

The Importance of Laboratory Confirmation in Measles Surveillance

Kızamık Surveyansında Laboratuvar Doğrulamanın Önemi

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Summary

Aim: Despite substantial recent progress in control of measles, thousands of measles cases continued to be reported each year in Turkey. We aimed to determine what proportion of the reported cases are true measles cases.

Material and Methods: In 105 patients reported as measles cases to the Health Directorate of İzmir Province, Turkey, measles and rubella specific IgM antibodies were measured.

Results: Thirtyfour (32.3%) cases met the clinical case definition of measles. Measles IgM antibodies were detected only in 2 cases. Both cases met the clinical case definition of measles. Thus, the sensitivity, the specificity, PPV and NPV were calculated as 100%, 69%, 6% and 100% respectively. Rubella specific IgM antibody was positive in 72 (68.5%) cases.

Conclusion: Our data indicated that the official numbers of measles cases does not reflect actual numbers of measles cases. Therefore, laboratory confirmation of the suspected measles cases is necessary as an important part of the measles elimination program in Turkey. (*J Pediatr Inf* 2007; 1: 55-7)

Key words: Measles, surveillance, case definition

Özet

Amaç: Türkiye'de kızamığın kontrolüne yönelik çalışmalarla rağmen, her yıl binlerce kızamık bildirimi yapılmaktadır. Bu çalışmada doğru kızamık bildirimi oranının saptanması amaçlandı.

Gereç ve Yöntem: İzmir İl Sağlık Müdürlüğü'ne kızamık olgusu olarak bildirilen 105 hastada kızamık ve kızamıkçık antikorları incelendi.

Bulgular: Otuz dört (%32,3) hasta kızamık olgu tanımı uymaktaydı. Bu olgulardan yalnızca ikisinde kızamık IgM antikoru saptandı. Duyarlık, özgüllük, positive predictive value (PPV) ve negative predictive value (NPV), sırasıyla %100, %69, %6 ve %100 idi. Kızamıkçık IgM antikoru 72 (% 68,5) hastada belirlendi.

Sonuç: Verilerimiz, resmi kızamık olgusu sayılarının, kızamık olgularının gerçek sayısını yansımadığını göstermektedir. Türkiye'deki kızamık yokedom (eliminasyon) programının önemli bir bölümü olarak, tanının kuşkulu olgularda, laboratuvar incelemesiyle doğrulanması gerekmektedir. (*Çocuk Enf Derg* 2007; 1: 55-7)

Anahtar kelimeler: Kızamık, surveyans, olgu tanımı

Introduction

Although the vaccine has been available since the 1970s, measles has remained an important public health problem mainly due to failure in reaching a high level of immunization coverage in Turkey. Among countries in the World Health Organization (WHO) European Region, Turkey has had a large number of measles cases reported annually over the last decade, with a peak of over 30.000 cases

reported in 2001 (1). Measles epidemics occurred every 3 to 4 years in the past.

The WHO Regional Office for Europe (WHO/Europe) has developed a strategic plan for the elimination of measles in the European Region by 2010 (1, 2). In parallel with the strategic plan, the Turkish Ministry of Health launched a National Measles Elimination Program at the same time. As an integral part of this program, a catch-up vaccination campaign targeting children aged between 9 months and 14 years was carried out in Turkey.

Yazışma Adresi

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In 2003, around 11 million school children aged between 6 and 14 years were successfully vaccinated with a coverage rate of 97%. A further 8.5 million pre-school children aged between 9 months and 6 years were vaccinated in 2004.

Although it was expected that there must be a decline in the number of measles cases after the catch-up campaign, 8,927 measles cases were reported to Turkish Ministry of Health in 2004 (Fig. 1). The number of cases reported in 2004 is higher than in 2003 (5,844 cases) (3). Because the diagnosis of measles is usually based on clinical findings in Turkey and laboratory confirmation is rare, it seems that most of the reported cases may not be true measles cases. In the present study, therefore, we aimed to determine whether the reported cases are true measles cases or not.

Material and Methods

Measles is a notifiable disease in Turkey. Diagnosis is mainly established by clinical findings. Health care providers in the private or public sector report measles cases to the Provincial Health Directorates, which in turn report to the national level (Ministry of Health) on a monthly basis. This study has been conducted by Department of Pediatrics of Faculty of Medicine of Ege University and Health Directorate of İzmir Province.

During 2004, 821 clinical measles cases were reported to the Health Directorate of İzmir Province, Turkey. Of these cases, 121 were reported in April 2004 by primary care physicians. The 121 cases were eligible for enrollment in the present study. The cases included in the study were reported by primary care physicians. The information about demographic characteristics (e.g., age and sex), clinical manifestations of illness, timing of serum specimen collection and the vaccination status (number of doses and dates of measles vaccination) were obtained from each participant. Clinical manifestations primarily included signs and symptoms found in the clinical case definition. According to the Measles Field Guide prepared for the Primary Health Care Providers by the Turkish Ministry of Health, a clinical case of measles was defined as a generalized maculopapular rash lasting for ≥ 3 days, a temperature of $\geq 38^{\circ}\text{C}$ (if not recorded, the patient "felt hot"), and at least one of the following symptoms or findings: cough,

coryza, or conjunctivitis. Measles reports were evaluated by the investigators in respect to their accordance with measles clinical case definition. Blood samples were taken between 3rd and 28th days after rash onset and measles and rubella specific IgM antibodies were measured from blood samples by ELISA method.

The performance (sensitivity, specificity, positive predictive value [PPV] and negative predictive value [NPV]) of the measles clinical case definition was evaluated in detecting serologically confirmed cases by examining the clinical case definition against a reference standard of serological confirmation of the rash illness as either positive or negative for measles. Sensitivity was defined as the proportion of all serologically confirmed cases of measles (positive by serological tests) that met the clinical case definition. Specificity was the proportion of all rash illnesses not serologically confirmed (negative results of serological testing) that was not clinical cases. PPV was the proportion of rash illnesses that met the clinical case definition and had a positive serological result. NPV was the proportion of all rash illnesses that did not meet the clinical case definition that were not serologically confirmed.

Results

Of 121 eligible cases with rash and fever, 115 accepted to participate in the study and had sufficient clinical information to evaluate the clinical case definition. Of the 115, there were 105 (48 female, 57 male) who also had adequate serum specimens and were included in the study. Ages ranged from 10 month to 31 years (median, 8.6 years). Two (1.9%) of them were <1 year of age, 17 (16.2%) were 1 to 4 years of age, 81 (77.1%) were 5 to 14 years of age, and 3 (2.8%) were ≥ 15 years of age. Ninety three percent of cases had been previously vaccinated with measles vaccine (44.2% one dose, 31.6% two dose and 17.5% three dose vaccination).

Thirty-four (32.3%) cases met the clinical case definition of measles. Among the whole study population, measles IgM antibodies were detected only in 2 cases. Both cases met the clinical case definition of measles (Table 1). Thus, the sensitivity, the specificity, PPV and NPV were calculated as 100%, 69%, 6% and 100%, respectively.

Rubella-specific IgM antibody was found positive in 72 (68.5%) cases.

Table 1. The sensitivity, specificity, PVP and PVN (with 95% confidence Intervals) of measles clinical case definition in our study

		Measles IgM antibody		Sensitivity	1.00 (0.35-1.00)
		Positive	Negative		
Clinical case definition	Yes	2	32	Specificity	0.69 (0.68-0.69)
	No	0	71	PPV	0.06 (0.02-0.06)
NPV					
PPV- positive predictive value, NPV- negative predictive value					

Discussion

Measles surveillance is an essential part of the measles elimination strategy. Turkish Ministry of Health published Measles Field Guide for the Primary Health Care Providers for measles surveillance (4). WHO-recommended case definition for measles is adopted into routine surveillance in Turkey (5). However, our study showed that 71 of the 105 cases reported as measles did not met clinical case definition of measles. These data imply that most of the physicians in primary health care centers are not fully aware of measles case definition. This may lead to over reporting of suspected measles cases and unnecessary home visits by health personnel when active surveillance would begin in the future.

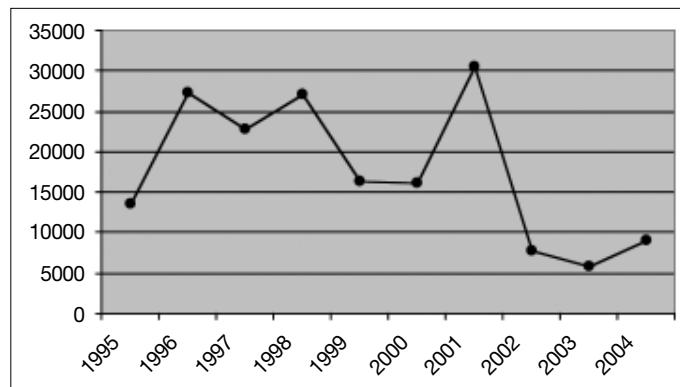
Because measles vaccination coverage was about 80%, the measles outbreaks were seen every 3 to 4 years in the past in Turkey. After the successful catch-up campaigns in 2003 and 2004, the circulation of the virus in the community was decreased. Hence, the reported cases of measles in the last years were decreased as compared to previous years (Fig. 1). However, this decrease was not sharp enough as expected. Thousands of measles cases continued to be reported each year. However, the surveillance system is mainly based on syndromic rash fever surveillance and

rubella vaccine has not been routinely administered in the national immunization schedule in Turkey yet. Therefore, WHO/Europe thought that most of the reported cases might be in fact rubella (6). Our data confirmed the prediction of WHO/Europe that 68.5% of the reported cases in İzmir were rubella. These findings indicated that some of the rubella outbreaks might be wrongly regarded as measles outbreaks, and the official numbers of measles cases may not reflect actual numbers of measles cases.

Our study showed that most of clinicians and health care workers are not fully aware of measles case definition. As the incidence of measles decreases, most of the physicians will be graduated from medical schools without seeing even one case of measles in the future. Therefore, measles surveillance should be strengthened be through nationwide training activities for physicians and other health care workers. Yet, PPV of clinical case definition of measles decreases as the incidence of measles decreases in accordance with our study. Thus, laboratory confirmation will be required to confirm clinical diagnosis of all suspected cases, as the elimination program progress in Turkey.

References

1. WHO. Eliminating measles and rubella and prevention congenital rubella infection, WHO European Region strategic plan 2005-2010. Copenhagen, WHO Regional Office for Europe, 2005. Available at: <http://www.euro.who.int/document/E87772.pdf>.
2. WHO. Strengthening national immunization systems through measles and rubella elimination and prevention of congenital rubella infections in WHO's European Region. Resolution EUR/RC55/R7 of the WHO Regional Committee for Europe, fifty-fifth session, 2005. WHO Regional Office for Europe, 2005. Available at: http://www.euro.who.int/Governance/resolutions/2005/20050920_3.
3. WHO. Member States on the WHO/UNICEF annual reporting form, 2005. Available at: <http://data.euro.who.int/cisid/TableID=80565>.
4. The Ministry of Health of Turkey. Measles Field Guide (Kızamık Saha Rehberi). Measles Elimination Programme 2004 (Türkiye Kızamık Eliminasyon Programı). Ankara, 2004.
5. Gürüş D. World Health Organization. Module on best practices for measles surveillance. Geneva: WHO, 2001 (WHO/V&B/01.43).
6. WHO. EURO Measles Quarterly. May 2003 Issue 3. Available at: www.euro.who.int/vaccine/publications/20040129-1.



Resim 1. Annual measles cases reported Ministry of Health in Turkey