Case Study

Occupational Risk from Measles in Healthcare Personnel: A Case Report

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In 2006 and 2008 two different outbreaks of measles, both occurring during winter seasons, were reported in the region of Apulia in south-eastern Italy. The second of these epidemics involved both young adults and children younger than 13 mo, the latter being the age range established by the Regional Vaccination Schedule for the first dose of the measles, mumps, rubella (MMR) vaccine¹, ².

The present epidemiological pattern of measles in Apulia reflects the vaccination efforts conducted in Italy from 2003, when the implementation of the National Elimination Plan for Measles and Congenital Rubella started up. The Plan engaged all Italian Regions in an extra-ordinary effort to reach target coverage of 95% in children at 24 mo of age, to introduce a second MMR dose at 5–6 yr of age (target: 90% coverage by 2007), and to carry out a catch-up vaccination program making use of all the occasions of contact children had with the vaccination services, including a campaign aimed at inviting all children of school age in primary and lower secondary schools (up to 8th grade) who had not yet received the two recommended MMR vaccine doses³.

Measles is usually a mild non-life-threatening disease in otherwise healthy children, but it may be severe with complications in infants, adults and people with impaired immune systems. Since the target MMR coverage for the WHO European Region (>95% for both doses) has not yet been reached, there is still the risk of outbreaks in susceptible adult subjects, and this includes health care workers. In Italy the current trends for measles in fact show an increase in the average age of infection.

The vaccination of susceptible healthcare personnel against measles is recommended because it protects both the employee from complications and the patient from infection.

In March, in an Apulian hospital, a case of measles was reported in a nurse, who worked in the Paediatric Unit where a child infected by measles had been hospitalized.

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On 8th March 2008 a 10-yr-old with measles was admitted to a Paediatric Unit, where a 39-yr-old nurse took care of her.

On 14th March, seven days after the first contact with the child, the nurse became unwell with a temperature >38°C, cough, rhinitis and conjunctivitis. On 19th March the nurse presented maculopapular rash on her face later extending to the rest of her body; the same day she was admitted to the Infectious Disease Unit.

At admission, examination revealed fever >38°C, hepatomegaly, diffused maculopapular rash and tender cervical lymphadenopathy. Pathological anamnesis revealed that the nurse had never been infected by measles or rubella and had never received the MMR vaccine.

On 20th March 2008 investigations revealed: a white cell count of 3,400 × ml, neutrophil leukocytosis of 84.1%, lymphopenia of 10%, monocytes of 5.6%, basophils of 0.3%, eosinophil of 0%, and abnormal liver function tests showing sGOT (Serum Glutamic Oxaloacetic Transaminase) 251 IU/l (NR: ≤37 IU/l), sGPT (Serum Glutamic Pyruvic Transaminase) 169 IU/l (NR: ≤55 IU/l), γGT (Gamma-GT) 252 IU/l (NR: ≤55 IU/l), alkaline phosphatase 248 IU/l (NR: ≤117 IU/l), Sedimentation Rate 33 mm/h (NR: 1–15 mm/h), and PCR 23.6 mg/l (NR: ≤3.5 mg/l). Seroprotein fraction values separated by electrophoresis and determination of Streptolysin Antibodies titre did not show pathological values.

Serodiagnosis according to Widal-Wright was negative; serum titres of IgM (Immunoglobulin M) antibodies to Epstein-Barr virus, citomegalovirus and rubella virus were not demonstrated, but high titres of IgG (Immunoglobulin G) were revealed.

Naso-pharyngeal swab, blood and urine cultures were negative; beta-haemolytic streptococci were not detected. With the progression of the rash, measles was considered. Elevated serum titres of IgG and IgM antibodies to measles virus were subsequently demonstrated. The diagnosis of measles was confirmed, and the patient improved over the next few days. On 24th March 2008 the nurse was discharged. The patient is now well.

No other case of measles was hospitalized in the same ward during March–April 2008.
Discussion

During the last two years several outbreaks of measles have been reported in Europe. In these outbreaks healthcare personnel and medical students were involved4–6. In WHO guidelines for measles elimination, the present epidemiological pattern of measles in Italy is defined "phase II of measles control": high vaccination coverage for one dose of MMR (90–95% <24 mo) has been reached and maintained, outbreaks are more deferred in time compared with the previous ones and involve older subjects7.

In 2003, when there was a large outbreak in Italy with 40,000 cases of measles reported8, a National Elimination Plan for Measles and Congenital Rubella was started. The Plan outlines an integrated approach to achieving both disease targets by 2010 through the implementation of the first vaccination of MMR at the age of 15 mo and the second vaccination to children at 5–6 yr old. A catch-up vaccination with two doses of the MMR vaccine has been added to the list of routine vaccinations for still-susceptible boys and girls at 11 to 12 yr of age9.

With the start of the National Elimination Plan for Measles and Congenital Rubella in Apulia, vaccination coverage for MMR in children aged <24 mo increased from 84.4% recorded in the 2001 birth cohort to 92% in the 2005 birth cohort. Vaccination coverage in the 1991–1997 birth cohort, target of the catch-up vaccination strategy, was 70.9% for one dose and 49.8% for two doses. The target MMR coverage for the WHO European Region (>95% for both doses) has not yet been reached.

The vaccination of susceptible healthcare personnel against measles, mumps and rubella is recommended because it protects both the employees from complications and the patient from infection10. In fulfilment of such obligations the National Vaccination Plan of 2005/2007 recommends that all susceptible health care workers should be offered the MMR vaccine11.

This recommendation is part of the workers’ health safeguard regulations and is part of the strategy aimed at the prevention of infections related to health care. In fact, there is a risk of infection during incubation in potentially susceptible health workers, which is particularly worrying for patients with immunodeficiency; the death rate in cases of measles is 70% in oncological patients and 40% in seropositive patients12. The rate of severe complications is equal to 80% in patients with immunodeficiency, much higher than in the general population13.

The responsibility of the screening of health operators susceptible to measles and rubella, the recommendation to vaccinate, and the administration of the MMR vaccination is entrusted, as specified by Italian Law 626/94, to occupational health physicians, who should operate giving due priority to health care workers who assist those patients subject to risk of infection and susceptible to these diseases, for example personnel in paediatrics, emergency, and vaccination services14. However this occupational health activity is still not fully implemented, perhaps because the ability to prevent infection by measles and rubella is a recent achievement. Even more recent is the evidence of the possible role of these diseases in infection relating to health care itself. There is a strong need for updated training of doctors delegated to the safeguarding of health care workers.

Training should be made available to all health care professionals, particularly nurses who are at risk, first to guarantee that the correct facts are known about the occupational health risks and second to promote MMR vaccination compliance among susceptible personnel.

Recommendations should also extend to medical students who are too often poorly protected against and insufficiently warned about potential occupational exposure to pathogens and their dissemination to patients15. In fact, during the last winter season an important nosocomial cluster of measles occurred in Reims, France. The epidemic involved healthcare personnel: a 22-yr-old unvaccinated medical student and a non-immune 24-yr-old nursing student who was taking care of hospitalised children16.

The prevalence of measles in non-immune health care workers is low, but with a fall in the uptake of MMR immunization and the increased likelihood of measles outbreaks, it is important to identify these at-risk individuals. To achieve complete immunity, it is cost-effective to screen and then offer immunization16 as the World Health Organization states: “in some settings, medical personnel have been the source of measles spread. Policies requiring immunization or proof of immunization may need to be implemented”17. Moreover more awareness among health professionals of measles diagnosis, appropriate infection control practices to prevent transmission in hospital settings and specific vaccination recommendations for health professionals is needed18,19.

References


