Acute childhood exanthems

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Abstract

Exanthems are rashes that in childhood are most commonly caused by viruses. This article describes the common exanthems, including measles, rubella, varicella, erythema infectiosum, papular-purpuric gloves and socks syndrome, roseola infantum, hand, foot and mouth disease, Gianotti–Crosti syndrome, unilateral laterothoracic exanthem and pityriasis rosea. It outlines their transmission, infectivity, prodrome, clinical presentation, complications and treatment. Although it is often difficult to identify the specific virus, polymerase chain reaction analysis has improved diagnostic accuracy, which is particularly important in immunocompromised individuals and pregnant women. Alternative diagnoses include bacterial and non-infectious causes.

Keywords erythema infectiosum; exanthem; measles; rash; roseola; rubella; varicella; virus

Exanthems are rashes that are usually generalized and associated with systemic symptoms including fever. The commonest cause in childhood is viral infection although other causes include bacterial infection and drug exposure. Diagnosis of the aetiology of a viral exanthem is often difficult, and relies on relevant history of prodromal symptoms, evolution, associated symptoms, exposure to infections, foreign travel, time of year and immunization history.[1] Examination findings that guide diagnosis include the nature of the rash, its distribution, and other manifestations including oral enanthems. Most viral exanthems can be diagnosed serologically or by identifying viral RNA by polymerase chain reaction (PCR) in blood, respiratory specimens or cerebrospinal fluid.

Viral exanthems are predominantly maculopapular rashes that may be difficult to distinguish. They should be differentiated from rashes associated with bacterial infection, such as meningococcal septicaemia, scarlet fever, toxic shock syndrome and staphylococcal scalded skin syndrome, tick-borne diseases such as Lyme disease and rickettsial diseases, and Kawasaki's disease. In addition it is important to consider non-infectious causes, such as Henoch–Schönlein purpura, juvenile idiopathic arthritis, leukaemia and drug exposure.

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What's new?

- The number of confirmed measles cases in the UK is still increasing
- There has been an increase in rubella outbreaks in unimmunized individuals relating to returned travellers from Europe
- Vaccine coverage of measles, mumps and rubella (MMR) in the UK, having dropped significantly, is now increasing again
- Shingles (varicella-zoster virus) vaccine has been added to the routine immunization schedule in the UK for those over 70 years old.

Viral exanthems are often difficult to differentiate from each other even after careful history-taking and examination. The availability of PCR has greatly increased diagnostic accuracy, important in contacts of pregnant women or immunocompromised patients, but results are rarely available immediately. Although most viral exanthems are benign and self-limiting, it is important to treat potentially life-threatening diseases in the differential diagnosis urgently.

Although severe complications occur occasionally, viral exanthems are generally self-limiting illnesses (Table 1).

Measles

Measles (rubeola) is caused by a paramyxovirus and is spread by respiratory contact. It remains a significant cause of childhood mortality in developing countries, although global mortality from measles has decreased since the introduction of comprehensive immunization programmes from 873,000 deaths in 1999 to 345,000 in 2005.[2] Controversy and media reporting in 1998, following publication of a small study suggesting an association between MMR (measles, mumps and rubella) vaccination and childhood autism, led to a decrease in the uptake of the MMR vaccine in the developed world reaching a nadir in 2003.[3] This led to outbreaks of measles in children and adults due to a loss of individual and herd immunity. The original study has since been discredited and withdrawn and numerous other studies have shown no relationship between MMR and neurodevelopmental or gastrointestinal conditions.[4–6] MMR uptake is increasing once again, and although currently only 86% of children in the UK have had two doses by their fifth birthday, this reflects a steady increase from 75% in 2008.[7] However, the incidence of measles is still increasing in the UK with 2016 laboratory-confirmed cases in 2012, greater than double the figure of 990 in 2007.[8] Over 60% of these are in infants, preschool and primary school age children. Unimmunized children are also at risk of acquiring measles when travelling to, or being in contact with recent travellers from, high-prevalence countries.

Measles has a prodromal period of fever, coryza, conjunctivitis and cough for several days before the rash develops. The morbilliform rash has maculopapular lesions of a few millimetres that may be confluent (Figure 1). Koplik's spots are pathognomonic white spots on the buccal mucosa. Complications include otitis media, pneumonia, pneumonitis, myocarditis and pericarditis. Encephalitis may occur, either acutely, or months to years later as subacute sclerosing panencephalitis.

Incubation and infectivity periods for acute viral exanthems

Exanthem	Incubation (days)	Duration of infectivity
Measles	8–12	Two days before prodrome to 5 days after rash appears
Rubella	14–21	Seven days before rash to 5 days after rash appears; in congenital infection viral shedding can persist for months
Varicella	10–21	Two days before rash to 5 days after rash appears
Erythema infectiosum	4–14	Before the onset of the rash
Papular-purpuric gloves and socks syndrome	10	During shedding of virus, which can persist until after the rash disappears after 7–14 days
Roseola infantum	9	During shedding of virus, which can persist for weeks
Hand, foot and mouth disease	4–7	During shedding of the virus, which can persist in the stool for several weeks

Table 1

Treatment of measles is primarily supportive, although in immunocompromised individuals intravenous immunoglobulin (IVIG) and ribavirin have been used to try to decrease the duration of viraemia. Vitamin A supplementation is widely used to reduce mortality, although a Cochrane review showed that this was likely to be of most benefit in children under the age of 2 years.[9] A further Cochrane review suggested that concurrent antibiotic treatment may prevent pneumonia and otitis media.[10] The mainstay of secondary prevention comprises contact tracing with implementation of catch-up immunization and, in immunocompromised individuals, prophylaxis with intramuscular human normal immunoglobulin.

Figure 1 Measles.

Rubella

Caused by a togavirus, rubella (German measles) is spread by respiratory droplets and is most prevalent in late winter and spring. In countries with comprehensive childhood immunization and effective catch-up campaigns in adolescence and in women of child-bearing age, there has been a dramatic decrease in the incidence of rubella.[11] However, many countries have no anti-rubella immunization programmes and globally the incidence of congenital rubella syndrome is estimated to be over 100,000/year. In Europe the majority of cases of rubella are from eastern Europe, including recent small outbreaks in the UK involving unimmunized adolescents returning from Europe.[12]

Rubella is an asymptomatic infection in up to 50% of individuals. In symptomatic children there is a mild prodromal febrile period with lymphadenopathy and conjunctivitis, whereas in adults the symptoms are usually more prominent, with anorexia, nausea and fever. The prodrome precedes a facial maculopapular rash that spreads to the trunk and limbs and fades after about 3 days. The rash, lymphadenopathy and conjunctivitis may initially be mistaken for adenoviral infection or Kawasaki's disease. Rarely, there are also red papules on the hard palate (Forschheimer spots). Complications are unusual, although occasionally adults develop transient arthropathy, and rarely peripheral neuritis or encephalitis. If a pregnant woman contracts rubella in the first trimester, transplacental infection can cause congenital rubella syndrome in the developing fetus. This leads to a high probability of fetal loss or premature birth, and a constellation of severe symptoms in the baby, including cerebral, cardiac, ophthalmic and auditory defects. It is a progressive disease and all abnormalities may not be present at birth.

Rubella vaccine is contraindicated in pregnancy. However, inadvertent vaccination during the first trimester does not necessarily cause congenital disease and is not an indication for termination.[13]

Varicella (see also Herpesvirus on pages 34–38 of this issue)

Varicella (chicken pox) is caused by a herpesvirus, varicella-zoster virus (VZV). The highest incidence is in young children, although non-immune adults are also at risk. It is highly infectious and the chance of a susceptible second household member becoming infected is 80–95%. Although the disease is spread primarily by respiratory droplets, the vesicle fluid is also infectious.

The prodromal period consists of fever, cough, coryza and sore throat, and is followed by an intensely pruritic rash. Initially papular, the lesions develop into clusters of vesicles that spread from the face and trunk to the limbs, occasionally becoming haemorrhagic (Figure 2). New crops of vesicles develop every few days until they crust over and lesions exist concurrently at several different stages. Secondary bacterial infection, usually in the form of otitis media or group A streptococcal cellulitis, occurs in about 10%. Rarely, the more severe manifestation of group A streptococcal necrotizing fasciitis occurs, which is characterized by severe pain. This is a surgical emergency and must be considered in an individual with varicella with these symptoms. The rate of complications following varicella, such as pneumonitis, encephalitis and cerebellar ataxia, is higher in adults than