designated Forschheimer spots, may occur but is not specific for rubella.

Fever may be absent entirely or may be present for only several days in the early phase of the illness.



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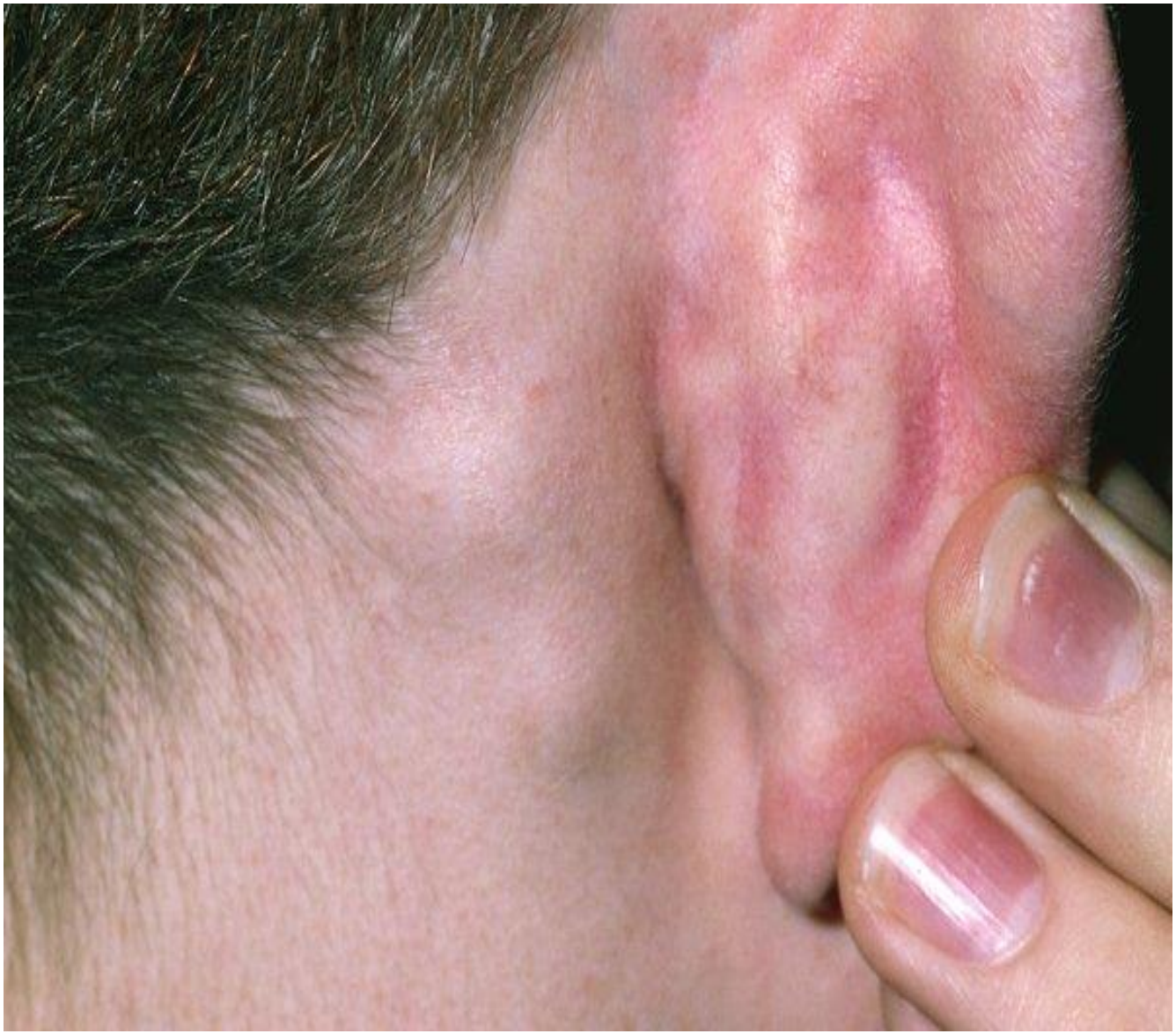
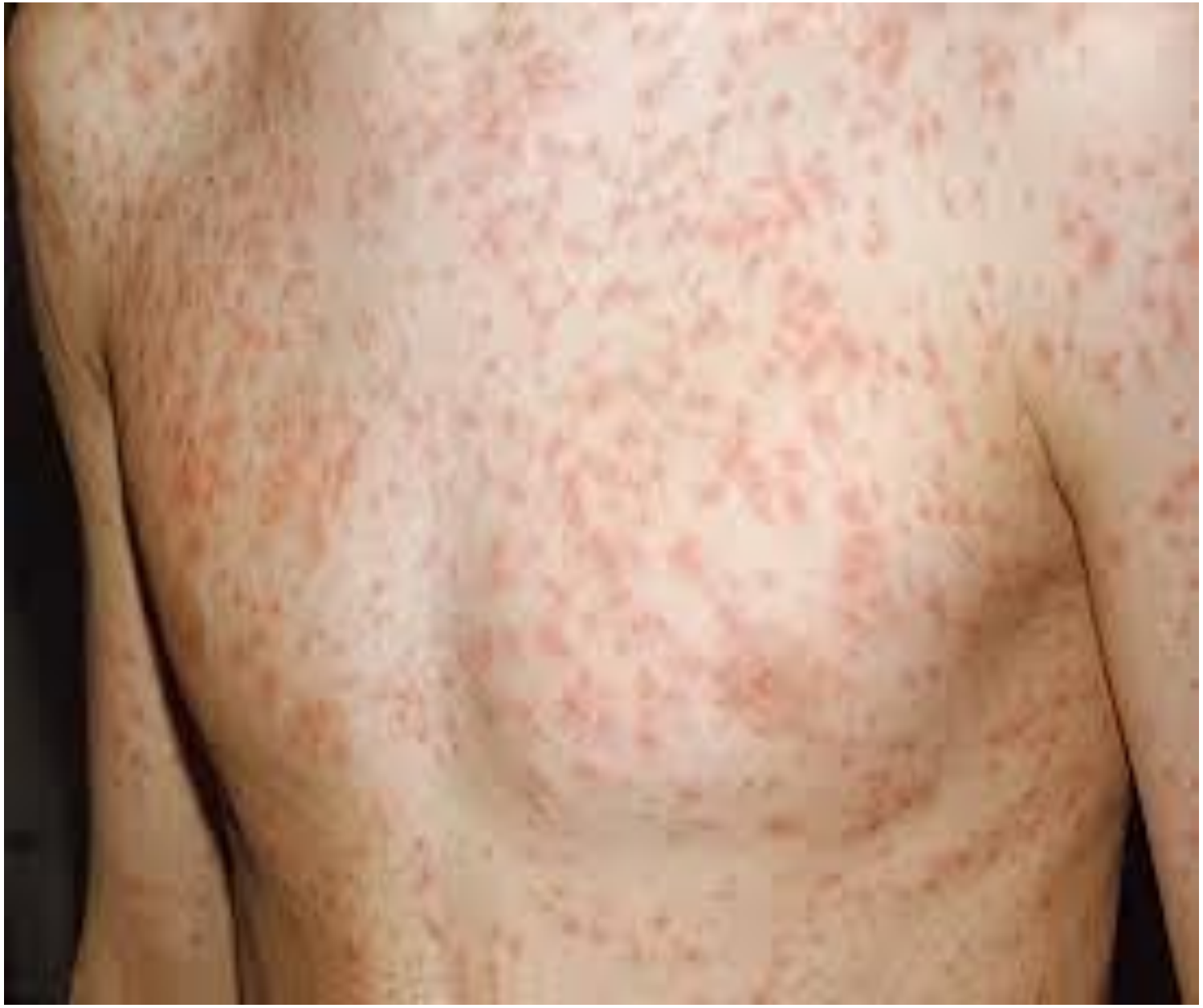




Complications of postnatally acquired rubella are uncommon; bacterial superinfection is rare.

One particularly troublesome complication is seen almost exclusively in women: arthritis, most frequently involving the fingers, wrists, and/or knees.

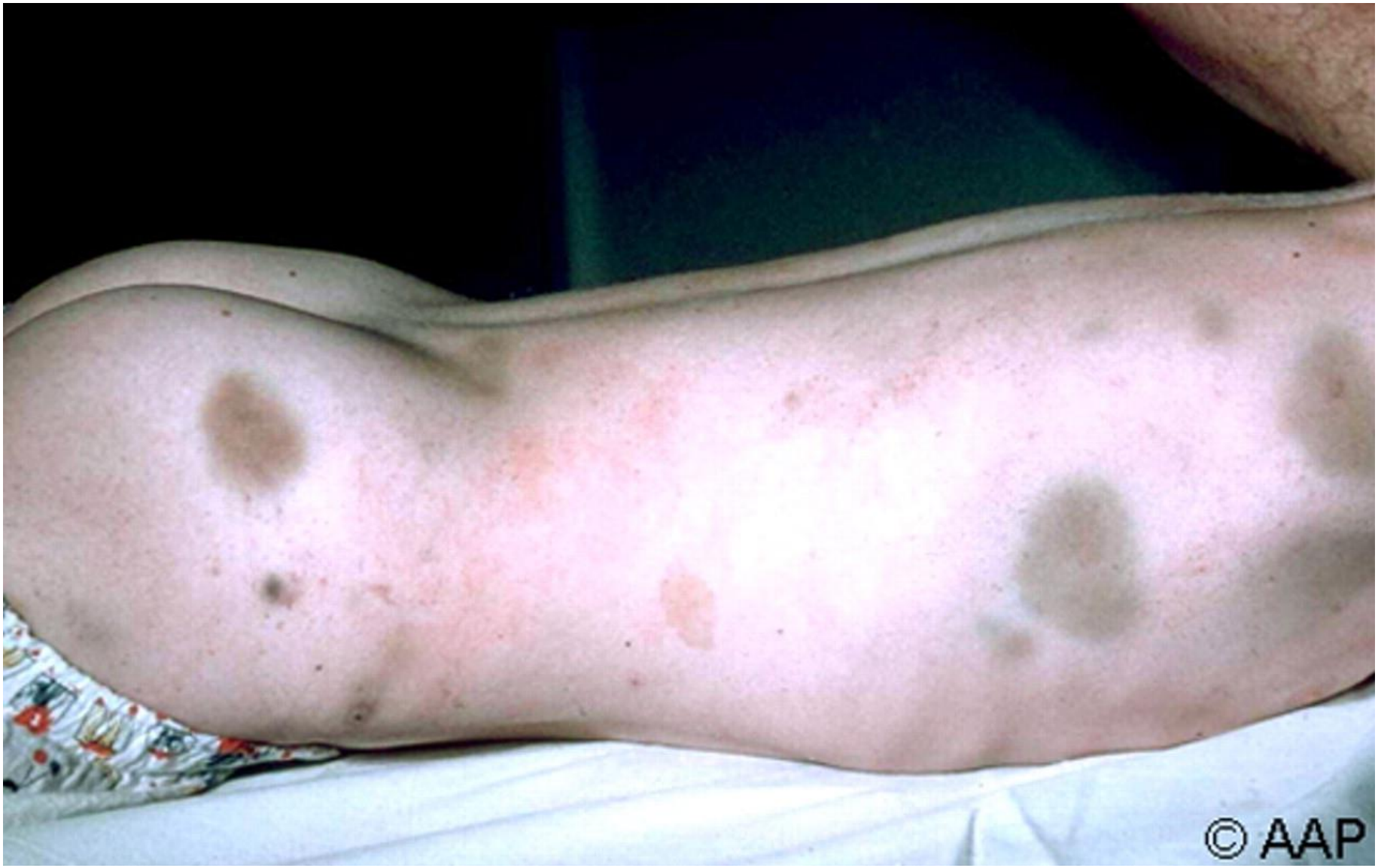
Arthritis develops as the rash is appearing and may take several weeks to resolve.

Chronic arthritis resulting from rubella is extremely rare.

Rubella virus has been isolated from joint fluid during acute rubella arthritis and from peripheral blood in chronic
rubella arthritis.

Another complication of postnatally acquired rubella is hemorrhage due to both thrombocytopenia and vascular damage; this complication occurs in 1 of every 3000 patients. Thrombocytopenia may last for weeks or months; it can have long-term consequences if there is bleeding into organs such as the eye or the brain.

Both children and adults may develop encephalitis after rubella; the incidence is about five times lower than that of encephalitis following measles. Adults are more likely than children to develop encephalitis;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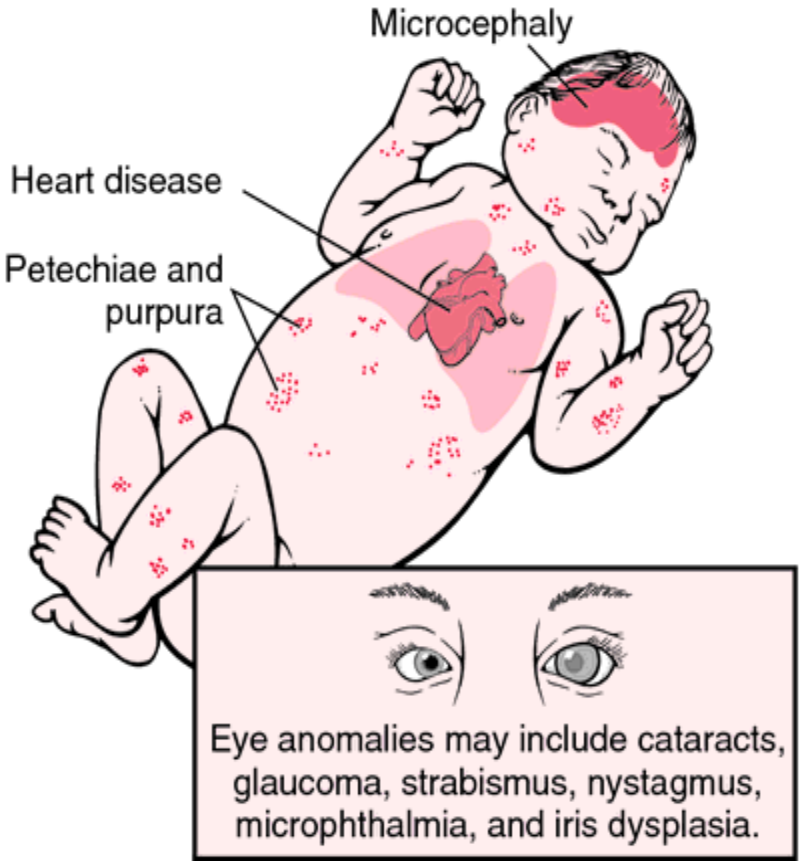
Congenital Rubella

Maternal infection in early pregnancy can lead to fetal infection, with resultant congenital rubella.

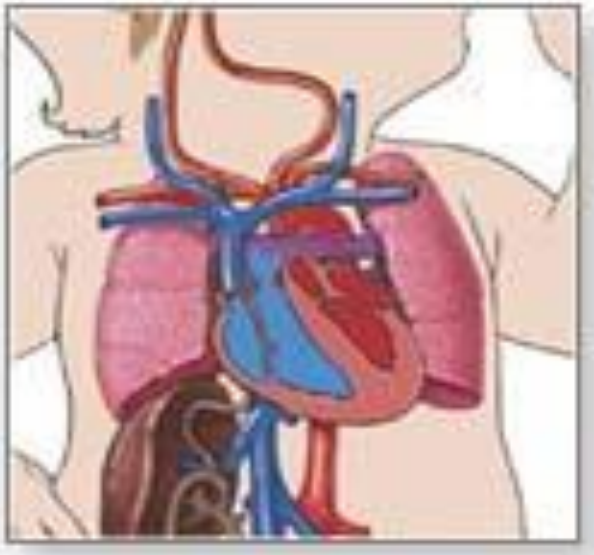
The classic signs of congenital rubella are cataract, heart disease, deafness, and myriad other defects.
The most important factor in the pathogenicity of rubella virus for the fetus is gestational age at the time of infection.
Maternal infection during the first trimester leads to fetal infection in ~50% of cases; maternal infection early in the second trimester leads to fetal infection in about one-third of cases. Fetal malformations not only are more common after maternal infection in the first trimester but also tend to be more severe and to involve more organ systems

Whereas a fetus infected in the fourth week of gestation may develop many problems, one infected later (e.g., in the twentieth week) may have isolated deafness as the only symptom.



Rubella syndrome

Microcephaly

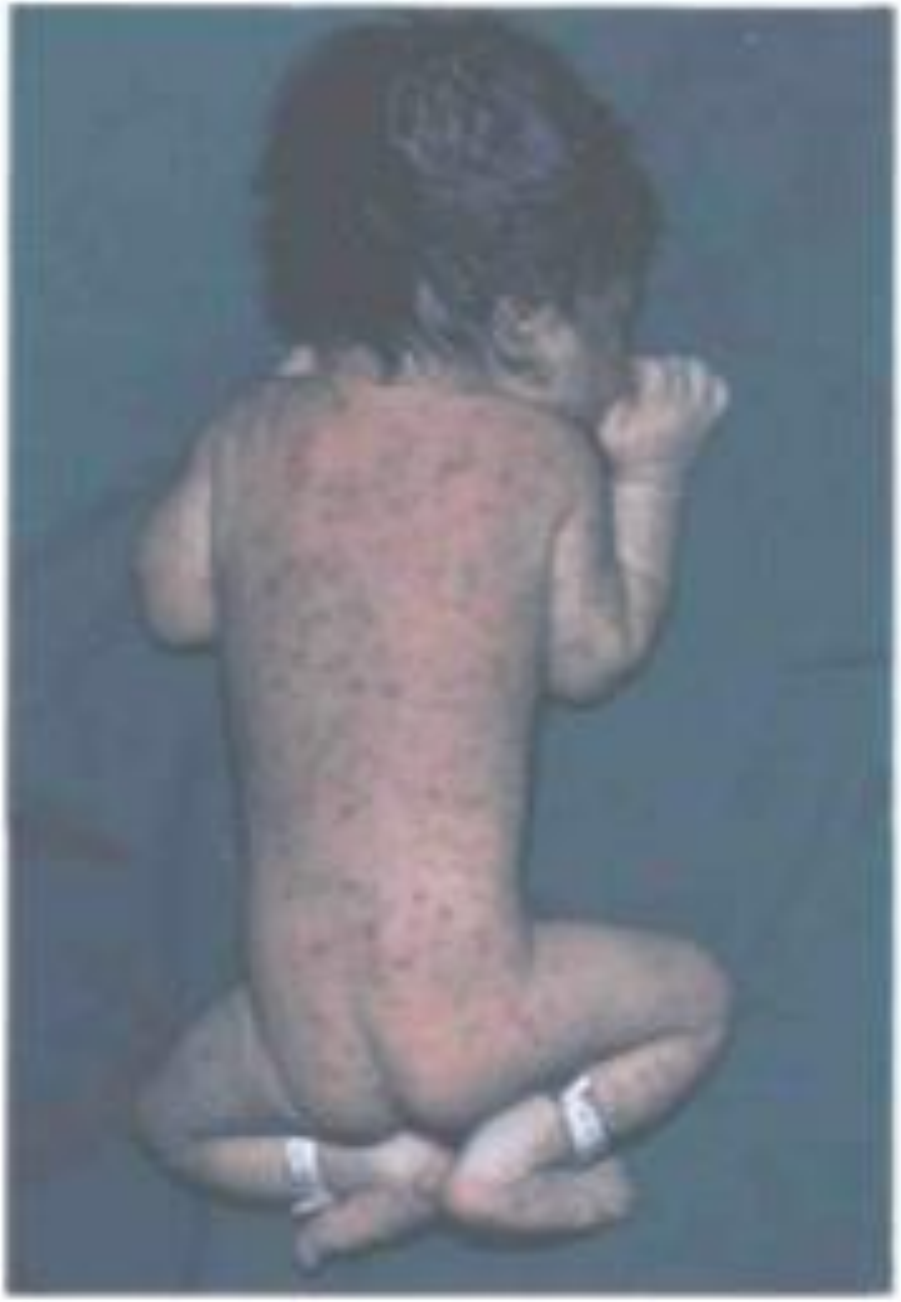


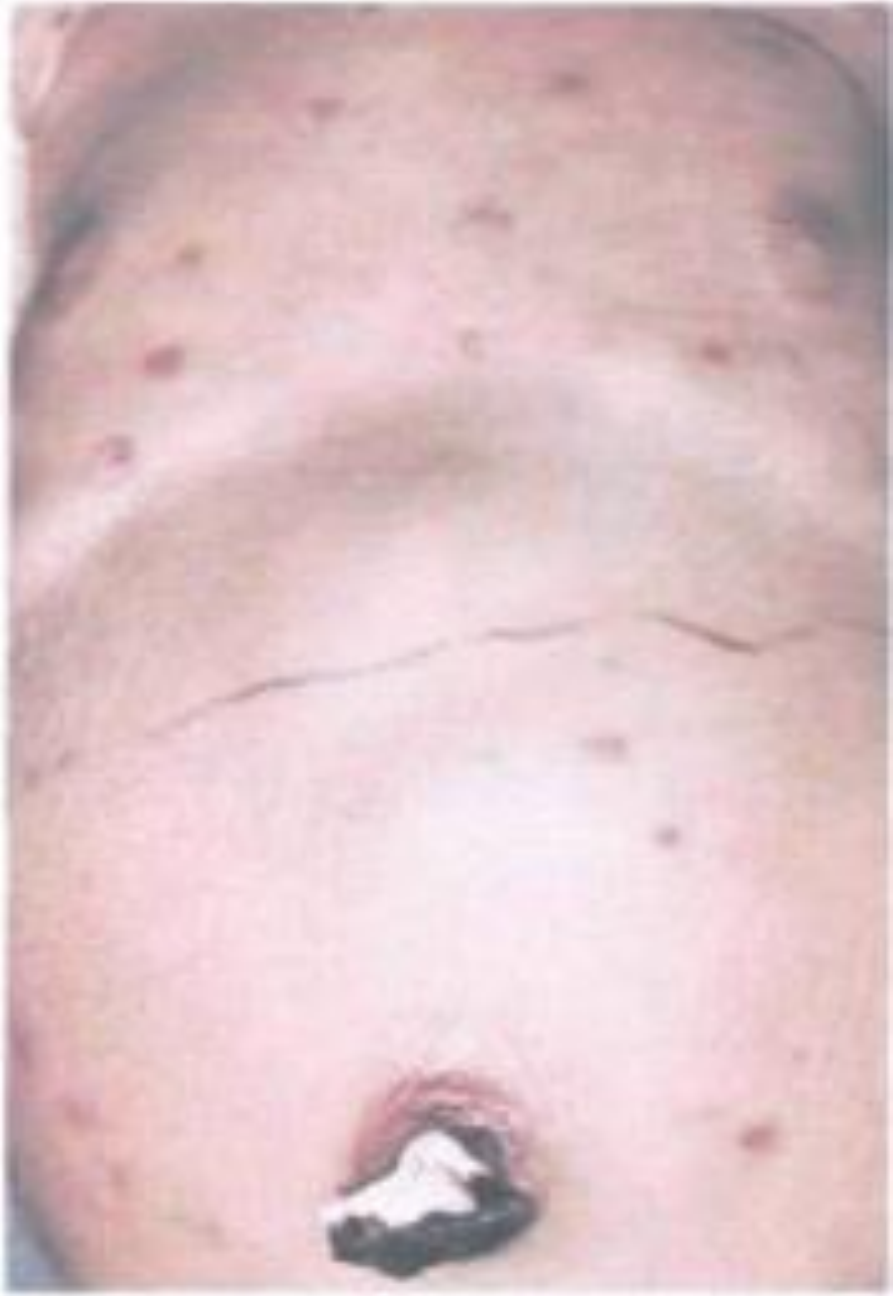
PDA

Cataracts

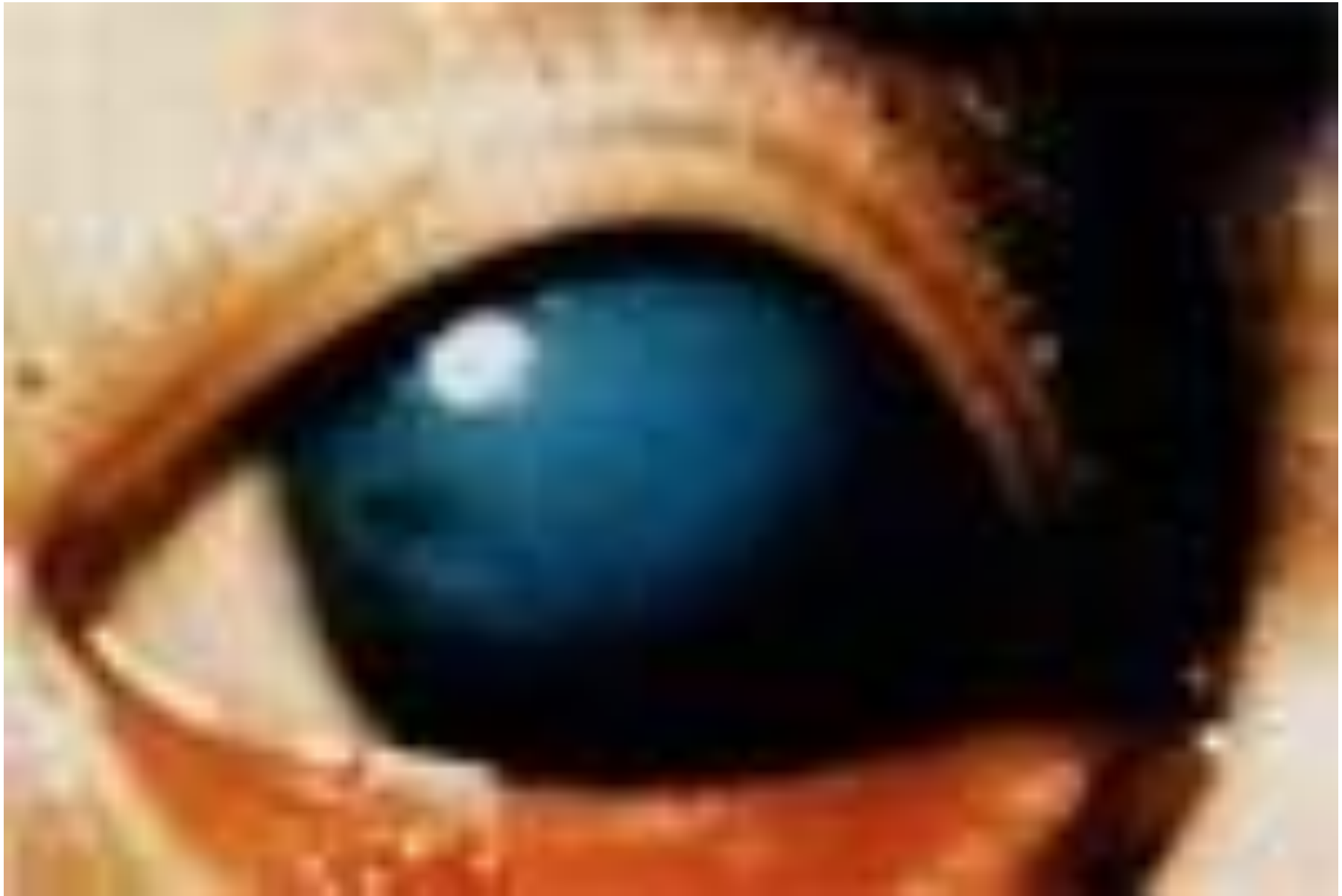
The direct action of the rubella virus is associated with its cytolytic activity in some tissues, with its ability to damage chromosomes and inhibit the mitotic activity of infected cells. In addition, when an embryo or fetus is infected, the rubella virus has an immunosuppressive effect, leading to inhibition of interferon production and

inhibition of cellular immunity.





congenital glaucoma associated with clouding of the cornea



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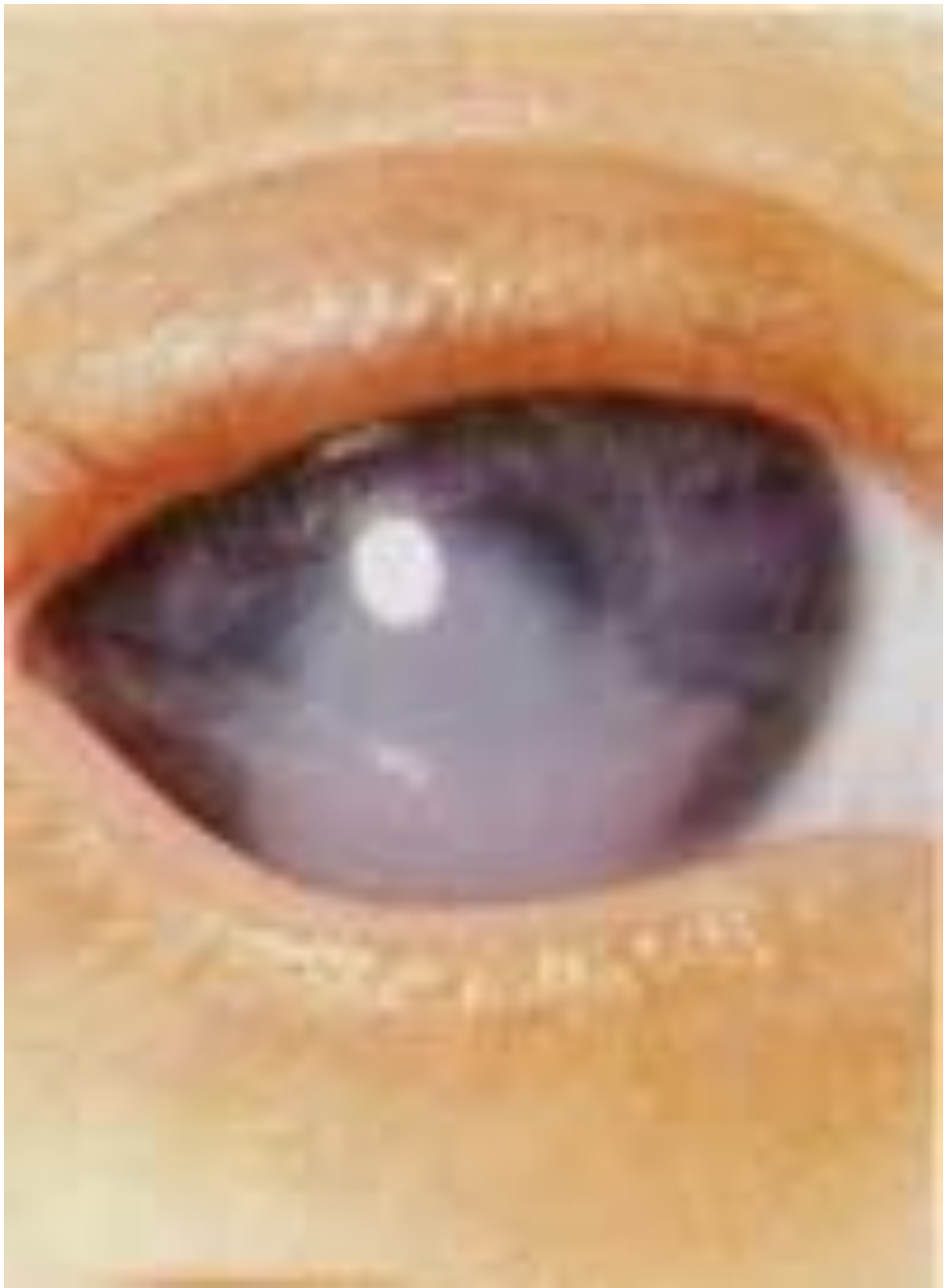
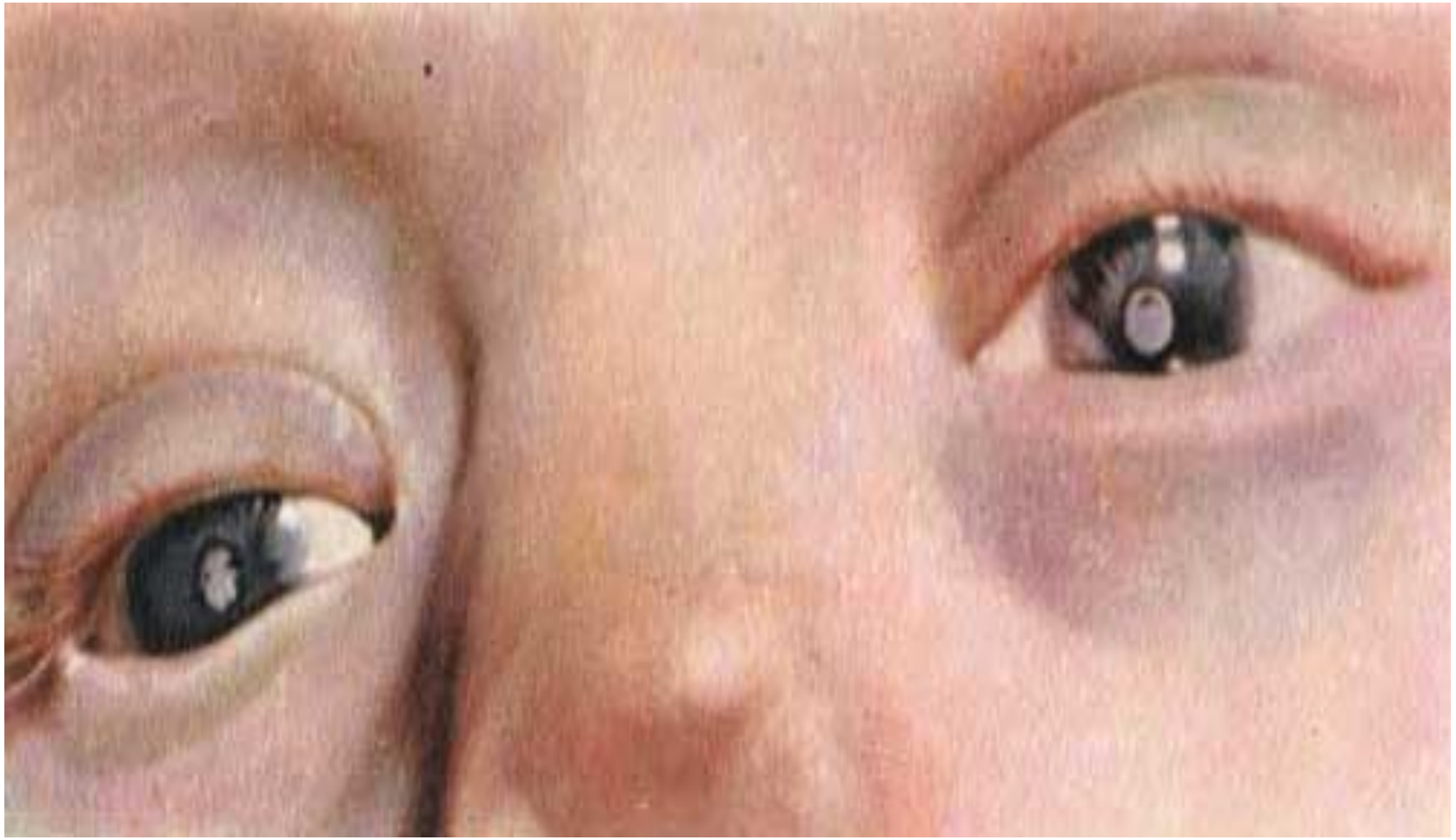
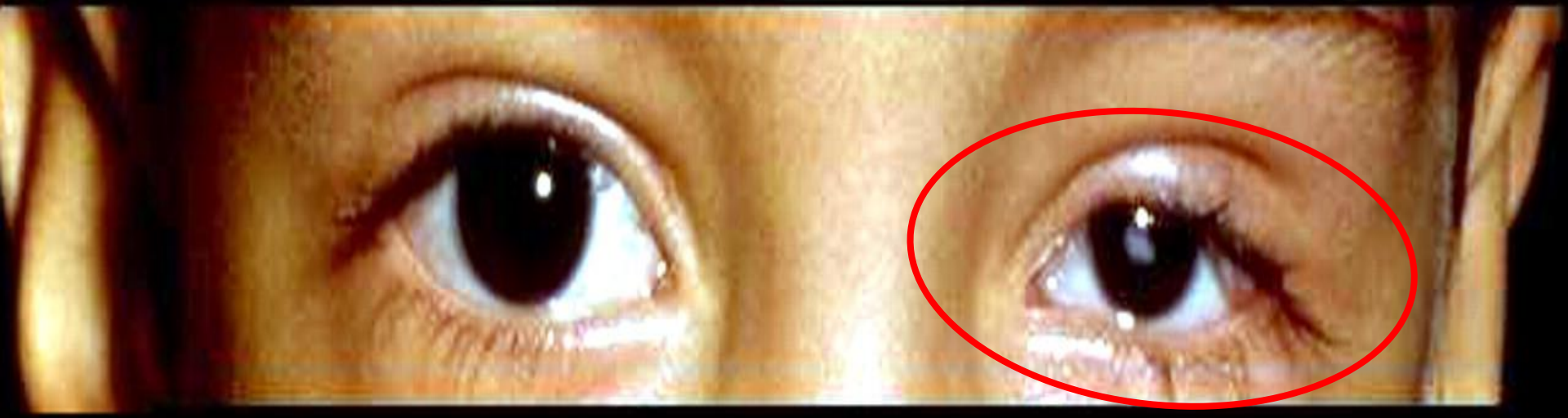
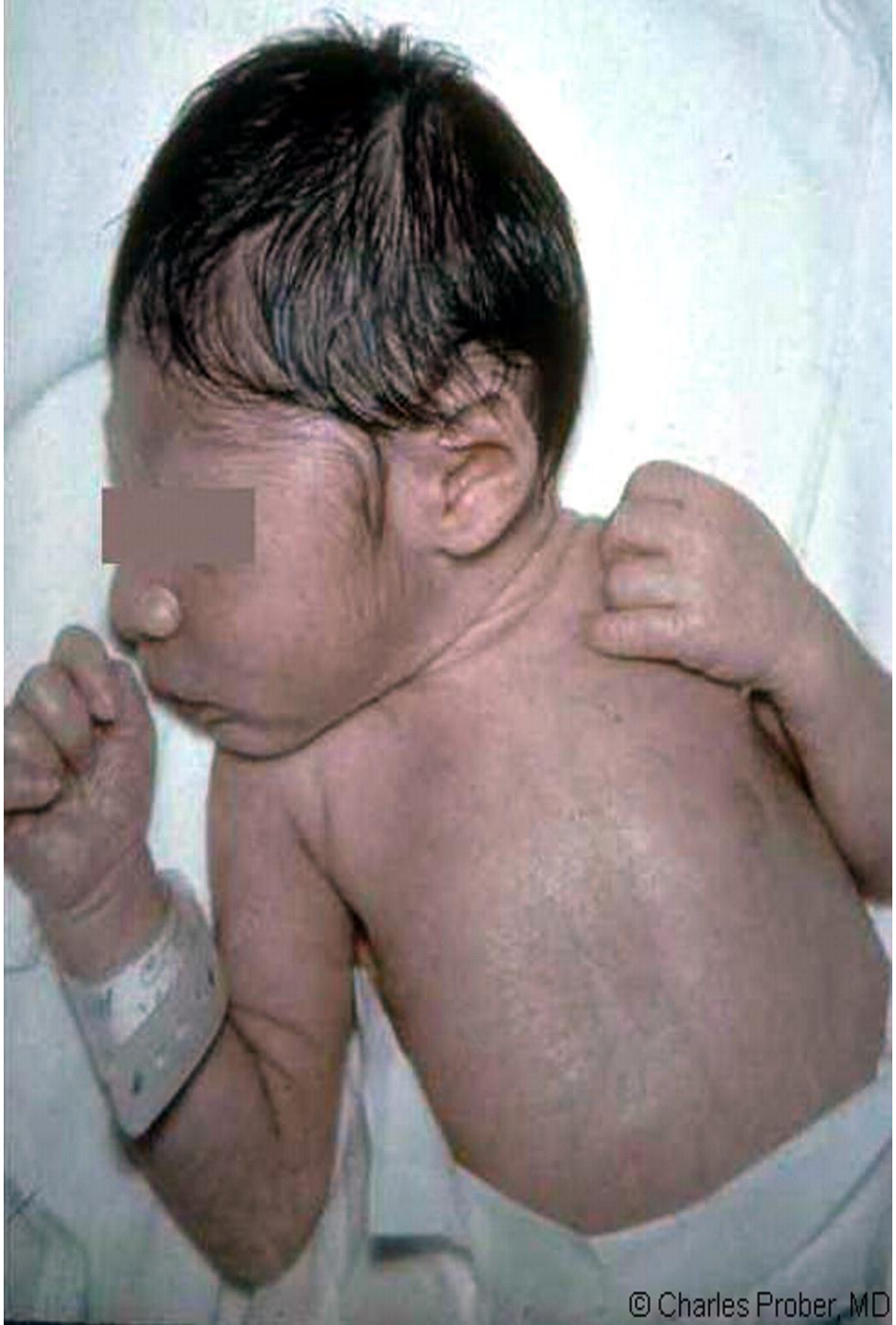





Congenital Rubella Syndrome (CRS)
cataracts

Microophthalmia and cataract





Microcephaly

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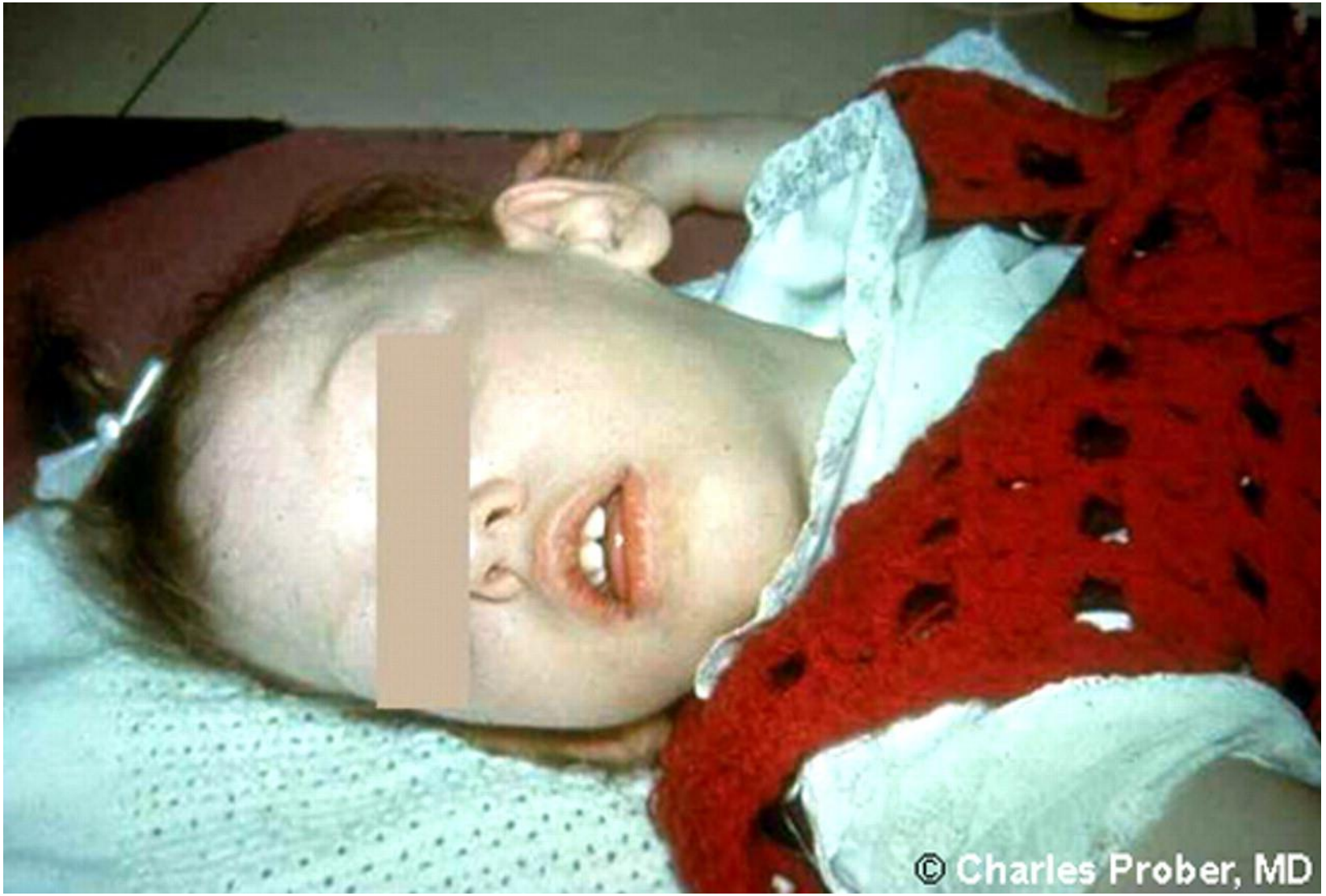
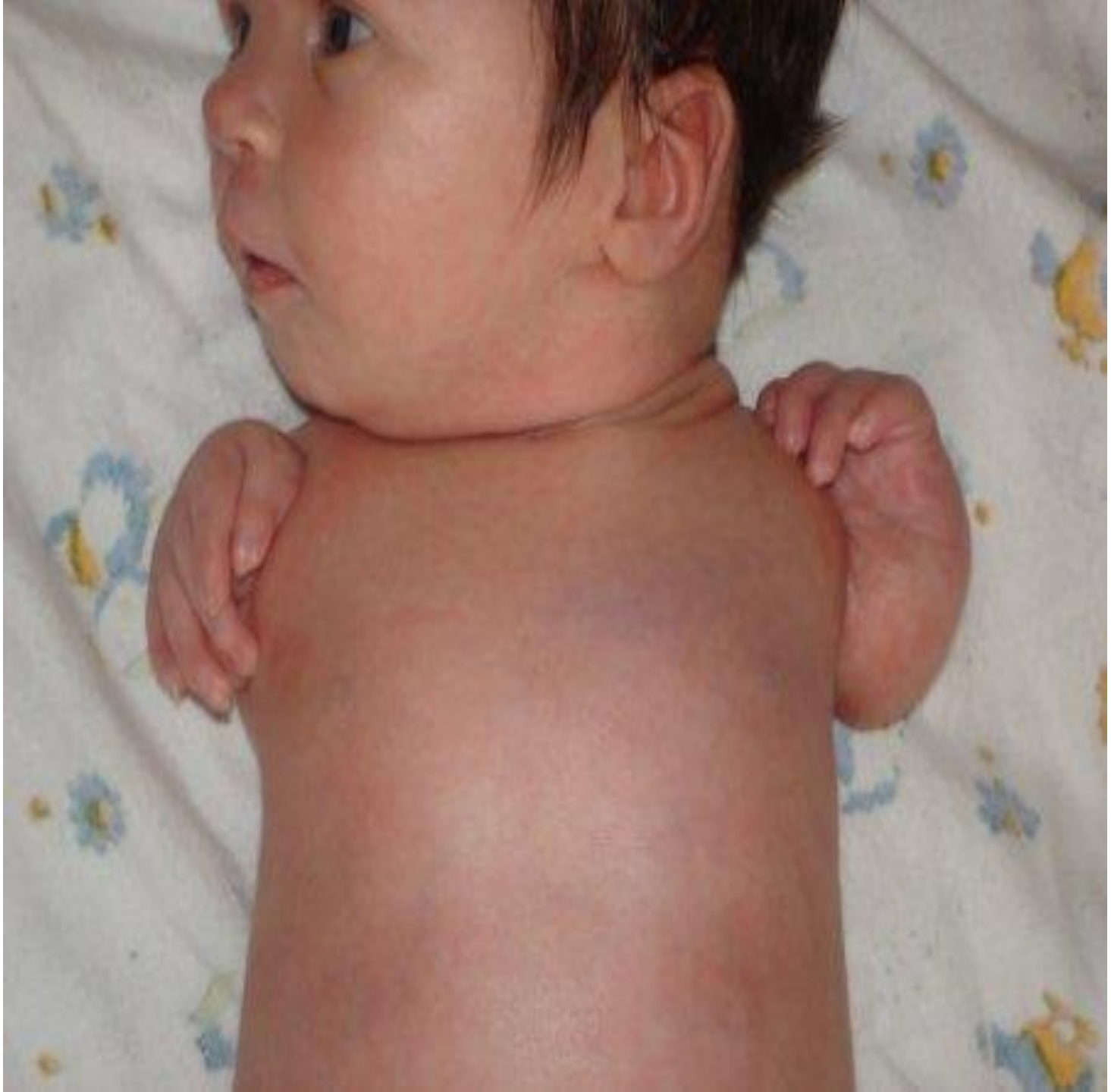
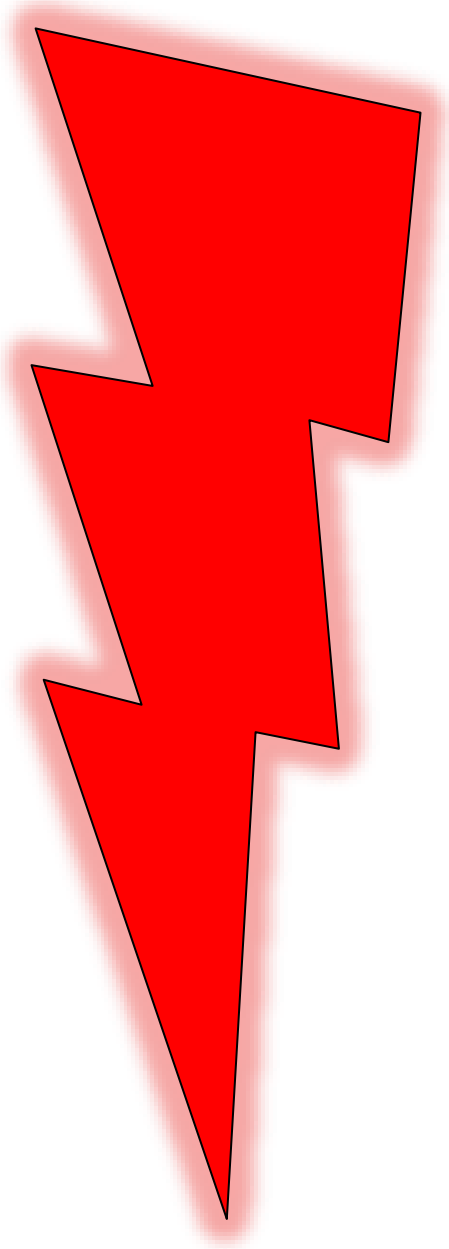




In the presence of two of the main symptoms (cataract, glaucoma, heart disease, deafness, retinopathy pigmentosa) or one of these symptoms plus one of the additional symptoms (purpura, splenomegaly, microcephaly, mental retardation), the disease is considered consistent with the diagnosis of congenital rubella, even if lack of laboratory confirmation.



Treatment: RUBELLA

There is no specific therapy for rubella.
At one time, immune globulin was used in an effort to prevent congenital
rubella when pregnant women became infected.
However, because administration of immune globulin did not prevent maternal viremia, this approach was discarded.
Symptom-based treatment is given for manifestations such as
fever, arthralgia, and arthritis.

PREVENTION

Live attenuated rubella vaccine was licensed in 1969, 7 years after rubella virus was first isolated in culture. This vaccine was developed as a strategy to prevent congenital rubella by ensuring that very few pregnant women would be susceptible and that there would be little circulating wild-type virus. Rubella vaccine induces seroconversion in >95% of recipients