Surveillance and outbreak reports

ONGOING RUBELLA OUTBREAK IN AUSTRIA, 2008-2009

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Since October 2008, a total of 143 cases of rubella have affected the two Austrian provinces Styria and Burgenland. The index case occurred in mid-October 2008, but was not notified to the public health authorities until February 2009, when the Austrian Agency for Health and Food Safety was asked to investigate a cluster of 32 rubella cases (24 laboratory-confirmed and eight clinically suspected cases). No case of rubella had been reported in the two affected provinces between February 2007 - when statutory notification for rubella was implemented - and mid-October 2008. 113 of the 143 cases (79%) were confirmed: 101 (89.3% of the 113 cases) clinical-laboratory confirmed and 12 clinical-epidemiological confirmed. Thirty cases fulfilled the criteria of a probable outbreak case only (laboratory results or data on epidemiological link are pending). For 140 outbreak cases data on age was known; the median age was 19 years (range: 2-60 years). 20 cases occurred in soldiers in seven military camps in the area. 55 cases (38.5 %) were female. One case of a laboratory-confirmed rubella infection, affecting an unvaccinated pregnant 18-years old native Austrian in the early first trimester of pregnancy, led to voluntary abortion.

Background

In Austria, rubella has been a notifiable disease since 2007. From February 2007 to the end of September 2008 a total of 13 cases of rubella were reported to the public health authority (seven in 2007 and six in 2008 including September). In the pre-vaccination era, rubella was endemic in Austria, with large epidemics occurring every few years. Rubella vaccination was introduced in 1984 with a monocomponent vaccine targeting 11-13 year-old girls and seronegative mothers after delivery. Rubeaten® (Berna Biotech Ltd.) or Ervevax® (GlaxoSmithKline) were used until 1994. A two-dose measles, mumps and rubella (MMR) vaccination programme was launched nationwide in 1994; the two doses were given at the ages of 14-18 months and six years. The vaccine used throughout the programme was MMRII® (Merck). From 2001 until the end of 2008 the vaccine Priorix® (GlaxoSmithKline) was used; as of 2003, the vaccination scheme was changed and the second dose was given already four weeks after the first dose. Since 2009, the vaccine MMR VaxPro® (Sanofi Pasteur MSD) has been in use. The available nationwide data on the proportion of rubella susceptibles in the Austrian population by age-group and sex are limited.

Rubella is a viral disease that usually presents as a mild febrile rash illness with adenopathy in adults and children; 20%-50% of infected persons are asymptomatic. The infection is acquired through direct contact with nasopharyngeal secretions containing the virus or through droplet spread of nasopharyngeal secretions. Laboratory diagnosis of rubella is required, since clinical diagnosis is often inaccurate. According to the case definitions proposed by the European Commission [1],

laboratory confirmation should be based on the detection of a significant rise in rubella immunoglobulin G (IgG) antibody titres in the serum between acute and convalescent phase or on the isolation of rubella virus from nasal, blood, throat, urine, or cerebrospinal fluid specimens, on the detection of rubella virus nucleic acid by reverse transcription PCR (RT-PCR) in one of these clinical specimens, or – in an outbreak situation – on the detection of rubella-specific immunoglobulin M (IgM) antibody in serum or saliva [1]. An epidemiologically confirmed rubella case is defined as a patient with a febrile generalised rash illness of acute onset and an epidemiological link to a laboratory-confirmed case [1].

Rubella is of high public health importance owing to teratogenic effects that can result from congenital rubella infection (CRI) during the first trimester of pregnancy, leading to miscarriage, stillbirth, or infants with a pattern of birth defects, known as congenital rubella syndrome (CRS). CRS occurs in up to 90% of infants born to women who are infected with rubella during the first 10 weeks of pregnancy [2,3].

Outbreak description

On February 10, 2009 the Austrian Agency for Health and Food Safety (AGES) was informed about a cluster of 24 laboratory-confirmed cases of rubella infection and another eight clinical suspected cases by the provincial public health authority Styria. The 32 cases were notified between calendar week 3 and calendar week 7 from nine of the 17 public health districts in the Austrian province Styria (total population: approximately 1,208,000). Half of the 32 notified cases were soldiers who were currently doing their mandatory military service (six months duty). Seven military camps were affected in Styria and one in the province Burgenland (total population: approximately 283,000). All soldiers with rubella were hospitalised in a military hospital.

The index case - not related to the military camps – had already occurred in mid-October 2008; the case was not notified to the public health authorities until February 2009. Of the 32 cases,

FIGURE 1

Rubella cases (including 20 army cases) by date of rash onset, Austria, October 2008-March 2009 (n=132, in which the date of rash onset was known)

Data as of 3 April 2009.
Grey squares: probable outbreak cases (n=27), including one soldier case (dark grey square); blue squares: confirmed outbreak cases (n=105), including 19 cases in soldiers (dark blue squares).

FIGURE 2

Rubella outbreak cases by public health district of residence in the affected provinces Styria and Burgenland, Austria, October 2008-March 2009 (n=143)

29 cases resided in nine of the 17 public health districts in Styria and three cases in three of the nine public health districts in the Burgenland.

No case of rubella had been reported in the provinces Styria and Burgenland (combined population: 1.5 million) between February 2007 - when statutory notification for rubella was implemented - and mid-October 2008.

The following is a preliminary report of the ongoing outbreak of rubella in Austria. Aim of our ongoing outbreak investigation is to ascertain the vaccination coverage among the outbreak cases, the number of congenital rubella infections and to identify possible target groups for additional vaccination campaigns.

Methods

The outbreak was described by time, place and person. A confirmed outbreak case was defined (1) as a patient with a febrile generalised rash illness of acute onset, (2) who fulfilled one of the criteria of a laboratory-confirmed rubella infection or who was epidemiologically linked to a patient with laboratory-confirmed rubella infection, and (3) who fell sick after 15 October in the Austrian provinces Styria or Burgenland.

A probable outbreak case was defined (1) as a patient with a febrile generalised rash illness of acute onset and in whom a healthcare worker suspected rubella, and (2) who fell sick after 15 October in the provinces Styria or Burgenland.

A suspected rubella case was defined as a patient who presented with fever and a maculopapular rash among the contact persons of outbreak cases, and was reported by the outbreak cases.

Case finding occurred as follows: Cases of rubella infection laboratory-confirmed by the Austrian reference laboratory and cases of rubella notified to the public health authority were reported to AGES. Rubella outbreak cases were asked to name further individuals with febrile generalised rash illness of acute onset among their contacts. Information on demographics, date of rash onset, and contact with laboratory-confirmed cases were obtained by telephone interviews conducted with 143 cases; for 57 of these cases the vaccination status could be ascertained based on their vaccination documents. For active case finding, local physicians were asked to collect blood samples from all incident patients with a generalised rash for serological examination.

Results

Between October 2008 and March 2009, a total of 143 cases fulfilled the outbreak case definition. Of these, 113 cases (79%) were confirmed outbreak cases of rubella: 101 (89.3% of the 113 cases) were confirmed clinically and by laboratory result, and 12 were confirmed clinically and epidemiologically. Thirty cases fulfilled only the criteria of a probable outbreak case; the procedure of laboratory or epidemiological confirmation is still ongoing for these cases. For 132 outbreak cases, the date of rash onset was known (illustrated in Figure 1).

Figure 2 shows the regional distribution by public health district of the cases' residence; 140 cases had their residence in Styria (affecting 16 of 17 public health districts) and three outbreak cases were resident in Burgenland (affecting three of the nine public health districts).

A further 21 suspected rubella cases (not included in Figure 1 and 2) were named by confirmed outbreak cases.

One case of laboratory-confirmed rubella infection occurred in an unvaccinated 18 year-old pregnant native Austrian. As the infection occurred in the early first trimester of pregnancy, a

voluntary abortion was performed. Already one year earlier, this woman had been identified as susceptible to rubella infection after delivery of her first child.

Of the 143 outbreak cases, 55 (38.5 %) were female. For 140 outbreak cases, data on age were known. The median age was 19 years (range: 2-60 years). A total of 136 cases (97% of 140 cases) were older than 15 years. The age group of 15-24 year-olds was most affected (88.6%; 124 of 140). Among the female cases, the age-group 15-19 years (67%; 35 of 52) was affected most, followed by the age-group 20-24 years (23%; 12 of 52). No female cases occurred in the age-group 25-39 years; two female cases occurred in the age-group 40-49 years (Figure 3).

To date, the vaccination status is known for 57 outbreak cases. Twelve cases (22%), including eight female cases, were vaccinated with one dose of rubella vaccine; none of them had received two doses. The remaining 45 outbreak cases were unvaccinated.

In the two most affected age groups, the 15-19 year-olds (n=32 in which vaccination status was known) and the 20-24 year-olds (n=24 in which vaccination status was known), the distribution of vaccination status by sex was as follows: in the age group 15-19 years, 11 of the 17 (65%) female cases were unvaccinated, while all 15 male cases were unvaccinated; in the age group 20-24 years, two of the four female cases and 14 of the 18 male cases were unvaccinated.

Outbreak control measures

MMR vaccination was immediately offered to any unvaccinated persons by public health officers and general practitioners in Styria. Although the rubella vaccine was offered at no cost, only 180 doses of MMR vaccine were administered as part of the outbreak control measures in February and March 2009.

Discussion

Before the introduction of routine rubella vaccination, rubella outbreaks were common [4]. Recent outbreaks in Europe identified susceptible groups [5], e.g. in 2003 in immigrants from Latin America to Spain [6,7] and in 2005 in a religious community in the Netherlands [8]. Rubella, together with measles, is targeted for elimination in the WHO European region, with the objective for 2010 to eliminate endemic measles, endemic rubella, and to prevent congenital rubella infection (<1 case of CRS per 100,000 live births) [9]. Introduction of rubella vaccination programme has led to decreased circulation of the virus resulting in a reduced probability of wild virus exposure. If then vaccine coverage falls below a threshold of approximately 80%, there is an increase in CRS, due to accumulation of susceptibles among unvaccinated adult females [10]. According to the strategic plan for eliminating measles and rubella, and for preventing congenital rubella infection in the WHO European Region a total of 95% of the Member States should have administered, by January 2009, at least one dose of rubella vaccine to $\geq 95\%$ of all children at the national level or to $\geq 90\%$ of children in all first administrative levels [9]. In Austria there are no nationwide reliable data available on MMR vaccine coverage for individuals born before 1997. The official estimate of MMR vaccine coverage with at least one dose of the birth cohorts 1997 to 2007 was 84%.

Among the currently known outbreak cases, 90% of the female cases were 15-24 years-old. The index case, who occurred in mid-October 2008, was a teenage girl. No data on the contact pattern

FIGURE 3

Rubella outbreak cases by age-group and sex, Austria, October 2008-March 2009 (n=140, in which the date of birth was known)

during her infectious period are available to date. The second case occurred in mid-November 2008 and was the first case among soldiers. The other 19 outbreak cases in soldiers occurred between calendar week 52, 2008 and calendar week 11, 2009. To our knowledge the affected military camps implemented - except for isolation of the rubella patients in the military hospital - no other activities to control the outbreak.

Postnatal rubella is a mild infection and many cases are subclinical. Therefore, there may be substantial underreporting of cases among the general population. The clustering of cases among soldiers in this outbreak is more likely to be due to increased awareness and more reliable reporting to the public authorities in this population group.

In Austria, soldiers doing their mandatory military service are usually allowed to stay with their families during weekends, and in the second half of their six months duties may even sleep outside the barracks during the week. Three non-army outbreak cases had an epidemiological link to army cases.

In the setting of an outbreak, supplementary immunisation activities undertaken with the aim of interrupting transmission of rubella virus are the most effective preventive measure [11]. Obviously, the additional vaccination activities implemented by the local Austrian public health authorities have not been able to interrupt the rubella spread in the general population so far.

The documented voluntary abortion because of CRS risk affected a native Austrian who had been not vaccinated in childhood after her first delivery a year earlier although she had been identified as non-immune to rubella infection. This is a salutary reminder that vaccine programmes require a suitable public health infrastructure if unintended adverse consequences are to be avoided. However, national immunisation programmes are increasingly threatened by a combination of public and political complacency regarding the value of immunisation, and by the disturbing rise in the influence of anti-vaccination groups and their dangerously misleading advocacy campaigns.

An outbreak of mumps among adolescents and young adults in 2006 and an outbreak of measles affecting primarily the age-group ≥ 10 years in 2008, demonstrated already that additional MMR vaccination campaigns targeting the age group of ≥ 10 year-olds are highly required in order to prevent outbreaks of mumps, measles and rubella in Austria in the future [12,13]. Whether the statement '*The WHO European Region is well on its way to achieving targets for measles and rubella prevention and strengthening the control of vaccine preventable diseases in childhood*' as published in *Eurosurveillance* in June 2003 [14] still holds true in April 2009, might be a matter of controversy.

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