

Adult Measles – Case Reports of a Highly Contagious Disease

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Abstract

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BACKGROUND: Measles is highly contagious and is caused by the RNA morbillivirus. The best protection is active immunisation in early childhood. Without immunisation morbidity and mortality of measles are high. In recent years, an increasing number of adult measles has been recognised in Europe.

CASE REPORTS: We report here on two adult patients – a 40-year-old male and a 55-year-old female – who presented with fever, fatigue, cough, coryza, conjunctivitis and maculopapular rash. The suspicion of adult measles infection was confirmed by positivity for IgM antibodies against measles virus and reverse-transcriptase polymerase chain reaction in blood and urine. Patients were isolated, and the treatment was symptomatic. In the younger patient, complete recovery was achieved within two weeks. In the older patient, an acute encephalopathy developed after initial improvement characterised by cognitive impairment.

CONCLUSIONS: In patients presenting with fever and maculopapular rash and fatigue, measles should be considered even in adult patients. Early diagnosis with subsequent isolation and registration of patients are important measures to prevent local outbreaks of the disease.

Introduction

Measles is caused by infection with morbillivirus, which belongs to the *paramyxoviridae* family of single-stranded, negative-sense, non-segmented RNA viruses. The complete genome sequence of measles viruses has been discovered [1].

Measles belongs among the most contagious disorders of humankind with a basic reproduction number (R₀) of 15 to 18, that translates into 15 to people who got infected by a single index patient. Almost everybody who is not immunised develops measles after two hours in the same room with an infected patient [2].

The incubation time is about 10 days. The disease is characterised by fever, followed by cough, coryza, and conjunctivitis. After 3 days of fever, the measles rash appears with small white Koplik's spots

on the buccal mucosa [3], [4] and maculopapular erythema, which starts on the face and spreads quickly to the trunk and the extremities [5]. Common complications include pneumonia, diarrhoea, middle ear infection, and central nervous system symptoms including seizures or encephalitis [6]. The risk of severe complication of measles is highest in children < 5 years of age and in adults > 20 years of age [7].

Immunisation provides protection [8]. The vaccine coverage in the general population should be as high as 95% to provide herd protection. Currently, this has not been realised in many European countries. In Germany, the Robert Koch Institute registered 727 cases of measles in 2017, translating into an incidence of 8.9 per 1 000 000 inhabitants. About 40% of registered cases were adults older than 20 years of age [9]. We report here two recent cases of adult measles in Dresden, Germany.

Case reports

Case 1

A 40-year-old male patient presented with high fever, fatigue, cough, sore throat, dysgeusia, conjunctivitis, and diarrhoea in the emergency department of the Municipal Hospital Dresden. About three days before, he had developed an erythematous rash. He had got a vaccination against measles as a child.

On examination, we observed a non-obese patient with severe fatigue. Koplik's spots were missing, but the oral mucosa was erythemic, vulnerable and bled easily. He had acute conjunctivitis and a generalised maculopapular rash including the palmar skin (Figure 1a).

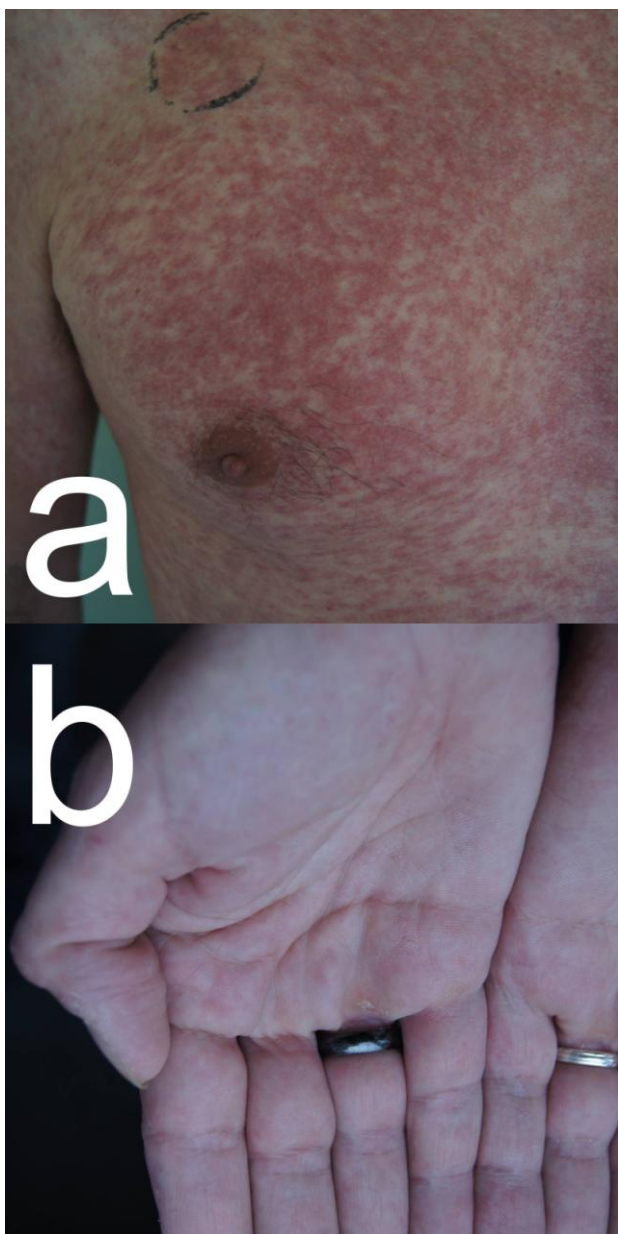


Figure 1: Measles: A) and B) Maculopapular rash. Involvement of the palms

Laboratory findings included thrombocytopenia, hyponatraemia, a moderate increase of C-reactive protein, and increased transaminases. Anti-measles IgM antibodies were positive in serum probes. Measles virus-RNA was detected from oral mucosa swabs and urine by polymerase chain reaction (PCR).

X-ray of the lungs suggested atypical pneumonia.

The patient was immediately isolated. Symptomatic therapy with intravenous infusions to correct hyponatraemia, antipyretic therapy with metamizole and clarithromycin for pneumonia was initialised. The patient achieved complete remission within 12 days.

Case 2

A 55-year-old female patient presented with fever, fatigue, arthralgia, muscle pain, dyspnea, dysphonia, sore throat, cough in the emergency department. On the day before, she developed an erythematous rash.

On examination, we found a patient with a generalised maculopapular rash, Koplik's spots, conjunctivitis, and basal pulmonary crepitations (Fig. 1b).

Laboratory findings were leukopenia with 2.27 Gpt/L, lymphopenia (11%), increased plasma cell count (3%), thrombocytopenia (115 Gpt/L), 5-fold increased transaminases ASAT (2.85 μ kat/L) and ALAT (2.09 μ kat/L), gamma-glutamyl transferase 10.01 μ kat/L (15-fold increase), creatinine kinase 22 μ kat/L (8-fold increase), C-reactive protein 23.4 mg/L. Infection serology for influenza, hepatitis B, HIV 1/2, and legionella spp. was all negative. Measles IgM-antibodies were positive. PCR for measles from oral swabs and urine were positive. Computerised tomography of lungs and brain was unremarkable.

The patient was immediately isolated. Symptomatic treatment was initiated, and clinical improvement was rapid. After a couple of days, however, the patient developed cognitive dysfunction. She became unable to organise her daily activities. Eventually, she was unable to dress. She lost spontaneous communication but could answer simple direct questions. We suspected central nervous involvement. The cerebrospinal fluid analysis (CSF) revealed normal cell counts, protein concentration, and immunoglobulin levels. Measles virus PCR was negative. Multiplex PCR film array disclosed no meningitis or encephalitis pathogens. Magnetic resonance imaging (MRI) of the brain was normal. Both electrocardiogram and electroencephalogram were normal. The neurologic and psychiatric evaluation suggested a chronic encephalopathy. Improvement was significantly delayed. Therefore, neurological rehabilitation was organised.

Discussion

Measles is a highly contagious viral disease affecting worldwide about 190 000 patients [6]. In the European Economic Area, 1818 measles infections were reported between July 2015 to June 2016, including 309 cases from Germany [10]. Local vaccination gaps caused several local epidemics in Berlin, Baden-Württemberg, and Bavaria. The most efficient and feasible intervention to limit measles outbreaks is the improvement of vaccination rate in the general population [11], [12], [13].

Clinical diagnosis of measles can be confirmed by laboratory methods such as a positive serological test for measles-specific immunoglobulin M antibody, isolation of measles virus in culture, or detection of measles virus RNA by ribonucleic acid reverse transcriptase-PCR [6].

There is an increasing number of adults affected by measles. Our patients disclosed a clinical peculiarity. In the typical case, measles exanthema spares palms and soles. Both patients, however, had involvement of the palms.

Patients older than 20 years of age are at risk of developing major complications such as subacute sclerosing panencephalitis (SSPE), a deadly disease due to persistence of measles virus in the central nervous system [9].

In both patients presented here, fatigue was associated with the 3 C's cough, coryza and conjunctivitis plus fever. The first patient was probably incompletely vaccinated during childhood. This is, however, questionable, since his course was not characteristic of modified measles. There were no vaccination documents available for both.

Both patients demonstrated thrombocytopenia, the most common haematological complication. They also suffered from pneumonia, a complication that is a major cause of mortality from measles in children [14].

The second patient developed, after clinical improvement, a severe neurologic disability. We do not expect SSPE since this disease usually develops with a delay of 4 to 10 years after acute infection and not within days or weeks. Children of less than 5 years of age represent the majority of cases [15].

Our second patient did not suffer from slow myoclonic jerks, visual symptoms, or periodic complexes on EEG. She had no raised titers of anti-measles antibodies in cerebrospinal fluid. Another possible complication is measles inclusion-body encephalitis. Again, we could not identify this particular disorder in our patient. Approximately one in 1000 patients with measles develop primary measles encephalitis, typically on day 5 of the rash (range: 1-14 days) [15]. In the present case, encephalitis was excluded by CSF analysis and MRI of the brain. We

suspect a yet not specified measles-induced acute encephalopathy [16].

In conclusion, measles is still an important viral infection worldwide. Due to vaccination gaps, adult-onset measles in industrialised Western countries such as Germany is increasing. Early recognition, isolation of patients and registration by the certified boards help to limit outbreaks. Symptomatic treatment is sufficient, but complications are common. Improved vaccination programs are necessary to protect citizens.

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