

## APPROACH TO THE DIAGNOSIS OF EXANTEMATIC DISEASES OF CHILDHOOD

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## Summary

Childhood involvement due to exanthematous pathologies is one of the most common conditions in pediatric practice, frequently posing diagnostic challenges. Several conditions can lead to exanthema, with

Infectious causes are responsible for more than 70% of episodes. Most exanthemas are self-limited, however the correct identification of the etiology has clinical relevance due to the severity and deterioration of the prognosis in case of delay in diagnosis in certain cases, and for public health, considering the potential for contagion of infectious causes. The clinical nonspecificity of exanthematous diseases requires a systematic approach for early diagnosis that includes the collection of a complete anamnesis and a broad and careful physical examination. These are the main instruments for diagnostic elucidation, also allowing guidance for laboratory diagnostic conduct. This study aims to expose the main clinical-epidemiological characteristics of exanthemas, emphasizing that anamnesis and physical examination are the main tools to aid in the differential diagnosis and consequent management of patients affected by exanthematous disease in childhood.

Keywords: rash; pediatrics; infection

## Abstract

Childhood involvement due to exanthematous pathologies is one of the most common conditions in pediatric practice, frequently posing diagnostic challenges. Several conditions can lead to rash, with infectious causes being responsible for more than 70% of episodes. Most exanthemas are self-limited, however the correct identification of the etiology has clinical relevance due to the severity and deterioration of the prognosis in case of delay in diagnosis in certain cases, and for public health, considering the potential for contagion of infectious causes. The clinical nonspecificity of exanthematous diseases requires a systematic approach for early diagnosis that includes the collection of a complete anamnesis and a broad and careful physical examination. These are the main instruments for diagnostic elucidation, also providing guidance for laboratory diagnostic conduct. This study aims to expose the main clinical-epidemiological characteristics of exanthemas, emphasizing that anamnesis and physical examination are the main tools to aid in the differential diagnosis and consequent management of patients affected by exanthematous disease in childhood.

Keywords: rash; pediatrics; infection

## Introduction

Exanthematous diseases pose a conflict for public health, due to their high similarity, which makes exanthemas or rashes indistinguishable, making identification and appropriate management difficult and even postponing them. In some situations, depending on the etiological agent, diagnosis is only possible through laboratory resources.

Furthermore, as they are cutaneous manifestations that may or may not be accompanied by more specific symptoms, they are a differential diagnosis of some drug-induced diseases, such as pharmacodermia caused by antibiotics and anti-inflammatories, miliaria, burns caused by exposure to irritating agents (sun, bases, acids) and inoculation by insects and other animals

## Methodology

This is a qualitative narrative review study, suitable for discussing exanthematous diseases in childhood. It consists of a broad analysis of the literature, without establishing a rigorous and replicable methodology at the level of data reproduction and quantitative answers to specific questions.

As it is a bibliographic analysis on the diagnostic approach to exanthematous diseases in childhood, articles indexed on the SciELO, Latindex, PubMed, Google Scholar platforms were retrieved during the month of February 2024, with the last 10 years as the reference period. They were employed the index terms or descriptors exanthematic diseases, infection, pediatrics, complete physical examination, isolated or in combination, without delimiting a temporal interval. The criteria used for inclusion of publications was to have the expressions used in the searches in the title or keywords, or to have it explicit in the abstract that the text is related to the association of the diagnostic approach to exanthematous diseases. The excluded articles did not meet the established inclusion criteria and/or were duplicated, that is, publications retrieved from more than one of the databases. Dissertations and theses were also excluded.

## Results and discussion

### Appearance of the injuries

| Papule   | Taint  | Vesicle  | Bubbles  | Petechiae   |
|--|--|--|--|---|
| <ul style="list-style-type: none"> <li>• Solid</li> <li>• Circumscribed</li> <li>• High</li> <li>• Lower than 1 cm in diameter,</li> <li>• Coming from dermal process, epidermal or mixed</li> </ul> | <ul style="list-style-type: none"> <li>• Change in skin color</li> <li>• Absence of relief or depression</li> <li>• Vasculanguinea (congestion, dilation, constriction)</li> <li>• Pigment (loss of red blood cells or accumulation of melanin)</li> </ul> | <ul style="list-style-type: none"> <li>• Circumscribed elevation</li> <li>• Contains clear, serous liquid, may become yellow, purulent, hemorrhagic red</li> </ul> | <ul style="list-style-type: none"> <li>• Vesicles may-res</li> </ul> | <ul style="list-style-type: none"> <li>• Red stain that does not disappear under vitropressure</li> <li>• Loss of red blood cells in the dermis</li> <li>• 1cm in diameter</li> <li>• Purplish and yellowish-green evolution</li> </ul> |
|  |  |  |  |   |

Figure 01



## Skin lesions

### Varieties of Rashes

|   |   |  |
|---|---|--|
| maculopapular   |   |  |
| Morbilliform: red macules and papules, confluent or not, with areas of healthy skin<br>• Typical of measles                                 | Urticarial: papuloerythematous rash, irregular contours<br>• Presentation in plaques, associated with drug or allergic reactions in general | scarlatiniform<br>• Diffuse, punctate, uniform, rough erythema, without areas of healthy skin<br>• Rashes disappear under pressure |
| Rubeoliform<br>Similar to morbilliform, but pink in color and smaller papules<br>• Areas of streaky erythema<br>• Rubella and enteroviruses | Papulovesicular<br>• Succession of maculopapules in vesicles, vesicopustules and crusts   | Petechial<br>• Vascular changes (red blood cell extravasation), with or without platelet or coagulation changes                    |
|   |   |  |

## Measles

Acute infectious disease, viral in nature (morbillivirus), transmissible and highly contagious. It classically presents with maculopapular rash. Infection or vaccine stimulate IgG (previous/immune) and IgM (recent), being detectable from the 12th to the 15th day after the onset of the rash and reaching the maximum peak from the 21st to the 28th day

Spread occurs among susceptible people through direct contact or fomites, i.e., droplets contaminated by proximity to the airways before the onset of prodromes until four days after the appearance of the rash

With viral penetration into the body, through the upper airways or mucous membranes, viremia occurs with multiplication in lymphatic tissues (primary viremia/prodromal period) prior to the rash (phase of greatest transmission). After 7 to 11 days, due to viral evolution, secondary viremia sets in, affecting the skin,





conjunctiva and mucosa of the respiratory tract

Prodromes appear after the incubation period (8 to 12 days), based on low to moderate fever, dry cough, runny nose and conjunctivitis. At this stage (1 to 4 days after the rash), Koplik spots appear. After 03 to 05 days of the onset of symptoms, the classic rash appears, fever is preserved up to 4 days after the rash, falls into crisis or lysis

The clinical picture is more expressive in the 2 days preceding the rash

After the prodrome, the rash appears, resulting in the patient appearing toxemia, with

significant decline in general condition and worsening of initial symptoms.

|  |
|--|
| Characteristics of the rash in measles |
| Generalized maculopapular rash         |
| Behind-the-ear home                    |
| Cephalocaudal progression              |
| Brown spots and furfuracea scaling     |
|  |

Common complications are otitis media, diarrhea, pneumonia and laryngotracheobronchitis. The most common bacterial complication is acute otitis media. It is estimated that the main cause of death is pneumonia, which can be caused by the virus itself, which is more common, or by an opportunistic bacterial infection, mainly pneumococcus.

Furthermore, keratoconjunctivitis, blindness, myocarditis, mesenteric adenitis, sinusitis, thrombocytopenic purpura, encephalitis, encephalomyelitis, reactivation of tuberculosis due to immunosuppression may occur. Subacute sclerosing panencephalitis (SSPE) is a rare but highly serious complication that appears 7 to 10 years after the primary disease, when there is reactivation of the virus that attacks CNS cells. The first symptoms may be: delay in neuropsychomotor development, drop in school performance, change in behavior and hallucinations, followed by muscle spasms, seizures, tetany and blindness, leading to death within one to three years.

There is no specific treatment. It is recommended to use vitamin A, orally, in two doses, on consecutive days, to reduce the duration, complications and morbidity and mortality, especially blindness.

Home isolation is recommended for up to 4 days after the onset of the rash. Hospitalized patients must undergo aerosol respiratory isolation within 4 days of the onset of the rash.

### Vaccine

The first dose is given at 12 months within the MMR (measles, mumps and rubella). The second dose, at 15 months in tetraviral (measles, mumps, rubella and chickenpox). The complete regimen is two doses for patients aged 12 months to 29 years and a single dose for patients aged 30 to 59 years.

### Post-exposure prophylaxis

It is necessary to carry out post-exposure prophylaxis with vaccine or immunoglobulin in all patients susceptible to the disease, that is, non-immunized patients who have come into contact with a suspected or confirmed case

| Vaccine                          | Immunoglobulin  |
|----------------------------------|---|
| Over 6 months<br>Immunocompetent | Under 6 months<br>Pregnant women<br>immunocompromised |
| Up to 72 hours post exposure     | Up to 6 days after exposure                           |
|                                  |   |

### sudden rash

Also known as infantile roseola or sixth disease, exanthema subitum is an infectious viral disease (human herpesvirus 6 and 7) characteristic of children aged between 6 months and 6 years, predominantly in children under 2 years of age.

Conceptually, the beginning of the painting is SUDDEN. The child has a high and continuous fever that lasts between 3 and 4 days, but without toxemia, as in measles. Before the rash, there may be good general condition, irritability, anorexia, febrile seizures, suboccipital cervical lymph node enlargement of the oropharynx, eyelids and tympanic membrane.

A classic rash is a high fever that lasts a few days and disappears, followed by a severe rash.



### culopapular

Sudden rash is one of the main causes of febrile seizures in children. The diagnosis of sudden rash is essentially clinical, and no examination is necessary.

Complications are rare, but can occur: encephalitis, acute disseminated demyelination, cerebellitis, hepatitis and myocarditis.

Treatment of sudden rash is only symptomatic, accompanied by guidance to those responsible. There is no vaccine available, nor post-exposure prophylaxis.

### Erythema infectiosum

It is a highly contagious viral exanthematous disease, also called parvovirus or fifth disease. The main target of parvovirus B19 is the erythroid line. Infection lyses the cell, causing depletion of erythroid precursors and a transient decrease in erythropoiesis.

Generally, there are no prodromes, the first manifestation being the exanthema. The exanthema begins on the face, with maculopapules that converge, giving the appearance of a “butterfly wing” or “slapped face”. In 1 to 4 days after its appearance, it evolves into the limbs, initially on the extensor surface, then flexor and trunk, with a lacy appearance.

The rash can persist for more than ten days and can exacerbate or reappear when the child exercises, after stress and exposure to cold or heat.

The evolution is generally afebrile, may manifest arthralgias or arthritis, and may lead to the rare gloves and socks syndrome. It is characterized by purpuric, symmetrical, erythematous and painless lesions on the hands and feet, mainly. It is self-limiting and can last from 1 to 2 weeks. Transient aplastic crisis, occurs in patients with chronic hemolytic anemia. Decreased erythropoiesis and reticulocytopenia decrease serum hemoglobin. This causes fever, malaise, lethargy, signs of profound anemia such as pallor, tachycardia and tachypnea. In immunocompromised patients, it may present with chronic anemia, neutropenia, thrombocytopenia or bone marrow suppression. In pregnant women, it can cause miscarriage, fetal death, fetal anemia or dropsy.

The diagnosis, once again, is essentially clinical and no examination is necessary. The contagion period for erythema infectiosum ends when the rash appears and, in most cases, the first manifestation is the rash itself. Therefore, when we make the diagnosis, the child is no longer contagious and does not need to stay away from school. Serology and PCR can be collected to detect viral DNA.

The treatment of sudden rash is only symptomatic and, in addition, guidance to those responsible. There is no vaccine available, nor post-exposure prophylaxis. In the case of patients with chronic hemolytic anemia, a blood transfusion may be necessary.

### Rubella

Viral rash disease considered mild. After an intense vaccination campaign, the last case of rubella in the country occurred in 2008 and that of congenital rubella syndrome in 2009. In April 2015, the Americas region was declared by the International Committee as the first in the world free from transmission endemic.

Around 30% of rubella cases are asymptomatic. In symptomatic patients, prodromes tend to be mild, and in some cases they may even be absent.

Despite being uncommon, the main complication of rubella is **arthralgia**. Other complications may include thrombocytopenic purpura and encephalitis.

There are two signs related to rubella, they are rare:

- Forchheimer's sign: the patient presents petechial lesions on the soft palate. It is not pathognomonic.
- Theodor's sign: The patient presents cervical lymph node enlargement, mainly retroauricular.

It is also not pathognomonic.

Congenital rubella syndrome. It occurs when a pregnant woman is infected by the virus and ends up transmitting it transplacentally to the baby. The sequelae can be deafness, cataracts and heart disease, associated with other non-specific manifestations, such as low birth weight, hepatosplenomegaly, jaundice and neurological changes.

Vaccination is the most effective means of preventing rubella. The complete regimen is done with the first dose at 12 months, in triple viral (measles, mumps and rubella), and the second dose at 15 months, in tetraviral (measles, mumps, rubella and chickenpox). As it is a live attenuated vaccine, it is contraindicated for immunocompromised people and pregnant women. Women of childbearing age must ensure vaccination before becoming pregnant. There is no consensus in the literature on how long one should wait to get pregnant, it varies between one and three months. No





There is immunoglobulin available for rubella and post-exposure prophylaxis must be carried out with vaccination, except in those contraindicated cases.

The diagnosis of rubella is essentially clinical and no exam is necessary in most cases. The virus can be isolated from nasopharyngeal material or urine or a test for IgM and IgG antibodies against rubella in the serum can be carried out.

Finally, treatment is only symptomatic and provides guidance to those responsible.

### Varicella

Chickenpox is a viral infectious disease that can be complicated by secondary bacterial infection. Popularly, it is known as chickenpox.

Prodromes tend to be mild, nonspecific, with low fever and malaise. However, in adolescents and adults, they are usually much more severe.

The rash begins with macules, which become papules, vesicles, pustules and, finally, crusts. They start in the head, reach mucous membranes and descend to the body. As injuries appear at different times, there are

There are several eruptions at different stages, characterizing a polymorphic exanthema.

| Taint | Papule | Vesicle | Pustule | Crust |
|-------|--------|---------|---------|-------|
|       |        |         |         |       |

The main complication is secondary bacterial skin infection, mainly after scratching caused by skin germs, such as *S. aureus*. There are other complications that can occur:

- Reye's syndrome. This syndrome has an unknown cause, but is associated with infections caused by flu and chickenpox in children who use acetylsalicylic acid (ASA) continuously. The symptoms are biphasic, starting as a viral infection, the same as the underlying disease, followed by acute encephalopathy, which can lead to coma and death. Treatment is supportive.

- Disseminated infection. May cause pneumonia, hepatitis, thrombocytopenia, encephalitis, cerebellar ataxia and acute myelitis.

It occurs mainly in immunocompromised people.

- Herpes zoster is a reactivation of the chickenpox virus, which remains latent after the initial infection, in ganglia. It is more common in people over 50 years of age, but can occur at any age, triggered by immunosuppression, stress, sleep deprivation, neoplasms, diabetes and chronic diseases.

With the introduction of the tetraviral vaccine (measles, mumps, rubella and chickenpox) for children aged 15 months, into the national vaccination calendar in 2013, there was a considerable reduction in the number of hospitalizations in the SUS.

Individuals vaccinated against chickenpox may develop the disease, but these are generally very mild cases without serious complications.

For older children, adolescents and non-immunized adults, societies also recommend the two-dose schedule, but it is not available through the public system, only through the private system.

The complete regimen is done with the first dose at 15 months of the tetraviral vaccine (measles, mumps, rubella and chickenpox) and the second dose at 4 years of age, of the isolated chickenpox vaccine. The vaccines are live attenuated, therefore contraindicated in cases of pregnancy or immunosuppression.

Post-exposure, prophylaxis can be carried out using a vaccine or immunoglobulin. We must always give preference to the vaccine, but it is live attenuated and cannot be administered to these groups: immunocompromised, pregnant women, children under one year of age admitted to hospitals, newborns of mothers who developed the disease 5 days before or 2 days after birth, premature babies over 28 weeks

### Chickenpox contactors

The vaccine is for immunocompetent people over 9 months of age up to 3 to 5 days after exposure Immunoglobulin is intended for immunocompromised, pregnant women, children under one year of age in hospital contact with the virus, newborns of mothers who developed the disease 5 days before or 2 days after birth, premature infants > 28 weeks, whose mother has never had chickenpox, premature infants < 28 weeks, regardless of maternal history of chickenpox within 96 hours of exposure whose mother has never had chickenpox, and children under 28 weeks, regardless of whether there has been a previous maternal infection . In them, the immunoglobulin must be used within 96 hours after exposure.

The diagnosis is also essentially clinical and no examination is necessary. In the vesicle phase,



an examination of the liquid can be performed by electron microscopy or antibodies can be detected by indirect immunofluorescence testing.

In most cases, treatment is symptomatic only, but for some patients, acyclovir is indicated.

### ACICLOVIR

- Everyone over 12 years old;
- Those over 12 months old with
  - Chronic skin disease
  - Chronic lung disease
  - Chronic neuropaths
  - Chronic users of corticosteroids, even aerosol;
  - Users of salicylates.

Treatment should be started as soon as possible, preferably within the first 24 hours of the rash appearing. The dose is 20 mg/kg/dose, 4x or 5x a day, for 5 days. Intravenous therapy is indicated in immunocompromised patients and in cases where the infection is disseminated. We used intravenous acyclovir, at a dose of 10 m/mg/kg/dose every 8 hours, for 7 to 14 days. The use of local antiseptics, for example potassium permanganate bath, is no longer recommended, as, when poorly diluted, they can cause burns to the skin. Furthermore, they have not been proven to prevent secondary bacterial infection.

The use of antibiotics is not indicated unless there is a secondary bacterial infection, in which case it should be directed towards it.

### HAND FOOT AND MOUTH DISEASE

Hand-foot-and-mouth disease is an enterovirus. It tends to be common in everyday life, especially in children who attend daycare centers.

The prodrome is nonspecific, consisting of low fever, irritability and anorexia. The exanthema is characterized by lesions in the mouth, hands and feet. In addition, painful ulcers in the oropharynx, papulovesiculares on hands and feet

Ulcers can occur on the lips, tongue, palate and gums. Papulovesicles occur mainly on the hands and feet, but in infants, perineal lesions can occur.

Extensive forms may present with disseminated vesicobullous lesions, disappear without leaving stains, but there may be skin or nail peeling.

### Conclusion

By analyzing the information presented in this study, it can be seen that the etiological investigation of exanthematous disease is one of the greatest diagnostic challenges. Associated with high prevalence, especially in childhood, clinical manifestations may be similar between different etiologies. Despite the immense advances in diagnostic techniques and the reduction in the incidence of some diseases due to immunization, the professional, faced with a patient with a rash, must obtain a complete clinical history and perform a careful and systematic physical examination. To this end, knowledge about the natural history of each etiology is essential so that early diagnosis allows effective intervention on occasions when severity requires it.

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