No Intussusception Rise with Rotavirus Vaccine Reintroduction

Rotavirus is a virus that causes severe watery diarrhea, often with vomiting, fever, and abdominal pain. Worldwide rotavirus is the leading cause of severe diarrhea in infants and young children and is responsible for more than half a million deaths in children younger than 5 each year. Large declines in severe rotavirus have occurred since the reintroduction of the vaccine in 2006 with an estimated decrease of 55,000 hospitalizations in 2008.

RotaShield, a live attenuated tetravalent rotavirus vaccine that was introduced in 1998, was withdrawn from the market a year later due to concerns of an increased risk for intussusception among infants within several weeks of being vaccinated. The largest increased risk was observed during the 3 to 7 days following the first vaccine dose. There have since been two newer vaccines introduced, RotaTeq (a 3 dose series) in 2006 and Rotarix (a 2 dose series) in 2008. Prelicensure trials for both vaccines revealed that there was not an increased risk for intussusception at 42 and 30 days post vaccination with RotaTeq and Rotarix, respectively. However, two recent international postlicensure evaluations have observed an increased risk of intussusception in the first week after the first dose of rotavirus vaccine. The first was an Australian study that found a statistically significant increased risk in intussusception during the first week after the first dose of RotaTeq, while the second study in Mexico and Brazil found an approximate 5-fold increase in intussusception in the first week after the first dose of Rotarix in Mexico, but not Brazil. Given this new data on intussusception and a documented administration increase for rotavirus vaccine in the Vaccine Safety Database (VSD), the intussusception risk, specifically during the week after RotaTeq administration, was re-examined.

Intussusception occurs when part of the intestines is pulled inward into itself. This can block the passage of food through the intestines and if the blood supply is cut off, the inward segment can die. The pressure caused by the walls of the intestine pressing together causes irritation and swelling. If the intestine dies, the patient can have significant bleeding and if a hole occurs, infection, shock and dehydration can happen very rapidly. If not treated, intussusception is usually fatal for infants.

The most recent study compared the rates of intussusception in infants aged 4 to 34 weeks who had received RotaTeq with infants who had received other vaccines without concomitant RotaTeq from May 2006 to February 2010. Rotarix was not assessed due to minimal records in the VSD population during the study time. During the study period, 786, 725 doses of RotaTeq were administered of which 39% were first doses, 33% second doses, and 28% third doses. There were no statistically significant increased risks in either the 1 to 30 day window or the 1 to 7 day risk window for all doses combined. Specifically, 21 ED and hospital intussusception events were identified in the 1 to 30 day risk window using ICD-9 codes, with 7 events documented after each dose. Of these 21 events, 4 occurred within the 1 to 7 days after vaccination with 1 after doses 1 and 2, and 2 following dose 3. These results translate to an upper limit for a risk of 1 in 65,287 for every dose-1 recipient of RotaTeq in the VSD population.

Even though intussusception is a rare event, the effects of such an event have serious implications if not treated. The findings of an increased risk in both Australia and Mexico after the first dose of either RotaTeq or Rotarix cannot necessarily be ruled out due to chance. However, other factors such as those due to the environment or genetics could play a role. It is worth noting that rates of natural intussesception are higher in Australia compared to the US (81/100,000 infant years vs. 47/100,000 infant years). Regardless, the introduction of the rotavirus vaccines has had a substantial effect on decreasing the rotavirus disease for infants in the US. Although a very low risk of intussusception is still possible, the benefits that the vaccines provide only further strengthen the need for the rotavirus vaccination.

References:

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