references


Seroepidemiology of Pertussis in Senior Adults

Sir—We read with interest the article by Hodder et al. [1] regarding antibody responses to pertussis antigens in elderly community residents. Given the poor sensitivity of bacterial culture, serodiagnosis of pertussis is an attractive methodology to determine the burden of illness, and results of serodiagnosis have been used as evidence to support the need for pertussis immunization in various populations. However, there are no well-defined criteria for evaluating the results of serodiagnosis of pertussis. Hodder et al., in table 1 of their study [1], gave estimates of disease incidence that varied up to 6-fold, depending on the definitions they used. We agree with Hodder et al. that pertussis toxin (PT) is the most specific antigen for pertussis, and the measurement of levels of other single antigens for serodiagnosis will likely overestimate the incidence of pertussis.

Similar to Hodder et al. [1], we studied 100 healthy adults >60 years of age who were recruited from the Nashville, Tennessee, community for clinical vaccine trials at Vanderbilt University. Fifty-nine percent of the subjects were women, and 97% were white. Forty-seven subjects recalled having had pertussis (“whooping cough”) in childhood. Twelve subjects reported a coughing illness that lasted >2 weeks during the previous year, and 35 subjects reported at least weekly contact with young children. The concentration of IgG antibodies to PT and filamentous hemagglutinin (FHA) were measured in serum samples by use of ELISA, according to the standard method of Manclark et al. [2]. Results are shown in figure 1, as are data on concentrations that were determined previously in our laboratory for serum samples obtained from younger persons in the same community [3]. Local regression (loess) analysis was used to estimate serological trends because the data did not conform to a single overall linear regression model.

The portion of the graph that shows data from the previous work illustrates that mean concentrations of antibody were significantly greater in subjects aged 4–6 and those aged 13–17 years. These peak concentrations are thought to correspond to a boost in the concentration of antibody after routine immunization, in children aged 4–6 years, and to reinfection, in children aged 13–17 years. In the current study, levels of PT and FHA for persons aged 60–90 years did not differ significantly from values obtained previously for persons aged >40 years. No subject in this study had serological evidence of recent pertussis infection, as defined by elevation of both PT and FHA titers above the 95th percentile. One subject, a 76-year-old man in good health with no recent history of coughing illness, met a less specific criterion for infection; namely, elevation of PT level alone that exceeded the 95th percentile.

Unlike the study by Hodder et al. [1], our serological survey cannot assess increases or decreases in antibody levels over time. However, the levels of IgG antibodies to PT and FHA in our cohort of senior adults are similar to the levels reported by Hodder et al. [1] among study subjects.

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References


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who did not have infections, and they are also similar to levels reported among nursing-home residents who did not have clinical infection during one large outbreak of pertussis [4]. The minimal variability of these levels should aid in the establishment of reference values, which could be used to diagnose pertussis in senior adult subjects on the basis of a single serum specimen. This method of diagnosis has been used to monitor pertussis activity in younger individuals [5], and is more practical and rapid than diagnosis on the basis of acute and convalescent serum samples.

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Appropriate informed consent was obtained from all subjects in this study, and the clinical research was conducted in accordance with guidelines for human experimentation as specified by the US Department of Health and Human Services and Vanderbilt University.

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Figure 1. Serologic responses (as determined by use of ELISA) to Bordetella pertussis antigens, by age (1–90 years of age). The older adults tested in this study (●) are shown in comparison with our previous data for younger individuals (○). Each symbol represents 1 subject. Solid line, geometric mean titer; left, pertussis toxin (PT) titers; right, filamentous hemagglutinin (FHA) titers.