NEW PERSPECTIVES IN THE DIAGNOSIS AND THE TREATMENT OF CHILDHOOD FEBRILE EXANTHEMAS

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NEW PERSPECTIVES IN THE DIAGNOSIS AND TREATMENT OF CHILDHOOD FEBRILE EXANTHEMAS (Abstract): A child with a febrile exanthema is a complex medical problem involving diagnostic challenges, epidemiological threats and a great concern for the parents and any physician, should be prepared to deal with it. Many of the classical ones (measles, rubella, chickenpox) have now a decreased incidence due to a high vaccine coverage, which makes even harder for the physician to establish an early diagnosis. To the untrained eye most of them are difficult to differentiate. Their prompt recognition is necessary in order to manage them adequately and to prevent spreading of the disease. Keywords: RASH, BLISTERS, ANTIBODIES.

The majority of the febrile exanthemas of the childhood have viral origin and have autolimitant spontaneous evolution. Even that, through its frequency, epidemiological implications and potential viral, bacterial or immunologic complications, these represents an important and delicate medical and epidemiologic problem. Due to high vaccination coverage, some of them are now rarely seen.

MEASLES
Measles, also known as morbilli, is an infection of the respiratory system, immune system and skin caused by a virus, specifically a paramyxovirus of the genus *Morbillivirus*. Symptoms usually develop 7–14 days (average 10–12) after exposure to an infected person and the initial symptoms usually include a high fever (often > 40 °C), Koplik's spots (spots in the mouth, these usually appear 1–2 days prior to the rash and last 3–5 days), malaise, loss of appetite, hacking cough (although this may be the last symptom to appear), runny nose and red eyes (1). After this a spot-like rash comes, covering much of the body. The course of measles, provided there are no complications, such as bacterial infections, usually lasts about 7–10 days. Measles is an airborne disease that is spread through respiration (contact with fluids from an infected person's nose and mouth, either directly or through aerosol transmission via coughing or sneezing), and is highly contagious-90% of people without immunity
sharing living space with an infected person will catch it. An asymptomatic incubation period occurs nine to twelve days from initial exposure. The period of infectivity has not been definitively established, some saying it lasts from two to four days prior, until two to five days following the onset of the rash (i.e., four to nine days infectivity in total), and whereas others say it lasts from two to four days prior until the complete disappearance of the rash. The rash usually appears between two and three days after the onset of illness.

The classic signs and symptoms of measles include four-day fevers and the three Cs-cough, coryza (head cold), and conjunctivitis along with fever and rashes (2). The fever may reach up to 40 °C. Koplik’s spots seen inside the mouth are pathognomonic for measles, but are not often seen, even in confirmed cases of measles, because they are transient and may disappear within a day of arising. Their recognition, before the affected person reaches maximum infectivity, can be used to reduce spread of epidemics.

The characteristic measles rash is classically described as a generalized, maculopapular, erythematous rash that begins several days after the fever starts. It starts on the back of the ears and, after a few hours, spreads to the head and neck before spreading to cover most of the body, often causing itching. The measles rash appears two to four days after the initial symptoms and lasts for up to eight days. The rash is said to "stain", changing color from red to dark brown, before disappearing. Complications with measles are relatively common, ranging from mild and less serious complications such as diarrhea to more serious ones such as pneumonia (either direct viral pneumonia or secondary bacterial pneumonia), otitis media, acute encephalitis and corneal ulceration (leading to corneal scarring). Complications are usually more severe in adults who catch the virus. In underdeveloped nations with high rates of malnutrition and poor healthcare, fatality rates have been as high as 28%. In immuno compromised persons the fatality rate is approximately 30%. Clinical diagnosis of measles requires a history of fever of at least three days, with at least one of the three C’s (cough, coryza, conjunctivitis). Observation of Koplik’s spots is also diagnostic of measles. Alternatively, laboratory diagnosis of measles can be done with confirmation of positive measles Ig M antibodies or isolation of measles virus RNA from respiratory specimens. In patients where phlebotomy is not possible, saliva can be collected for salivary measles-specific Attesting Positive contact with other patients known to have measles adds strong epidemiological evidence to the diagnosis. The contact with any infected person in any way, including semen through sex, saliva, or mucus, can cause infection. There is no specific treatment for measles. Most patients with uncomplicated measles will recover with rest and supportive treatment. It is, however, important to seek medical advice if the patient becomes more unwell, as they may be developing complications. Some patients will develop pneumonia as a sequel to the measles. Other complications include ear infections, bronchitis (either viral bronchitis or secondary bacterial bronchitis), and encephalitis. Acute measles encephalitis has a mortality rate of 15%. While there is no specific treatment for measles encephalitis, antibiotics are required for bacterial pneumonia, sinusitis, and bronchitis that can follow measles.
**RUBELLA**

Rubella, also known as *German measles* or *three-day measles*, is a disease caused by the rubella virus. This disease is often mild and attacks often pass unnoticed. The disease can last one to three days. Children recover more quickly. Infection of the mother by rubella virus during pregnancy can be serious; if the mother is infected within the first 20 weeks of pregnancy, the child may be born with congenital rubella syndrome (CRS), which entails a range of serious incurable illnesses. Miscarriage occurs in up to 20% of cases (3). The disease is caused by Rubella virus, a togavirus that is enveloped and has a single-stranded RNA genome. The virus is transmitted by the respiratory route and replicates in the nasopharynx and lymph nodes. The virus is found in the blood 5 to 7 days after infection and spreads throughout the body (4).

Rubella is a common childhood infection that is seldom fatal usually with minimal systemic upset although transient arthropathy may occur in adults. Serious complications such as deterioration of the skin are very rare. Apart from the effects of transplacental infection on the developing fetus, rubella is a relatively trivial infection. Rubella has symptoms that are similar to those of flu. However, the primary symptom of rubella virus infection is the appearance of a rash on the face which spreads to the trunk and limbs and usually fades after three days. The facial rash usually clears as it spreads to other parts of the body. Other symptoms include low grade fever, swollen glands (sub occipital and posterior cervical lymphadenopathy), joint pains, and headache and conjunctivitis lesions. During this incubation period, the patient is contagious typically for about one week before he/she develops a rash and for about one week thereafter. In children Rubella normally causes symptoms which last two days and include the following: rash beginning on the face which spreads to the rest of the body, low fever, posterior cervical lymphadenopathy (5). The swollen glands or lymph nodes can persist for up to a week and the fever rarely rises above 38°C the rash of German measles is typically pink or light red. The rash causes itching and often lasts for about three days. The rash disappears after a few days with no staining or peeling of the skin. When the rash clears up, the skin might shed in very small flakes where the rash covered it. Forchheimer’s sign occurs in 20% of cases, and is characterized by small, red papules on the area of the soft palate. Other symptoms are swollen glands, coryza (cold like symptoms), and aching joints (especially in young women). Diagnosis is done through determination of Rubella virus specific IgM antibodies present in people recently infected by Rubella virus, but these antibodies can persist for over a year and a positive test result needs to be interpreted with caution. The presence of these antibodies along with, or a short time after, the characteristic rash confirms the diagnosis (5, 6). There is no specific treatment for Rubella.

**CHICKENPOX**

Chickenpox is an airborne disease which spreads easily through coughing or sneezing by ill individuals or through direct contact with secretions from the rash. Chickenpox is a highly contagious disease caused by a primary infection with varicella zoster virus (VZV). It usually starts with a vesicular skin rash mainly on
the body and head rather than on the limbs. The rash develops into itchy, raw pockmarks, which mostly heal without scarring (5, 7). On examination, the observer typically finds skin lesions at various stages of healing, and ulcers in the oral cavity and tonsil areas. The disease is most commonly observed in children. Children with chickenpox are infectious one to two days before the rash appears. They remain contagious until all lesions have crusted over (this takes approximately six days). Immunocompromised patients are contagious during the entire period as new lesions keep appearing. Crusted lesions are not contagious. Chickenpox is a highly contagious disease caused by primary infection with varicella zoster virus (VZV). It usually starts with a vesicular skin rash mainly on the body and head rather than on the limbs. The rash develops into itchy, raw pockmarks, which mostly heal without scarring. On examination, the observer typically finds skin lesions at various stages of healing, and ulcers in the oral cavity and tonsil areas. This is followed by the characteristic rash or oral sores, malaise, and a low-grade fever that signal the presence of the disease. Oral manifestations of the disease (exanthem) not uncommonly may precede the external rash (exanthema). In children the illness is not usually preceded by prodromal symptoms, and the first sign is the rash or the spots in the oral cavity. The rash begins as small red dots on the face, scalp, torso, upper arms and legs; progressing over 10–12 hours to small bumps, blisters and pustules; followed by umbilication and the formation of scabs (8).

At the blister stage, intense itching is usually present. Blisters may also occur on the palms, soles, and genital area. Commonly, visible evidence of the disease develops in the oral cavity and tonsil areas in the form of small ulcers which can be painful or itchy or both; this exanthem) can precede the exanthem by 1 to 3 days or can be concurrent. These symptoms of chickenpox appear 10 to 21 days after exposure to a contagious person. Because watery nasal discharge containing live virus usually precedes both exanthem (external rash) and exanthem (oral ulcers) by 1 to 2 days, the infected person actually becomes contagious one to two days prior to recognition of the disease. Contagiousness persists until all vesicular lesions have become dry crusts which usually entail four or five days, by which time nasal shedding of live virus also ceases. Chickenpox is rarely fatal, although it is generally more severe in adult men than in women or children. Non-immune pregnant women and those with a suppressed immune system are at highest risk of serious complications. The diagnosis of varicella is primarily clinical, with typical early "prodromal" symptoms, and then the characteristic rash and oral-cavity sores. Confirmation of the diagnosis can be sought through either examination of the fluid within the vesicles of the rash, or by testing blood for evidence of an acute immunologic response. Vesicular fluid can be examined with a Tzanck smear, or better by testing for direct fluorescent antibody. The fluid can also be "cultured", whereby attempts are made to grow the virus from a fluid sample.

**SCARLET FEVER**

Scarlet fever is an infectious disease of children. The disease itself is caused by secretion of pyrogenic exotoxins by the
infecting *Streptococcus*. Exotoxin A (speA) is probably the best studied of these toxins (9). Symptoms include sore throat, fever and a characteristic red rash. Scarlet fever is usually spread by inhalation. Scarlet fever is usually spread by the aerosol route (inhalation) but may also be spread by skin contact or by fomites. Asymptomatic carriage may occur in 15–20% of school-age children. The incubation period is 1–4 days. Scarlet fever is characterized by: fever, sore throat, bright red tongue with a "strawberry" appearance, Forchheimer spots (fleeting small, red spots on the soft palate). A characteristic rash, which is fine, red, and roughtextured, blanches upon pressure appears 12–72 hours after the fever starts generally begins on the chest and armpits and behind the ears. It may also appear in the groin on the face, often shows as red cheeks with a characteristic pale area around the mouth (circumoral pallor) is worse in the skin folds (so-called Pastia lines), where the rash runs together in the armpits and groin, appear and can persist after the rash is gone) may spread to cover the uvula begins to fade three to four days after onset and desquamation (peeling) begins. This phase begins with flakes peeling from the face. Peeling from the palms and around the fingers occurs about a week later. Peeling also occurs in the axilla, the groin, and the tips of fingers and toes. The rash is the most striking sign of scarlet fever. It usually appears first on the neck and face (often leaving a clear, unaffected area around the mouth). It looks like bad sunburn with tiny bumps, and it may itch. It then spreads to the chest and back and finally to the rest of the body. In the body creases, especially around the axillae (underarms) and elbows, the rash forms the classic red streaks known as Pastia lines. On very dark skin, the streaks may appear darker than the rest of the skin. Areas of rash usually turn white (or paler brown, with dark completed skin) when pressed on. By the sixth day of the infection, the rash usually fades, but the affected skin may begin to peel (5, 10).

Usually there are other symptoms that help to confirm a diagnosis of scarlet fever, including a reddened and sore throat, fever and swollen glands in the neck. Scarlet fever can also occur with a low fever. The tonsils and back of the throat may have a whitish coating, or appear red, swollen, and dotted with whitish or yellowish specks of pus. Early in the infection, the tongue may have a whitish or yellowish coating. Also, an infected person may have chills, body aches, nausea, vomiting, and loss of appetite.

When scarlet fever occurs because of a throat infection, the fever typically subsides within 3 to 5 days, and the sore throat passes soon afterward. The scarlet-fever rash usually fades on the sixth day after sore-throat symptoms started, and begins to peel (as described above). The infection itself is usually cured with a 10-day course of antibiotics, but it may take a few weeks for tonsils and swollen glands to return to normal. Scarlet fever can be diagnosed by clinical signs and symptoms. Complete blood count findings characteristic of Scarlet fever would show marked leukocytosis with neutrophil a and conserved or increased eosinophils, high erythrocyte sedimentation rate and C-reactive protein and elevation of antistreptolysin O titer. The treatment and course of scarlet fever are no
different from those of any strep throat-penicillin or macrolides.

Other diseases with febrile exanthema, but with a lower frequency, are epidemic megalerythema hand-foot-mouth disease, roseola infantum or the consequence of infection with different subtypes of enteroviruses or adenoviruses (11).

CONCLUSIONS
Any childhood febrile exanthema is a complex medical problem involving diagnostic challenges, epidemiological threats and a great concern for the parents and any physician, especially the infectious disease specialist, pediatrician or dermatologist should be prepared to face them.

REFERENCES