

## ORIGINAL RESEARCH

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## Assessment of adult measles cases followed at a military hospital during a measles epidemic: does forced migration increase infectious diseases such as measles that may affect public health?

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Available online 07.12.2016 with doi: 10.5455/medscience.2016.05.8554**Abstract**

In this study, our aim was to review the data of adult patients followed due to a measles diagnosis and the reasons for the measles cases, which has shown an increase because of the events of recent forced migration in our country. Adult patients who referred to the outpatient clinic of infectious diseases and clinical microbiology of our hospital between January and April 2013 and who were diagnosed with measles were retrospectively studied. Patients were diagnosed with measles in accordance with the presence of symptoms described by the World Health Organization (WHO) and in combination with the determination of measles IgM positivity by Enzyme Linked Immunosorbent Assay (ELISA). 16 patients did not have any information about their measles vaccination background. Only one patient reported that he received a single dose vaccination one year previously. Measles IgM positivity by ELISA was determined for all patients. When laboratory findings were assessed we found that leukopenia and thrombocytopenia developed respectively, in 4 and 4 patients. In addition, hepatitis developed in 4 patients, otitis media in 2 patients, pneumonia in 3 patients and a sinusitis complication in 2 patients. Measles is a very contagious disease with a high contagion rate but can be kept under control by maintaining vaccination rates high in the community. However, we must not forget that vaccinations may only provide 95% protection. Measles may become epidemic when sensitive individuals are present in the community at a certain ratio. Therefore, immunity rates must be accelerated in young adults in the community by vaccination campaigns (catch-up) while existing rates of childhood vaccinations are maintained. Especially when the population shows a tendency to increase, due to reasons such as migration or war, it is essential to comply with the mentioned precautions.

**Keywords:** Measles, epidemic, vaccination**Introduction**

Measles virus is a RNA virus of the *Paramyxoviridae* family. The measles virus is a highly contagious virus and spreads through the air by coughing and sneezing. Measles starts with fever, runny nose, cough, red eyes, and sore throat. The condition then displays a maculopapular dermal eruption that spreads over the body [1]. Measles is seen mostly in pre-school age children; however, non-inoculation against the disease, terms and conditions related to storage and errors made during vaccination may with time reduce the protective character of the vaccination and therefore the disease can be seen in adult age groups. Individuals who previously did not have immunity against this condition may have a high risk of becoming sick when they are exposed to respiratory droplets containing the virus. The incubation period of the disease may vary from 10 to 14 days. The infective period of the disease may start 4 days prior to the eruption and then continue 4 days after. In other words, this period is about 8 days. Effective

vaccination programs can significantly reduce the rate of incidence of the disease. Once again, measles is still considered to be an important public health concern due to the incidence of sporadic cases or epidemics that may occur from time to time [2]. The clinical course of the disease may develop more severely in adults when compared with children and complications can be more frequent. In the present study, our aim was to review the data of adult patients in our hospital diagnosed with measles and the reasons that caused a significant increase in measles cases in the recent years in our country are examined.

**Materials and Methods**

Adult patients diagnosed with measles and who were referred to the Sarıkamış Military Hospital, Outpatient Clinic of Infectious Diseases and Clinical Microbiology between January and April 2013 were retrospectively reviewed. Patients were diagnosed with measles in accordance with the presence of symptoms described by the World Health Organization (WHO) and in combination with the determination of measles IgM positivity by Enzyme Linked Immunosorbent Assay (ELISA). Patients were followed with the aid of a follow-up form where

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demographic information and lab values were included. SPSS 20.0 program was used for statistical analysis.

## Results

During the period from January to April 2013, 17 patients with clinical symptoms compatible with measles and serological evidence who were referred to our outpatient clinic of infectious diseases and diagnosed with measles infection were hospitalized for further assessment. All patients were males. Their age range varied between 20 and 28 years old and the average age was  $22.47 \pm 2.52$ . 16 patients out of 17 were hospitalized while 1 patient was followed at the outpatient clinic. Sixteen patients did not have any information regarding their measles vaccination background. However, one patient stated that he had received a single dose vaccination one year previously.

Four patients out of seventeen were vaccinated after contact. None of the patients were aware of whether they had measles during their childhood period. The average hospitalization period of these patients in the department of infectious diseases was 6 days. Patients displayed symptoms such as fever (8/17), coughing (8/17), conjunctivitis (2/17) and photophobia (2/17) and their average eruption period was  $6.18 \pm 1.46$  days. Laboratory results demonstrated leucopenia in four and thrombocytopenia in four patients. The average white blood cell level of patients was  $5229 \pm 1682 \mu$ , thrombocyte level:  $197.470 \pm 93.247 \mu$ , AST level:  $54.64 \pm 49.77 \text{ U/L}$ , ALT level:  $63.17 \pm 85.76 \text{ U/L}$ , ALP level:  $72.18 \pm 21.25 \text{ U/L}$ , GGT Level:  $38.41 \pm 31.57 \text{ U/L}$ , LDH level:  $320.76 \pm 131.568 \text{ U/L}$ , sedimentation level:  $22.41 \pm 14.24 \text{ mm/hour}$  and CRP level:  $20.32 \pm 18.12$ . Measles IgM positivity was determined by ELISA method for all patients. Otitis media developed in 2 patients, hepatitis in 4, pneumonia in 3 and sinusitis complication in 2. When the infection route of the disease was questioned, it was determined that measles was widely spread by droplets through coughing and sneezing, after close contact with a friend who had the measles virus or due to collective living conditions in communities.

**Table 1.** Patient Symptoms

Symptom	Number of Patients
Fever	8 (47%)
Weakness	17 (100%)
Coughing	8 (47%)
Photophobia	2 (12%)
Sore Throat	17

**Table 2.** Patient Findings

Finding	Number of Patients
Maculopapular Eruption	17 (100%)
Conjunctivitis	2 (12%)
Tonsillopharyngitis	10
Koplik Spots	0
Respiratory Rales	3 (17%)

## Discussion

Measles is a highly infectious disease and an important viral condition. It is very well known that the disease does not differ due to age or gender during its pre-vaccination period [3,4]. As we are employed in a military hospital, and therefore mostly young and adult patients refer to our outpatient clinic, we lacked referrals of children and female patients since all patients in our hospital are young males. Nevertheless, the average initial period of symptoms in patients who were referred to our clinic was approximately 10 days.

The majority of deaths induced by measles can occur due to neurological and, especially, respiratory system involvements. Pneumonia is one of the most important and life-threatening complications that may emerge during a measles infection. In nearly 30-50% of these cases, bacterial superinfections may develop [5].

Symptoms such as coughing, high fever, fatigue, sore throat, photophobia, nausea-vomiting, diarrhea and myalgia are frequently seen during the prodromal period of the disease, while physical examination findings such as eruption, conjunctivitis, Koplik Spot's, lymphadenopathy, tonsillopharyngitis and lung rales can be observed in the later period of the condition [1,3,6]. In our patients, compatible with the literature, symptoms such as high fever, weakness, coughing and physical examination findings such as eruption, conjunctivitis and tonsillopharyngitis were observed. However, anomalies can be seen in lab findings of adult measles patients. Leukopenia is mentioned in several studies (at rates that vary between 11.2-73%) [1,3,6]. Additionally, there are also other studies regarding the presence of thrombocytopenia in measles cases (at a ratio of 33.6-50%) [6,7].

In the present study, leukopenia was observed in 24% of the patients while thrombocytopenia was detected in 24% of the cases. Elevation in liver function tests is one of the frequent laboratory findings in adult measles patients and is usually considered as a good prognosis [8]. High transaminase levels were determined in 20-80% [1,3,6,8] of patients in previous studies, while high AST and ALT levels were found, respectively, in 41% and 35% of our patients. During the 2013 epidemic in Europe, 62% of patients were generally evaluated, hospitalized and treated and all age groups were included in this process [9]. In our country, there are several clinics that follow such adult patients, but hospitalize only 57% of measles cases. There are also some clinics where patients are hospitalized and followed [1,3,8]. The hospitalization rate is high in our hospital (94.1%), however when we carefully study the condition of these clinics, we can say that in clinics where hospitalization rates are higher than expected, as it is with our patients, these clinics have a high ratio of patients with altered laboratory values.

Measles is a preventable disease than can be eradicated by vaccination. It is therefore recommended that at least 95% of the community should be immunized against the disease. Hence, it is important to maintain high measles vaccination rates in order to avoid epidemics [10]. During recent years, because of high vaccination rates in our country and the amendment of the first dose of the Measles-Mumps-Rubella vaccination to month 12 starting from year 2012, very few measles cases were observed [3,11]. However, with the low vaccination rates from the past years and the increase in the number of individuals who were not immunized against the disease, after imported cases it became highly likely to observe measles in non-vaccinated individuals [3].

In a study carried out by Dilli et al., the vaccination rate for measles was 96.9% while the seropositivity was 81.6% and this was interpreted as a decrease in immunity obtained by vaccination, which may be dependent on age [12].

According to the measles report dated March 12, 2013 issued by HASUDER (Association of Public Health Specialists), the year 2012 measles epidemic became evident after the visit of a Romanian family and index cases that arrived right after a visit to Saudi Arabia [10]. When the age groups were examined, we found that the epidemic was mostly observed in infants under one year old with an early vaccination period, while as in our country, especially among soldiers, the epidemic was observed among individuals in an age group that varied between 20 and 29 years of age [10]. The World Health Organization (WHO) reported a number of 7404 confirmed measles cases from Turkey during 2013, which displayed a sharp spike from the approximately 700 cases that were reported during 2012 [13]. Many of the cases occurred in the southern and southeastern provinces.

As mentioned above, measles, which was observed to spread out as an epidemic in the last ten years, was almost reset to zero by the rigorous practice of vaccination at the beginning of 2010, but because of foreign-sourced cases a serious increase was monitored in the number of measles cases within the period of one or two years after Syrian refugees took shelter in our country. The ratio of measles cases has eventually increased tenfold when compared to previous years.

The high risk of exposure to measles is also particularly provoked by the surge in population in the Southeastern and Mediterranean provinces of Turkey, which are the destinations for most of the Syrian refugees who have fled from the civil war in their country.

Although the Turkish Health Ministry is implementing a wide-range vaccination campaign in refugee camps where Syrian children are located and especially children five and younger are vaccinated against measles, poliomyelitis, tetanus and diphtheria in the camps, due to the fact that an

estimated 600,000 of the 800,000 Syrian refugees in Turkey do not reside in the camps, a burden is placed on Turkey's health delivery system. Although refugees living outside the camps are monitored by family practitioners, nevertheless the number of off-record Syrian citizens in Turkey is substantially high.

It is obvious that not all individuals may be recorded. This group is under great risk and no doubt this may increase the risk of epidemics in the community.

*Then, are foreign migrations the only reason for these epidemics in our country?*

Even though the migrations mentioned above are considered to be the main reason for the measles epidemic in Turkey, once structural factors of the event are thoroughly studied we can see that the primary reason may arise from incomplete and inadequate solidarity related to vaccination in family and public health centers. The second matter is that instead of providing a service to the community regarding the presentation of immunity services, the system is constituted as a service that depends on referral to a listing of family doctors or physicians. However, individuals who do not have a Turkish Republic citizenship number, or individuals who do have a Turkish Republic citizenship number, but who are not recorded in the family doctors system, were not targeted for vaccination, as they were not recorded in the mentioned system. Thus, they were not included in the unvaccinated population records. Thirdly, the Ministry of Health has sent instructions to healthcare employees to carry out necessary precautions in order to control the epidemic. However, even though the precautions were minimal for avoiding this epidemic, since the practice may have been considered insignificant in some regions where the measles vaccination was not included in the performance system, and where employees neglected the recommended vaccines, a period of vulnerability occurred.

In the last few years, concerns about the safety of vaccines have led to decline in immunization coverage rates and new outbreaks of measles in many European countries [2]. Moreover, the measles outbreak that was observed one year ago at Disneyland has shown another side of the highly infectious disease, that it is still a danger to people of all ages, not only in our country but also in Europe and America [14].

In conclusion, measles is a highly contagious virus that lives in the nose and throat mucus of an infected person, and therefore shows high contagion rates. It can be kept under control by maintaining high vaccination rates in the community. However, we must not forget that vaccinations may display only 95% protection. Measles may become epidemic when sensitive individuals at a certain ratio are present in the community. Therefore, immunity rates must be accelerated in young adults in the community by

vaccination campaigns (catch-up) while existing rates of childhood vaccinations are maintained. Especially, when the population shows a tendency to increase, due to reasons such as migration or war, it is essential to comply with the mentioned precautions.

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