

Experience of hepatitis A vaccination during an outbreak in a nursery school of Tuscany, Italy

P. BONANNI^{1*}, R. COLOMBAI², G. FRANCHI³, A. LO NOSTRO¹,
N. COMODO¹ AND E. TISCIONE¹

¹ Public Health and Epidemiology Department, University of Florence, Viale G.B. Morgagni, 48, 50134 Florence, Italy

² Health Management Service, Hospital 'S. Chiara', Pisa

³ Operative Unit of Community Health Care, Local Health Unit n. 11, Empoli, Italy

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SUMMARY

An outbreak of hepatitis A started in late October 1996 in a nursery school in Tuscany, Italy. A programme of hepatitis A vaccination without the use of immunoglobulin started at the beginning of December 1996 and included 33 children, 21 household contacts and 6 adults working in the school. Overall, 11 cases occurred in children attending the school (attack rate 27%) and 10 among their household contacts (attack rate 9%). The latter also included parents, and, in two cases, grandmothers. The data indicate that susceptibility to HAV has increased over recent decades in central Italy. Past and recent experience shows that the usual duration of hepatitis A epidemics in the absence of immune prophylaxis is longer than that described here. The use of hepatitis A vaccine probably contributed to the early extinction of the outbreak, because no further cases were notified in the area after 7 February 1997.

INTRODUCTION

Hepatitis A is one of the most common infectious diseases, with about 1·4 million cases reported yearly [1]. Hepatitis A virus (HAV) is present worldwide, although the risk of transmission depends upon socio-economic conditions of populations. In many developed countries, the progressive improvement of hygienic conditions and environmental sanitation have led to a much-reduced risk of acquiring the infection during infancy, when most cases are asymptomatic [2]. The creation of large cohorts of susceptibles allows the occurrence of epidemics, sometimes with a large number of subjects involved, including adults in whom the infection is almost always clinically overt and may be particularly serious [3].

The availability of a safe and effective vaccine offers good protection and reduces the risk of infection [4].

* Author for correspondence.

The value of post-exposure prophylaxis in the control of community-wide epidemics is less certain. However, the data tend to indicate that vaccination is able to shorten the duration of outbreaks [5, 6].

This paper describes the pattern of transmission and time distribution of an outbreak of hepatitis A which occurred in children attending a nursery school and their relatives in Tuscany, Italy. During the outbreak, active immunization was used and its effect on the outbreak estimated.

METHODS

Study population and incidence of hepatitis A

The outbreak occurred in the area 'Valdarno Inferiore' – Local Health Unit n. 11, Tuscany, with a population of 79290 at the end of 1996. From 1985–95, the yearly incidence of hepatitis A was

constantly 2.5/100 000 inhabitants. The population of Ponte a Elsa, where the outbreak of HAV infection started, consisted, at the same date, of 1115 inhabitants.

Laboratory tests

All cases of suspect hepatitis A identified in the area where the outbreak occurred, were serologically confirmed by the detection of anti-HAV IgM (ETI HAV IgM K, Sorin Biomedica, Saluggia, Italy).

Immunoprophylaxis

Following the occurrence of several cases of confirmed hepatitis A between end of October and beginning of December 1996 in children attending a nursery school and in their relatives, a programme of vaccination was started which included all children and school personnel. Active immunization was also offered to all infant and child household contacts of hepatitis A cases and to some of the adults. The protocol of vaccination consisted of three doses of a paediatric HAVRIX (360 ELISA Units/dose) (Smith Kline Beecham, Rixensart, Belgium) for children, and of a dose of HAVRIX 1440 for adults.

Passive immunoprophylaxis with standard immune globulin was not used.

RESULTS

In the period 20 October 1996 to 6 December 1996, a total of 11 cases of hepatitis A were detected; 5 in children who attended a single nursery school and 6 among adult household contacts. The index case was identified as a child who had recently returned from Albania. The total number of children enrolled in the school was 46, but only 41 attended during the period of the outbreak.

On 7 December 1996, an active immunization programme started. Thirty-three children attending the school received the first dose of vaccine on the same day. Two children were not immunized due to refusal of their parents. Vaccine was also given simultaneously to 11 of 36 cohabitant children of hepatitis A cases. All 6 adults working in the school and 10 out of 78 adult household contacts of cases were also immunized.

Of the 33 vaccinated schoolchildren, 2 developed hepatitis 5 and 7 days after vaccination, i.e., these children were already infected when given the vaccine. In 3 more cases, non-specific symptoms of gastroenteritis were present when the first dose of vaccine was given. After a few days, all 3 developed typical symptoms of acute hepatitis A.

With regard to cohabitants, 2 cases of hepatitis occurred among 11 immunized children after 7 and 10 days after the first dose of hepatitis A vaccine. All the remaining immunized children (both those attending the school and their household contacts) received the second dose of vaccine 1 month after the first, and completed the vaccination course at month 6 of follow-up.

Three more cases were registered in non-immunized adult household contacts of children attending the school. The last notified case of hepatitis A related to the epidemic in the nursery school occurred on 7 February 1997. Overall, notified cases of hepatitis A during the outbreak were 11 in children attending the school (attack rate 26.8%) and 10 among household contacts (attack rate on the total number of cohabitants 8.8%). Figure 1 shows the epidemic curve of the outbreak.

DISCUSSION

The outbreak we observed in a community in Tuscany is an example of the changing patterns of HAV infection occurring in recent decades in Italy. In the past, when the infection was highly endemic, infection occurred most frequently in the first years of life, with a low disease/infection ratio. More recently, a reduced endemicity led to the accumulation of a large number of susceptibles including adults [7]. Consequently, the introduction of HAV in a community may easily lead to outbreaks of disease, with the occurrence of a large number of cases and the involvement of different age-groups.

The epidemic we report here originated in children attending a nursery school for 3–6 year-olds, but spread to siblings, parents and, in 2 cases, to grandparents. The increasing movements of populations and individual travel may lead to importation of the virus from countries where the infection is still highly endemic, as happened here.

The attack rate of acute hepatitis A in children attending the nursery school was unexpectedly high for the age (about 27%). Because it was not possible

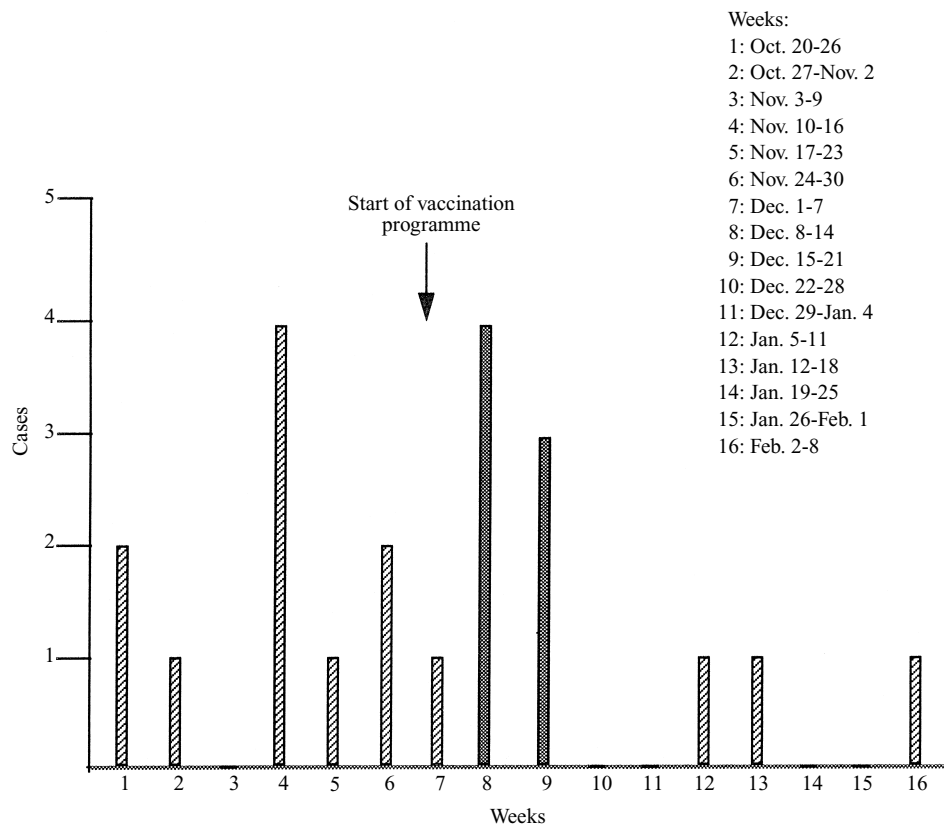


Fig. 1. Epidemic curve of the outbreak of hepatitis A occurring between October 1996–February 1997 in Tuscany, Italy, ■, vaccinated; ▨, not vaccinated.

to verify the immune status of all adult household contacts, the reported attack rate (about 9%) is probably an underestimate. This rate was calculated on the total number of contacts and not on susceptibles only.

However, it must be emphasized that the intra-familial spread of infection was quite high, in spite of the information supplied by public health doctors to all parents on mechanisms of viral transmission and on precautions to adopt in order to avoid contagion.

To our knowledge, this is the first outbreak of hepatitis A in Italy where immune prophylaxis was performed using vaccine only, without administration of immunoglobulin. The maximum effort was concentrated on immunization of children, both attending the school or living in the same household of cases.

There is published evidence to indicate that the use of hepatitis A vaccine during outbreaks is able to significantly shorten their duration [5]. With regard to the experience of active immunization reported in Alaska in 2 communities with large hepatitis A epidemics, it is noteworthy that, where coverage exceeded 80%, the outbreak ended after 4–8 weeks. On the other hand, in the community where coverage

reached 50% only, the epidemic lasted 50 more weeks [6].

In our experience, we observed 7 cases of overt acute hepatitis A occurring in vaccinees. However, infection in such cases occurred before active immunization. This conclusion is confirmed by the time interval elapsing between vaccine administration and appearance of typical symptoms of hepatitis A (maximum 10 days). The last case of hepatitis A related to the outbreak occurred on 7 February 1997 in a non-immunized brother of a schoolchild. The number of asymptomatic HAV infections occurring during the epidemic was not determined, due also to the urgency of active immune prophylaxis. For this reason, we cannot prove that the extinction of the outbreak in a relatively short time is exclusively attributable to the use of vaccine. Nevertheless, the reported increase in the susceptibility to HAV and the density of population in the area where the epidemic occurred, suggests that the outbreak would have lasted for a longer time in the absence of immune prophylaxis.

The use of hepatitis A vaccine during outbreaks in large communities is needed in order to prove

definitely the value of using only active immunization for post-exposure prophylaxis, without administration of immune globulin.

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