

Simultaneous chickenpox and measles infection among migrant children who stayed in Italy during the second half of June 2011

Igor Ivić-Hofman,¹ Ante Cvitković,¹
Bernard Kaić,² Tatjana Vilibić-Čavlek,³
Nenad Pandak,⁴ Zorana Marić,¹
Dragana Jurić¹

¹Brodsko-posavska County Institute of Public Health, Slavonski Brod; ²Croatian National Institute of Public Health, Department of Infectious Disease Epidemiology; ³Croatian National Institute of Public Health, Virology Department, Zagreb; ⁴General Hospital Dr Josip Benčević, Slavonski Brod, Croatia

Abstract

We are reporting on a household outbreak of measles, in which cases of simultaneous measles and chickenpox infection occurred in children of a family who resided in Italy during the incubation period (June 2011). In three children, fever and generalized confluent macular rash were the dominant symptoms. Serology testing revealed simultaneous measles and chickenpox infection in four children.

Introduction

Measles and chickenpox are two separate clinical entities. They are caused by distinct viruses that belong to different families (varicella-zoster virus, a DNA virus belonging to the family *Herpesviridae*; morbilli virus, an RNA virus belonging to the family *Paramyxoviridae*).¹

Universal measles vaccination was introduced into the Croatian Immunization Program in 1968. Owing to sustained high vaccination coverage with two doses of measles vaccine, at the age of one and seven years, measles are virtually eliminated in Croatia.² In the last decade only sporadic imported cases of measles are reported, with the exception of two small outbreaks, which occurred in 2004 and 2008 following importation of measles.³

Since there is no universal chickenpox vaccination in Croatia and the number of vaccinated persons upon request is very low, chickenpox is a common childhood disease with an annual incidence of 25-30 cases per 1000 children under 15 years of age.⁴

Case Report

A migrant family resided in Italy in the second half of June 2011. The first symptoms of illness (fever and rash on the trunk and extremities) appeared during their stay in Italy. Upon arrival to Croatia, on 5 July, two of the children (15 and eight years of age) were admitted to hospital with suspected measles and chickenpox.

Both children presented with fever up to 39°C, dry cough and confluent macular rash which was most prominent on the face and neck. The 15-year-old daughter had prominent retroauricular confluent rash and Koplik spots on the buccal mucosa.

Five days later, on 10 July an 18-year-old boy from the same family, presented at the infectious clinic with fever up to 39°C and dense confluent macular rash, with numerous scabs on the face and entire body. An epidemiological investigation revealed that he had chickenpox with disease onset at the time of their stay in Italy about 15 June.

The epidemiological investigation focused on ten children from the same family. In six children (including the two hospitalized girls) blood samples were taken on 14 July and sent to the Reference Laboratory at the Croatian National Institute of Public Health (CNIPH) for measles and varicella-zoster serology testing.

Based on clinical manifestations and results of serology testing, four of these six children had simultaneous infection with measles and varicella and two children had chickenpox. Four siblings who had no symptoms and had no history of measles immunization were vaccinated with a monovalent measles vaccine following the investigation.

Laboratory Investigation

Serologic tests were performed at WHO National Measles Laboratory, Department of Virology (CNIPH). Specific IgM and IgG antibodies to measles and varicella-zoster virus (VZV) were detected using commercial enzyme-linked immunosorbent assay (Virotech, Russelsheim, Germany). VZV IgG positive samples were tested for IgG avidity (Euroimmun, Lubeck, Germany).

Serologic results are presented in Table 1. In two patients (patients 1 and 2) varicella infection was confirmed by presence of IgM antibodies and low IgG avidity. Four patients (patients 3-6) showed simultaneous measles and varicella infection. All of them had positive measles IgM antibodies. Two patients (patients 3 and 4) had positive VZV IgM antibodies with low IgG avidity. For two patients (patients 5 and 6), paired samples were

Correspondence: Igor Ivić-Hofman, Brodsko-posavska County Institute of Public Health, Slavonski Brod, Croatia.
E-mail: igor.ivic78@gmail.com

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obtained three weeks later. In both patients, varicella infection was confirmed by low IgG avidity in the second sample (Table 1).

Discussion

The epidemiological investigation revealed that none of the ten children were vaccinated against measles (which is mandatory according to the Childhood Immunization Programme in Croatia) or varicella (which is not mandatory). The fact that none of the children were vaccinated represents a public health issue in a relatively small migrant population and indicates that vaccination coverage may be low in this population.

Simultaneous infection and clinical illnesses of a viral and bacterial etiology is a well known fact, as well as co-infections but not simultaneous illness caused by two distinct viruses. However, clinical disease caused by two viruses at the same time is known to be a feature of only a few viruses, notably HIV, hepatitis B and hepatitis C viruses.

Our literature search revealed only a few case reports of children who had measles and chickenpox at the same time.⁵⁻⁸ All these cases occurred at the time when incidences of both measles and chickenpox were high in the populations.

Due to very high incidence rates of chickenpox and still high incidence of measles in countries with low vaccination coverage, one would expect numerous cases of simultaneous disease in the absence of some kind of immunological interference. The rarity of reports on simultaneous measles and chickenpox illness indicates that recent infection with one virus results in suppression of clinically manifest disease caused by another virus if a

Table 1. Serologic results in six patients with suspected measles and varicella infection.

Patient	Age	Sex	Measles virus		Varicella-zoster virus			
			IgM	IgG	IgM	IgG	IgG avidity	
1	I	11	F	Negative	Negative	Positive	Positive	Low
2	I	12	M	Negative	Negative	Positive	Positive	Low
3	I	15	F	Positive	Negative	Negative	Positive	Low
4	I	8	F	Positive	Negative	Positive	Positive	Low
5	I	18	M	Positive	Negative	Positive	Equivocal	-
	Positive			Positive	Positive	Positive	Low	
6	I	12	F	Positive	Positive	Negative	Negative	-
	Positive			Positive	Positive	Equivocal	Low	

*Paired serum samples (obtained three weeks later).

person acquires the other infection soon afterward.^{9,10}

The simultaneous illness described in our report is quite unexpected because measles is virtually eliminated in Croatia and in earlier decades, when measles was a common childhood disease, we have not identified cases of simultaneous clinical illness caused by measles and chickenpox.

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