# Group B streptococcal meningitis has long-term effects on children's developmental outcomes

June 12 2012

Parents of infants who survive bacterial meningitis caused by group B *Streptococcus* might have to live with the effects of the disease on their children long after they're discharged from the hospital.

A new study in the journal *Pediatrics* finds that even though mortality rates of children infected with GBS meningitis have decreased in the past 25 years, just under half of children who survive the disease will suffer impairment as a result of the disease.

"These bacteria can quickly cause significant damage to the developing infant brain very quickly despite the infant's having received excellent medical care," says Morven S. Edwards, M.D., professor of Pediatrics at Baylor College of Medicine and a co-author on the paper. "This is a potentially devastating illness and we still have a large percentage of infants who have poor outcomes after the infection."

According to the CDC, 25 percent of pregnant women carry GBS. It is routine for these women to receive antibiotics during labor to protect the baby from infection occurring in the first days of life. There is no way to prevent late-onset GBS infections in infants.

"We haven't had recent data on the outcomes of GBS meningitis in over 25 years and the quality of medical care has changed," says Prachi Shah, M.D., a clinical assistant professor at the University of Michigan

Medical School Department of Pediatrics and Communicable Diseases, and a senior author on the paper. "We wanted to know, in this era of using antibiotics during birth, whether outcomes have changed for infants who do acquire GBS meningitis. Our study counsels families to be very vigilant about their child if they've had GBS."

The current study shows that, although modern day medicine has improved survival rates, children can still suffer adverse long-term outcomes.

"Despite the fact that mortality has decreased in the last 25 years, survivors of GBS meningitis continue to have substantial long-term morbidity," says Romina Libster, M.D., a physician in the Department of Pediatrics at Vanderbilt University and first author on the paper.

The overall impact of invasive GBS infection in infants is just over 2,000 cases per year in the United States. Among those with bloodstream infection, 10 to 20 percent can also develop meningitis.

The relative importance of GBS as a cause of meningitis has grown in recent years. "GBS is responsible for over 85 percent of bacterial meningitis in children under two months of age," says Edwards. "Vaccination with the newer pneumococcal vaccines has led to tremendous reductions in meningitis from those bacteria."

Using three different and distinctly defined levels to measure functionality, researchers find that 56 percent of children who survived GBS meningitis went on to have age-appropriate (or normal) development, 25 percent had mild-to-moderate impairment and 19 percent had severe impairment.

Signs of mild-to-moderate impairment include continual and significant academic underachievement as well as evidence of mild neurological or

functional impairment. Indications of severe impairment include blindness, hearing loss, cerebral palsy, and significantly delayed development.

According to lab data and cranial images at the time of discharge, there are a number of factors that can help predict the likelihood of long-term severe impairment in GBS meningitis survivors, including a failed hearing screening, an abnormal neurologic exam, and abnormal imaging of the head. However, data and imaging cannot as accurately predict children who will have mild impairments, according to the study.

"The more subtle developmental delays suggest that any child who has had GBS meningitis should have ongoing developmental evaluation," says Edwards, "so that problems can be identified early and addressed even before the child actually starts school so that the child has the best chance to fulfill their potential."

The study examined 43 survivors of GBS meningitis between the ages of three and 12 years. Patients were examined physically, neurologically, with hearing and vision screening, and were also assessed using standardized developmental assessments.

Parents were also questioned on perceptions of their child's development. Parents of children who either had normal or severely impaired functionality are able to accurately identify their children as such. However, according to the report, parents of children with mild-to-moderate impairments are less likely to accurately label their child's developmental delay. Because of this, Shah suggests the importance of follow-up evaluations. "Parent self-report is not always an accurate identifier of children who have mild impairment," she says, "which is why survivors of GBS meningitis should receive long-term development surveillance."

According to Edwards, there are two important steps to be taken moving forward. The first is the development of a vaccine for mothers so that the disease can be prevented altogether. "The other," Edwards says, "is just to enhance awareness of the consequences of the infection and of the need for its prevention."

Currently, clinical testing is already underway for a GBS vaccine developed by Novartis Vaccines & Diagnostics.

**More information:** Libster et al, "Long Term Outcomes of Group B Streptococcal Meningitis," *Pediatrics*; originally published online June 11, 2012; DOI: 10.1542/peds.2011-3453

Provided by University of Michigan Health System