Immunization not linked to increased hospitalization for children with inherited disorder

April 11 2011

Children with inborn errors of metabolism received vaccines on the same immunization schedule as did healthy infants, according to Kaiser Permanente Vaccine Study Center scientists who examined the Kaiser Permanente Northern California population. In addition, immunization was not associated with significant increases in emergency room visits or hospitalizations during the month following vaccination, according to Nicola Klein, MD, PhD, lead author of the study and co-director of the Kaiser Permanente Vaccine Study Center.

The study appears in the current online issue of *Pediatrics*.

The paper is among the first to study immunization rates and vaccine safety in children with inherited metabolic disorders, which is a potential high-risk population for vaccine-preventable illnesses. Inborn errors of metabolism comprise a large class of genetic diseases characterized by defects in enzymes required for breaking down organic compounds, said the researchers. Although each condition is individually rare, it is estimated that the collective birth prevalence is between 1 in 2,500 to 5,000 live births, they explained.

Studying infants with inborn metabolism errors compared with matched healthy controls, similar proportions of children in the Kaiser Permanente Northern California population were up to date for vaccines at 2 years of age, and there was no evidence of delay in receipt of

recommended vaccines during the first year, said Klein. Importantly, vaccination of children with inborn errors of metabolism was not associated with significant increases in emergency room visits or hospitalizations during the 30 days after vaccination.

"It's important to note that children with inherited metabolic disorders are particularly vulnerable to metabolic stress, including fever that results from infections and inflammatory processes, as well as vaccine-preventable diseases," Klein said. "This study adds important information to the evidence base because it's among the largest and thus perhaps gives us the best look at this to date. The results suggest that routine vaccination of children with inborn errors of metabolism is safe, but we recognize that larger studies are needed because these conditions are so rare."

Researchers grouped inborn errors of metabolism into three groups – sickest, chronic and stable. They identified children up to 18 years old who were assigned an inborn error of metabolism diagnosis from 1990 to 2007. Researchers assessed immunization rates by comparing infants with inborn metabolism errors with matched healthy controls. Researchers then assessed for vaccine-related adverse events, defined as an emergency room visit or hospitalization, by comparing days 0-30 post vaccination versus 31-70 days post vaccination among all children with inborn errors of metabolism who were vaccinated. This was done to allow for evaluation of adverse events that could be due to both inactive and live viral vaccines. They also examined the vaccination period from 0 to 14 days post vaccination as secondary analyses.

Unlike a prior single report describing seven children with inborn errors of metabolism who experienced metabolic de-compensation after vaccination, this larger study of 271 vaccinated children with inborn errors of metabolism did not detect such an association for most children in the 30 days following vaccination, including children with inborn

errors of metabolism less than 1 year old, added Klein.

Klein explained that secondary analyses indicated there may be increased rates of hospitalizations two weeks after vaccination for the sickest 1-4 year olds. This suggests that there may be a subset of more fragile children with inborn errors of metabolism at increased risk for adverse events during the immediate post vaccination period, she said.

"However, this finding should be interpreted cautiously in light of the sparse data with a small number of hospitalizations (11 during post vaccine days 0-14), the lack of a clear association with any particular vaccine(s), the long time period of which these hospital events occurred (17 years), and the lack of a corresponding increase in ER visits during the post vaccine days of 0-14."

The study also observed some evidence of increased ER visits during the two weeks after vaccination for "stable" children aged 0-18 years. Again, there were few numbers of events (13 during the post vaccine days of 0-14) which occurred over a long period of time. The lack of a corresponding increase in hospitalizations for this group is reassuring because it suggests that ER events were not serious enough to result in hospitalization, said the researchers.

"Although a larger study will be needed to investigate these observations further, it is important to consider that, for this vulnerable population, the risk of an ER visit or hospitalization following infection with a vaccine-preventable disease would likely be greater than the increased frequencies observed in this study," said Klein.

Because infants with underlying inherited metabolic disorders are especially vulnerable if unprotected against vaccine-preventable diseases, the American Academy of Pediatrics (AAP) recommends routine vaccination for children with inborn errors of metabolism, she

said, explaining that this study supports that recommendation.

Provided by Kaiser Permanente

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