

# Maculopapular Rash with Fever: Reporting of a Case with Imported Measles and Diagnostic Difficulties in Non-Epidemic Times

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## Abstract

**Background:** Measles is a highly contagious infection caused by the measles virus with a worldwide distribution. Measles is one of the diseases that have been reported in our country since 1945. It is known that international travelers are an important source of infectious pathologies. Our goal is to document a case of imported Measles and the difficulty of diagnosing it, especially in non-epidemic times. **Cases Presentation:** We presently report a 20-year-old woman who was hospitalized at the Infectious Disease Service for fever and maculopapular rash. She had traveled outside of Albania. Measles ELISA IgM (blood) resulted positive while other serological examinations resulted negative. Our case was treated with antibiotics, multivitamins and intravenous fluids. She was subsequently discharged home in good clinical condition. **Conclusions:** Measles should be included in the differential diagnosis of patients with symptoms of fever and rash, in particular when they have traveled abroad. Patients who have received the Measles vaccine should not be excluded from clinical suspicion and further diagnostic tests for this disease as it can affect this group of patients as well.

## Keywords

Measles, Travelers, Imported Diseases, Symptoms, Serological Analysis

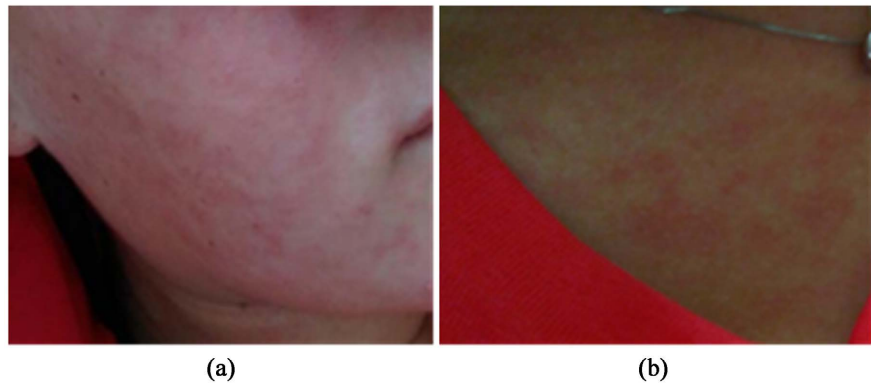
## 1. Introduction

Measles is a highly contagious infection caused by the measles virus that belongs to the Paramyxoviridae family [1]. In the 9<sup>th</sup> century, a Persian doctor published one of the first written accounts of measles disease. Francis Home, a Scottish physician, demonstrated in 1757 that measles is caused by an infectious

agent present in the patient's blood [2]. In 1912, measles became a nationally modifiable disease in the United States. In our country, measles is one of the diseases that must be reported, since 1945. The main measles epidemics in our country occurred in 1955 followed by those in 1970-1971, and 1989-1990. Sporadic cases have been reported by the Institute of Public Health in the following years. In 1971, mandatory routine measles vaccination was introduced into the national immunization schedule for all new birth cohorts [3]. Those who were not vaccinated or who did not develop immunity after vaccination have a high risk of getting infected. It is known that international travelers are an important source of infectious pathologies. Imported cases of measles have been reported by other authors [4]. Imported cases of Measles remain a challenge for the health systems of countries that have reported a complete elimination of this pathology. The virus is spread by coughing or sneezing and having direct contact with infected nasal or throat secretions. In tropical countries, the dominance of measles cases is during the dry season, while in mild areas, it is at the end of winter and the beginning of spring. Measles is a serious disease that is transmitted by the respiratory route and causes a maculopapular rash and fever. Initial signs and symptoms typically include fever, often greater than 40°C, cough, runny nose, and inflamed eyes. Two or three days after the start of symptoms, small white spots may form inside the mouth, known as Koplik's spots [5]. The most serious complications include blindness, encephalitis, and profuse diarrhea followed by severe dehydration or severe infections of the pulmonary apparatus. Measles can cause severe complications, especially in adults and the immunocompromised [6]. There is still no specific antiviral medication for this virus. Treatment includes food rich in vitamins and nutrients, adequate fluid intake, good rehydration, vitamin A supplements and antibiotics to treat pneumonia. We report a case of imported measles in an adult patient who had traveled abroad and was previously vaccinated for measles.

## 2. Case Report

Our case is a 20-year-old woman admitted to the Infectious Disease Emergency Service with a history of fever, myalgia, sore throat, and diarrhea for over 5 days. She developed a cutaneous rash three days after the onset of fever. She had a history of traveling across Europe ten days prior to the onset of temperature. On general examination, the patient was febrile at 39°C and had an exanthematous maculopapular rash over the face, anterior trunk, back, and upper extremities (**Figure 1(a)**, **Figure 1(b)**). On neck examination lymphadenopathy was present. Systemic examination showed bilateral axillary and inguinal lymphadenopathy, regular pulse 88/min. Cardiac, respiratory, and central nervous system examinations were normal. Hematochemical parameters at baseline are summarized in **Table 1**. The patient had a decreased platelet count of 117,000, an increased Erythrocyte sedimentation rate of 38 mm/h, leucopenia with White blood cells 1300/mm<sup>3</sup>, and lymphocyte 19%. C-reactive protein was 26.8 mg/L,



**Figure 1.** Exanthematous maculopapular rash.

**Table 1.** Hematochemical parameters at baseline.

Parameter	Value at baseline	Normal range
Red blood cells, cells/mm <sup>3</sup>	4,800,000	3.8 - 5.8
Hemoglobin, g/dl	12.3	11 - 16.5
Platelet count, cells <sup>3</sup> /mm <sup>3</sup>	117,000	150 - 390
Erythrocyte sedimentation rate, mm/h	38	<20
White blood cells, cells/mm	1300	4 - 10
Lymphocyte, %	19	25 - 45
C-reactive protein, mg/L	26.8	1.1 - 8
Fibrinogen, mg/dL	428	200 - 400
Alkaline phosphatase, U/L	66	89 - 365
Aspartate aminotransferase, U/L	37	14 - 35
Alanine aminotransferase, U/L	26	9 - 24
Gamma-glutamyl transferase, U/L	17	12 - 64
Total bilirubin, mg/dL	1.0	0.1 - 1.2

and fibrinogen 428 mg/dl. There was also a mild hepatic impairment with aspartate aminotransferase of 37 U/L and alanine aminotransferase of 26 U/L. Protein electrophoresis was normal. By means of the leukocyte immunophenotype of the bone marrow, no distinct immunophenotypically pathological populations were observed. The urinalysis resulted in 35 - 40 leukocytes/hpf. A thoraco-abdominal CT was performed which resulted in axillary and inguinal lymphadenopathy, pulmonary posterobasal fibrotic changes, densification of mesenteric adipose tissue in the hypogastric region, and follicular ovaries. Myelogram for the Leishmania resulted in negative. Serological examinations such as CMV IgM, HIV, WRIGHT, Weil-Felix, Anti-Leishmania, EBV IgM and immunological examination resulted in negative. Throat swab for bacterial culture was negative. The Measles IgM Antibody ELISA Test for the detection of specific IgM antibodies against Measles in serum and plasma was positive. The patient

was vaccinated with MMR vaccine (Measles, Mumps, Rubella) in childhood. Our treatment included foods rich in nutrients/vitamins, adequate fluid intake, intravenous fluids, and vitamin A, B, and C supplements and antibiotics. The patient had a mild disease and improved with supportive treatment. She did not develop severe complications and was discharged from the hospital alive and in good clinical condition.

### 3. Discussion

Measles is part of the group of infectious diseases that are a major public health concern not only in our country, which has a very good vaccination coverage but also in other countries. After the 1990s, political changes followed an uncontrolled movement of the population, which was followed by a failure in the vaccination chain. Also, during the years 1997-1998, our country was involved in an armed conflict, almost on the verge of a civil war. This resulted in an important dysfunction of the medical services, including the chain of vaccination. Sporadic cases have been reported by our Institute of Public Health in subsequent years. However, we described a case of imported Measles and diagnostic difficulties in a non-epidemic period. For the diagnosis, we were based on the anamnestic, clinical, laboratory, and serological data to suspect and subsequently diagnose Measles infection even though the patient had a positive history of receiving Measles vaccination. It is well known that international travelers have increased the spectrum of imported infectious diseases. Outbreaks resulting from foreign travel are a bigger problem anywhere in the world because close contact with non-vaccinated individuals from these countries (e.g. airports, hospitals, etc.) increases the chance of exposure among individuals [7]. Imported cases of measles have been reported by other authors. In the study by Hu *et al.* [4], it was reported the importation of measles virus, genotype B3 from Egypt or measles virus, genotype D8 from the Philippines through international travel. Also, Cheng *et al.* [8] showed that almost all measles viruses circulating in the Taiwan province of China were imported.

Our case was a 20-year-old female who was previously vaccinated. In fact, in ECDC 2022 reports, Measles not only continues circulating in Europe but also cases with previous vaccination were seen with 7% of cases receiving one dose of Measles containing virus and 12% receiving 2 doses [9]. Measles infection in post-vaccination is a known phenomenon and is associated with mild disease/no symptoms [10] [11]. In the ECDC 2022 report the age group of 20 - 29 years old accounted for 15% of cases [9].

The prodromal stage occurs 10 to 12 days after exposure and is characterized by two to three days of fever, anorexia, and malaise combined with cough, conjunctivitis, and rash similar to our patient who had a history of traveling 10 days prior to developing symptoms [12]. The rash was characteristic appearing over the face, anterior trunk, back, and upper extremities. She was febrile also when she arrived in the emergency room. Our case also had significantly low platelet

counts,  $117 \times 10^3/\text{mm}^3$  (normal 150 - 390); a decrease in the number of leukocytes white blood cells  $1.3 \times 10^3/\text{mm}^3$  (4 - 10) and leukocyte formula resulted in a left shift with lymphopenia, 19% (25 - 45). Platelets, interacting with the innate or acquired immune system elements, or directly with viruses, become active elements during the immune, antiviral response. Studies published in the past 10 years describing natural infection in adults report mild leukocytopenia and thrombocytopenia as frequent findings, occasionally with minor bleeding complications, but no thromboembolisms [13].

The diagnosis of Measles infection is made by appropriate clinical symptoms, laboratory findings, and positive Measles IgM Antibody ELISA Test. The presentation of fever with rash in an adolescent age group usually suspects disease with wide differential diagnoses such as malaria, drug allergy, leptospirosis, typhoid, infectious mononucleosis, or blood diseases. Serological examination such as CMV IgM, HIV, WRIGHT, Weil-Felix, Anti-Leishmania, EBV IgM and immunological examination resulted in negative in our case. Our case was treated with antibiotics, multivitamins and intravenous fluids, then she left the hospital in a state of well-being. Recent research has demonstrated clinical benefit in patients with severe measles virus infections who are treated with ribavirin and vitamin A supplementation [6]. However, a limitation of this case description is the lack of thoracoabdominal images, which were not collected for this case description. RT-PCR for confirmation of Measles virus was not available, therefore, the laboratory diagnosis was based on ELISA positivity.

#### **4. Conclusion**

Measles should be included in the differential diagnosis of patients with symptoms of fever and rash, in particular when they have traveled abroad. Patients who have received the Measles vaccine should not be excluded from clinical suspicion and further diagnostic tests for this disease as it can affect this group of patients as well.

#### **Consent for Publication**

Written informed consent was obtained from the patient's relatives for the publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

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#### **Authors' Contributions**

EM conceived and drafted the manuscript. AK, AH, and DK critically revised the manuscript. All authors read and approved the final version of the manuscript.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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