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# Інфекційні хвороби в практиці лікаря-інтерніста: сучасні аспекти

***Infectious diseases in practice of physician-internist: modern aspects***

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Revenko Georgiy Oleksandrovych,
Mavrutenkov Victor Volodymyrovych,
Chykarenko Zoya Oleksandrivna

**STRENGTH OF POPULATION IMMUNITY AGAINST DIPHTHERIA IN DNIPROPETROVS'K REGION**

Department of Infectious Diseases
SE "Dnipropetrovs'k medical academy of Health ministry of Ukraine", Dnipro, Ukraine

*Ревенко Георгій Олександрович,*
*Маврутенков Віктор Володимирович,*
*Чикаренко Зоя Олександрівна*

***НАПРУЖЕНІСТЬ ПОПУЛЯЦІЙНОГО ІМУНІТЕТУ ПРОТИ ДИФТЕРІЇ У ДНІПРОПЕТРОВСЬКОЇ ОБЛАСТІ***

*Кафедра інфекційних хвороб*
*ДЗ «Дніпропетровська медична академія МОЗ України»,*
*м. Дніпро, Україна*
***georev5@mail.ru***

***Резюме.*** *Встановлено, що рівень протективного імунітету проти дифтерії становив 69,5%. Переконливий рівень імунологічного захисту серед дітей становив 70,9%, серед дорослих – 68,3%. Жодна з вікових груп не мала достатнього рівня антитоксичного імунітету, необхідного для припинення трансмісії збудника дифтерії. Відсоток захищених осіб знижувався зі збільшенням віку людей. Така ситуація може створювати передумови для спалахів дифтерії у Дніпропетровській області.*

**Importance**. Diphtheria is an infectious disease spread of which is limited by population post-vaccination immunity. In the system of epidemiological surveillance of diphtheria for objective assessment and prediction of epidemic situation in low intensity of epidemic process of this infection the serological control of immunity is crucial.

**The aim of the investigation.** Prognosis of epidemic situation regarding the risk of outbreaks of diphtheria in Ukraine by the detection of populational post-vaccination immunity against diphtheria in Dnipropetrovsk region and evaluation of the effectiveness of widespread vaccination.

**Materials and methods.** 483 people aged 0 to 78 years were examined in total in 2015 (children - 234 children and 249 adults). Evaluation of specific immunity against diphtheria was carried on with the following criteria: those with levels of antibodies 0.015-0.06 IU/mL should be considered relatively protected; 0.1-0.5 IU/ml were considered with medium level of protection; > 1.0 IU/ml were attributed to high level of protection. Protective antibody titer should be considered the concentration of not less than 0.1 IU/ml.

**Results**. Our studies have shown that the layer of susceptible to diphtheria population was 30.5% (n = 147), whereas 7.9% (n = 38) were seronegative persons and in 22.6% (n = 109) antibodies lower than protective level were revealed. Reliable level of antitoxic protection, namely 0.1 IU / ml or higher was detected in 69.5% (n = 336) of population, that is, 45.3% (n = 219) had the average level of protection and 24.2% (n = 117) had high level. This situation may create conditions for outbreaks of diphtheria in the Dnipropetrovsk region.

Analyzing the tension of population antitoxic immunity in 2015 in different age groups, we revealed adequate antibody level in only 70.9% (n = 166) of children and in 68.3% (n = 170) of adults. Thus, the rate of seronegative persons among children was 6.4% (n = 15) and the rate of relatively protected ones was 22.6% (n = 53). Among adult population the group of seronegative people included 9.2% (n = 23), relatively protected ones were 22.5% (n = 56). Detailed analysis of children population by age groups revealed that in a cohort from 0 to 5 years of age adequate immunity level was found in 75.8%, between 6 and 9 years it was found in 69.8%, 10 to 17 years it was only in 61.1 %.

Both among children and among adults the following tendency was revealed: percentage of protected population decreased with

increasing age of people. Data analysis of vaccination status among adults showed that in the age group of 18 to 27 years a sufficient level of antitoxic immunity was in 80.8%; of 28 to 37 years it was in 80%, from 38 to 47 years it was in 75%, from 48 to 57 years it was 61.2% and in those older than 58 years it was 48%. As we can see, none of the age groups (among children and adults) had enough anti-toxic level of protection required to stop transmission of diphtheria pathogen. Such low percentages of protected population, especially among adults, may be explained by the lack of booster diphtheria toxoid administration; as in children it is more or less controlled at kindergartens and schools. These data show the importance of maintaining of protective antibody levels through widespread immunization of children, as well as the importance of booster vaccination among adolescents and adults that will allow to exclude the category of susceptible layer of population. Thus, the complete total protection of the population can help to evade recurrence of this serious, potentially fatal infectious disease.

**Conclusions**. Thus, analyzing the state of antitoxic population immunity against diphtheria, we can see that the guaranteed level of immunological protection in 2015 in population of Dnipropetrovsk region was low and reached only 69.5% against 92-95% of required threshold. This can create grounds for outbreaks of diphtheria. None of age groups had reliable protective level of immunological protection, and children aged 6 to 9 years, 10 to 17 years and adults 48 to 57 and older than 58 years had the lowest level of protection that presents both medical and social problem. These circumstances set the condition for booster vaccination in all age groups against diphtheria in the Dnipropetrovsk region. Our perfromed analysis oflevel of specific immunity argues the need for further study of post-vaccination immune status and factors influencing its formation in relation to controlled infections in more numerous groups with further generalization of the results.