

Surveillance and outbreak reports

THE DETECTION OF MENINGOCOCCAL HOUSEHOLD CLUSTERS AND THEIR PROPHYLAXIS IN THE CHANGING EPIDEMIOLOGICAL SITUATION OF INVASIVE MENINGOCOCCAL DISEASE IN POLAND, 2003-2006

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Individual surveillance reports on meningococcal disease in Poland from 2003-2006 were screened for information on cluster detection and chemoprophylaxis administration, and a questionnaire was distributed to the country's regional health departments in order to summarize cluster investigation. The number of primary cases of meningococcal disease reported in 2003-2006 was 635, including 292 cases of meningitis, 185 cases of septicaemia, and 158 cases of meningitis with septicaemia. Chemoprophylaxis was administered to close contacts on average in 33.2% cases, the proportion increasing from 3.9% in 2003 to 43.8% in 2006. Between 2003 and 2006, there were five household clusters reported, involving a total of 10 cases. In one cluster, only co-primary cases were identified, and in the other four clusters, secondary cases were detected. Four of the five clusters were microbiologically confirmed, and the serogroup was established in two clusters (one C, one B). Chemoprophylaxis was correctly administered to household members in one cluster, after the diagnosis of the primary case, and a further case was recorded 42 days after the onset of disease in the primary case. Vaccination of contacts was not performed during the studied period. No deaths or serious disease sequelae were observed in the course of described household clusters.

Introduction

Invasive meningococcal disease (IMD) usually occurs sporadically, but can sometimes cause subsequent cases in close contacts. The detection and investigation of clusters is one of the most important aims of epidemiological surveillance of IMD, allowing the monitoring of the effectiveness of chemoprophylaxis and an assessment of the possible need for public health interventions, such as mass immunisation of the population when hyperepidemic strains are increasingly identified. In Poland, recommendations for IMD chemoprophylaxis were issued by the National Reference Centre for Bacterial Meningitis (NRCBM) in 2004 and were endorsed by the Chief Medical Officer for their national application [1]. Currently, the recommended prophylaxis of IMD cases includes the identification of close contacts and the referral of these individuals to general practitioners (GP) for observation and the administration of appropriate antibiotics. The drugs recommended for carriage eradication include rifampicin, ciprofloxacin, and ceftriaxone. IMD chemoprophylaxis is not free of charge for the patients, but is covered by the National Health Fund partial refund. Vaccination against IMD is neither included as a routine (free of charge) vaccine in the childhood immunisation schedule, nor recommended for the prevention of subsequent cases when vaccine-preventable strains are involved.

In recent years, the epidemiological situation of IMD in Poland has changed. The proportion of serogroup C among all *Neisseria meningitidis* isolates and the incidence of infections caused by this serogroup in teenagers have increased [2], coinciding with an increased number of hyperinvasive strains of serogroup C (ST-11) meningococci detected in the NRCBM [3]. These changes were linked to larger community-based and institution-based outbreaks that attracted increased media attention [3,4,5].

The aim of the present study was to summarise the prophylactic measures undertaken within IMD surveillance and to describe the meningococcal household clusters identified in Poland in 2003-2006 in order to review the public health recommendations in this area.

Methods

For the purpose of this study, reports summarising the investigation of all IMD cases reported in 2003-2006 were screened for information on prophylaxis of close contacts and detection of disease clusters. In Poland, physicians are legally obliged to report all newly diagnosed cases of IMD to the local sanitary-epidemiological stations (SES). Public health officers at SES carry out the epidemiological investigation of cases, administer prophylactic measures to their closest contacts and complete standardised surveillance reports. Completed surveillance reports containing demographic, clinical, epidemiological and laboratory data on each case are sent to the National Institute of Hygiene. Case-based information for meningococcal meningitis has been available since 1994, and for all-spectrum IMD since 2005 [2].

An additional survey on cluster surveillance of IMD was collected from public health departments to supplement information on routinely collected case reports from 2003-2006. Some information was collected specifically for the purpose of this survey, e.g. the length of the follow-up period in each case.

The following definitions were used in the present study: a primary case was defined as the first case of IMD in a household setting; a household contact was a person living in the same household or household type situation, as the primary case, during the seven days before onset of illness; a co-primary household case was defined as a case of IMD in a household contact of a primary case with onset within 24 hours after the onset in the index case; a secondary household case was defined as a case of IMD in a household contact of a primary case with onset >24 hours after

onset in the index case; follow-up period was defined as the time between the notification of the case and the end of the investigation of cases and their close contacts.

Results

The number of primary cases reported in 2003-2006 was 635, including 293 cases of meningitis only, 156 cases of septicaemia only, and 186 cases of meningitis with septicaemia. The number of cases with symptoms of meningitis ranged from 76 in 2003 (incidence of 0.2 per 100,000 population) to 148 in 2006 (incidence of 0.4 per 100,000), and the number of cases with symptoms of septicaemia ranged from 23 in 2003 (incidence of 0.06 per 100,000) to 147 in 2006 (incidence of 0.4 per 100,000). Chemoprophylaxis was administered to close contacts in the average of 33.2% cases, the proportion increasing from 3.9% in 2003 to 43.8% in 2006, with marked variations between regions (Figure).

In 2003-2006, five IMD household clusters were reported, involving a total of 10 cases (average household size = 5 persons; mean attack rate = 38.5%) (Table).

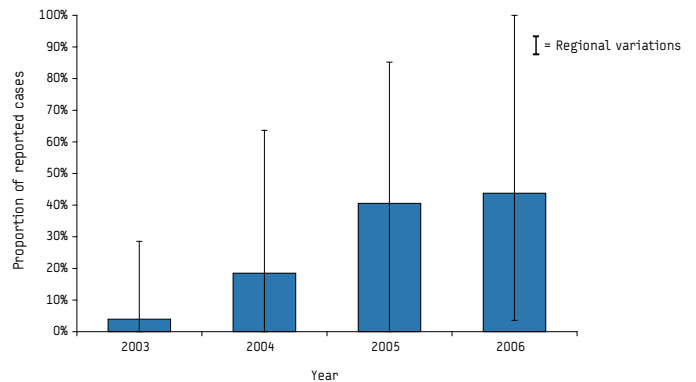
In one cluster, the cases occurred within 24 hours in two household members (co-primary cases), and in four clusters secondary cases were detected (mean time interval between primary and secondary cases = 15.7 days; mean attack rate in contacts = 18.2%). Four of the five clusters were microbiologically confirmed. The serogroup was established for at least one case in two clusters (one C, one B). Chemoprophylaxis was administered to close contacts in two clusters. In one cluster, it was given correctly to all household members after the diagnosis of the primary case, and a further case was recorded 42 days after the onset of disease in the primary case. In the second cluster, chemoprophylaxis was only administered after the onset of illness in the second case. Vaccination of contacts was not performed during the studied period. No deaths or serious disease sequelae were observed in the course of described household clusters.

Discussion

The epidemiological surveillance of IMD should result in applying prophylactic measures to prevent subsequent cases in households and in monitoring their effectiveness. Administering antibiotics

FIGURE

Proportion of cases of invasive meningococcal disease in which chemoprophylaxis was administered to close contacts, Poland, 2003-2006



eradicating meningococcal carriage was confirmed to be a cost-effective method of preventing subsequent cases [6]. One of the primary aims of the case investigation should be the follow-up of close contacts and the administration of chemoprophylaxis. Despite clear recommendations, chemoprophylaxis was not widely used in 2003-2006. This highlights the urgency of extensively educating public health officers and physicians and discussing the possibility of providing chemoprophylaxis to close contacts free of charge.

During 2006, no household clusters of IMD were identified, which could be related to the higher proportion of contacts given prophylaxis. In contrast, two large institution-based and two community-based outbreaks caused by group C meningococci occurred in 2006-2007, which required the undertaking of considerable control measures. In case of two outbreaks in army barracks massive chemoprophylaxis was undertaken [3,5] and the decision was adopted to routinely vaccinate all military personnel in Poland. In case of the two community outbreaks local immunisation campaigns were undertaken with conjugate meningococcal group C vaccine to reduce the carriage of hyperinvasive strains amongst teenagers [4,7].

TABLE

Selected characteristics of household clusters of invasive meningococcal disease, Poland, 2003-2006

Year	Follow up period (months)	House-hold size	Number of primary cases	Number of co-primary cases	Number of secondary cases	Time interval between primary and secondary cases (days)	Chemoprophylaxis of close contacts	Type of microbiological confirmation	Sero-group	Number of fatal cases
2003	2	8	1	-	1	42	Yes	Isolation	C	0
2004	1.5	4	1	-	1	8	No	Latex	-	0
2005	0.5	4	-	2	-	-	No	Isolation	-	0
2005	0.25	6	1	-	1	6	No	Isolation	B	0
2005	1	4	1	-	1	7	Yes*	Isolation	-	0

* Chemoprophylaxis administered to close contacts after the secondary case occurred.

The studied period was selected based on availability of data on chemoprophylaxis administered. During this period, in 2005, the IMD surveillance system has changed, with its extension to all-spectrum IMD, and implementation of case definitions [2]. The exclusion of non-meningitis cases from surveillance before 2005 probably resulted in the underascertainment of clusters, especially if cases of septicaemia were involved. Additionally, the occurrence of group C outbreaks in 2006-2007 has led to increased sensitivity of IMD surveillance. The preliminary data for 2007 indicate that the proportion of cases in which chemoprophylaxis was administered to close contacts was higher than in 2006. A recent review of public health policies for managing cases of meningococcal disease in European countries helped identify several areas in which clear recommendations were missing in Poland, including the lack of guidelines for administering chemoprophylaxis to contacts in institutional settings and to fellow passengers in buses, trains and aeroplanes [8]. Based on these considerations, further work needs to be performed to update national recommendations for chemoprophylaxis and improve their implementation.

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