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SENSITIVITY OF PASSIVE DIARRHEA SURVEILLANCE IN INFANTS UP TO THE SECOND YEAR OF LIFE IN MAŁOPOLSKIE VOIVODESHIP

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ABSTRACT

INTRODUCTION. In EU countries and also in Poland, the surveillance of infectious acute gastro-enteritis is a mandatory system based on cases notification (suspected and confirm) conducted by physicians in hospitals and ambulatory care.
STUDY OBJECTIVE. The assessment of surveillance sensitivity on acute diarrhea in children up to 2nd year of life in Małopolskie voivodeship from 2009 to 2012.
MATERIAL AND METHODS. The data about 720 infants surveyed respectively from birth up to 2nd year of life were used in this study. The information on acute diarrhea cases (outpatient and hospitalized) occurred in infants during follow-up was included in analysis. The data derived from medical records. Each case of acute diarrhea in infants detected by medical records was surveyed in local surveillance system on infectious diseases whether it was notified by physician.
RESULTS. The surveillance sensitivity on acute diarrhea in infants up to 2nd year of life increased in Małopolskie voivodeship from 14.3% in 2009 to 24.3% in 2012. The sensitivity of surveillance on hospitalized cases was twofold higher compared to all kind of cases assessed inclusively.
CONCLUSION: The surveillance sensitivity on acute diarrhea in infants up to 2nd year of life improved significantly in recent years but is still too low, especially with respect to outpatient cases.

Key words: *infants, acute diarrhea, surveillance sensitivity*

INTRODUCTION

Acute diarrhea in infancy causes a serious epidemiological and therapeutic problem. In general practice diarrhea is a second reason of medical consultations. The rotavirus is the main etiological agent of children diarrhea worldwide. In Europe, before rotavirus vaccines introduction the number of outpatient visits among children up to 5th year of life was calculated to 700 000 per year, from which 50 000 cases required hospitalization. These data have indirect character and do not derive from surveillance but are calculated indirectly based on epidemiological studies (1). In EU and also in Poland, the surveillance of infectious acute gastroenteritis is a mandatory system based on cases notification (suspected and confirm), conducted by physicians in hospitals and ambulatory care. Additionally, there is an obligation of the etiological agents notification, detected by laboratory system. Diarrhea in infants up to 2nd year of life is included to surveillance of infectious diseases in Poland, independently whether the etiological agent is confirmed or not (2,3). Despite the adequate presumptions of diarrhea surveillance in children, its sensitivity seems to be very low. Assuming that rotavirus is the main etiological agent of diarrhea, the assessment of diarrhea incidence in the youngest children is very important issue in discussion on rotavirus vaccines introduction to national immunization programs (4).

The aim of study was:

1. The assessment of surveillance sensitivity on acute diarrhea in children up to 2nd year of life in Malopolskie Voivodeship from 2009 to 2012.
2. The determination of average annual diarrhea incidence in the youngest children based on data of surveyed cohort derived from general population in Małopolskie voivodeship.

3. The estimation of diarrhea incidence in infants up to 2nd year of life calculated according to the surveillance sensitivity.

MATERIAL AND METHODS

The retrospective cohort study was applied in this study. Its objectives were the assessment of rotavirus vaccines effectiveness and surveillance sensitivity on acute diarrhea in children. The detailed methodology of the cohort follow-up was published in previous paper (5). In current analysis we used data related to 720 infants up to 2nd year of life, residents of Małopolskie voivodeship in 2009-2012. Infants were derived from representative regions for entire voivodeship. The information related to diarrhea cases was treated inclusively for all infants in our cohort, independently on rotavirus vaccination status. The data about number of diarrhea cases in infants occurred from birth up to 2nd year of life was included to that analysis (hospitalized and outpatient cases). The information on diarrhea cases was derived from medical records. Possessing the personal identification of diarrhea cases we checked up all of them in local surveillance registers whether the physicians had notified these cases. For comparison of the results obtained according to our cohort survey with surveillance data we collected the official number of diarrhea cases in infants up to 2nd year of life from surveillance registers for Małopolskie Voivideship for the same period of time when our infants were followed-up. The required in analysis number of infants, residents of entire voivodeship was derived from public statistical records for the examined area.

Statistical analysis

The surveillance sensitivity was calculated as the rate of notified diarrhea cases to the all number of cases that occurred during the cohort follow-up. That rate was calculated for all kind of acute diarrhea cases and separately for hospitalized one. The revealed surveillance sensitivity was used to estimate the diarrhea incidence for all infants at the same age in Małopolskie voivodeship. Furthermore, the diarrhea incidence determined in surveyed cohort was compared to incidence rate calculated according the surveillance data.

RESULTS

In our cohort consisted of 720 children, 172 diarrhea cases occurred in infants up to 2nd year of life (among them 68 hospitalized cases) during four years follow-up. The surveillance sensitivity on diarrhea in surveyed infants, representative for entire voivodeship, revealed

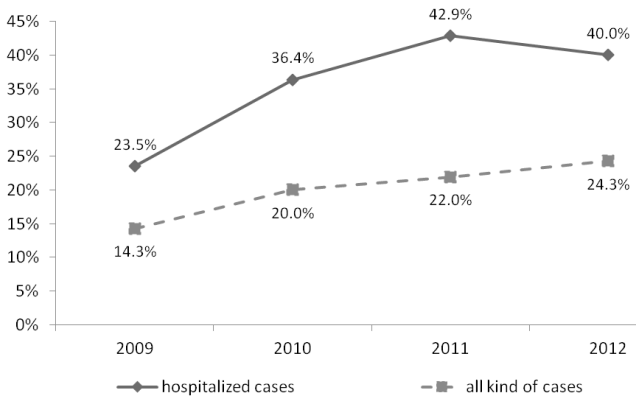

Fig. 1 The passive surveillance sensitivity on acute diarrhea in infants up to the 2nd year of life in Małopolskie Voivodeship in 2009-2012.

in analyzed period of time the increasing trend reaching 14.3% in 2009 and 24.3% in 2012. With respect to hospitalized cases the surveillance sensitivity was nearly twice higher compared to the all kind of diarrhea cases (fig.1). The number of diarrhea cases notified in Małopolskie voivodeship at the same time revealed also the increasing trend including respectively – 1960, 2193, 2410 and 2584 cases during the last four years. The average diarrhea incidence in our cohort during analyzed period was 1642.7/10 000 per year. That incidence was fivefold higher compared to surveillance data for Małopolskie voivodeship and only somewhat larger than that, estimated according to surveillance sensitivity. The incidence of hospitalized cases in our cohort was two and a half fold higher in comparison to the results obtained according to surveillance data, and similar to that estimated on the basis of surveillance sensitivity (fig.2).

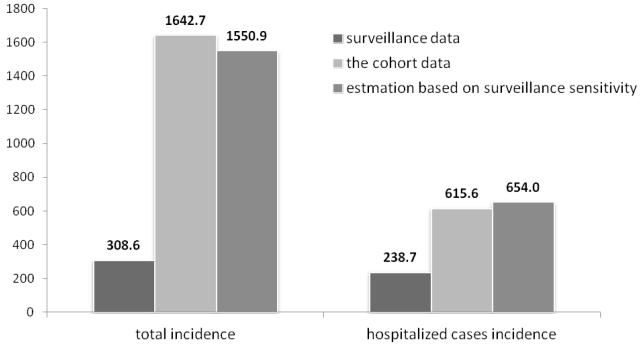

Fig. 2. The average annual diarrhea incidence rate per 10000 population in infants up to 2nd year of life in Małopolskie voivodeship in 2009-2012

DISCUSSION

The results of our study confirmed the relatively low passive surveillance sensitivity on acute diarrhea in infants up to 2nd year of life at surveyed voivodeship.

Despite having conducted the mandatory notification for many years, the most of diarrhea cases are not notified, yet. That problem is not only related to Poland. In the other countries the diarrhea incidence revealed by epidemiological studies was significantly different compared to the passive surveillance data (6,7). Therefore, the adequate data about epidemiological situation of acute gastrointestinal infections are indirectly estimated according to studies conducted on smaller, representative populations. The additional problem of surveillance is very low ratio of etiologically confirmed diarrhea, especially among outpatient cases (6,7,8).

During analyzed period the surveillance sensitivity on acute diarrhea in infants has improved in Małopolskie voivodeship. The trend was more stable for the all kind of cases compared to hospitalized ones, which after three years of getting up, declined somewhat in 2012. Despite, the average improvement in entire voivodeship, there were still significant disproportions in surveillance sensitivity between smaller regions included to surveyed area. That situation does not allow to conduct reliable epidemiological studies based on surveillance data. That low surveillance sensitivity on acute diarrhea in infants should not be related to the all of notified infectious diseases. One rule usually exists, the greater diseases severity the better surveillance sensitivity. The acute diarrhea is treated rather as not severe disease with self-limiting course, that is probably one of the reason of low surveillance sensitivity (9). It is confirmed in better notification rate of more severe diarrhea cases required hospitalization compared to cases treated in general practice. The similar differences in surveillance sensitivity were observed by the authors of other studies (6,7).

There is increasing concern on adequate epidemiological situation of gastrointestinal infections in children, especially in countries which implemented rotavirus vaccination to immunization programs. Conducting the sensitive surveillance, after some years of rotavirus vaccinations, the significant decline of rotavirus diarrhea incidence should be noticed, presuming the high vaccines effectiveness revealed in many studies (10,11). In the lack of etiological agent confirmation, presuming that about 50% of diarrhea cases before rotavirus vaccinations were caused by that agent, the vaccines introduction to immunization schedule should influence significantly diarrhea incidence in children, independently whether the infectious agent is known.

The rotavirus vaccinations were introduced in Poland as a voluntary strategy in 2007. In Małopolskie voivodeship the vaccination coverage of infants gradually increased reaching the highest rate of 21% in 2011. At the same time when rotavirus vaccination coverage has been increasing, the surveillance sensitivity on acute diarrhea in infants were improved, as well. Paradoxically, the higher rotavirus vaccination coverage was reached, the more diarrhea cases in infants were notified. The fact, that surveillance sensitivity in Małopolskie voivodeship has improved should be judged positively but this is an example how carefully must be treated such data using them in epidemiological studies. According to the gathered surveillance data, the rotavirus vaccinations would have no positive impact on epidemiological situation of infants diarrhea.

The results of our study related to surveillance sensitivity are real data for general population because the cases vaccination status does not influence on physicians attitude towards notification responsibility. Nevertheless, the diarrhea incidence calculated for entire voivodeship according to our cohort is biased because the half of followed-up infants were vaccinated against rotavirus infections but the vaccination coverage in infants from general population was less than 20% at the same time. Presuming 40% rotavirus effectiveness in preventing all-cause diarrhea in infants (independently on etiology), what was revealed in previous studies, the diarrhea incidence for entire voivodeship was underestimated compared to real epidemiological situation, despite it was fivefold higher than that derived from surveillance data (12).

The knowledge about the adequate diarrhea incidence in children is an important argumentation in ongoing discussion on the rotavirus vaccines introduction to immunization schedule. The underestimated data derived from passive surveillance could be not sufficiently convincing to dedicate especially public resources for rotavirus vaccinations. There is very important to be aware what kind of limitations have the data collected by passive surveillance on infectious diseases.

CONCLUSION

The surveillance sensitivity on acute diarrhea in infants up to 2nd year of life improved significantly in recent years but is still too low, especially with respect to outpatient cases.

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