New study suggests two causes for bowel disease in infants

April 27 2009

New research from Lucile Packard Children's Hospital and the Stanford University School of Medicine is helping physicians unravel the cause of a deadly and mysterious bowel disease that strikes medically fragile newborn babies. The findings could lead to a better understanding of the disease and its medical management, and also shed light on the causes of sepsis, a major killer of children and young adults.

The bowel disorder, necrotizing enterocolitis, or NEC, is seen mainly among premature infants, affecting about one in every 2,000 births. A similar constellation of symptoms, also labeled NEC, is also seen in children born with congenital heart defects. The disease causes massive intestinal inflammation and impairs nutrient uptake. Complications can include perforation of the intestine and widespread infection of the abdominal cavity or blood — sepsis — as well as lasting consequences such as the need for bowel transplant or chronic intravenous feeding.

The findings, which will appear in the May issue of the journal *Pediatrics*, suggest that the diagnosis of NEC in premature infants versus those with heart disease may actually encompass two distinct disease processes with different origins.

"If we start accepting that we are looking at two different diseases, further research may be able to elucidate some differences in the disease process and help us tailor management," said senior study author Sanjeev Dutta, MD, assistant professor of surgery and pediatrics at Packard Children's and the School of Medicine. Right now, because physicians

have such a poor understanding of what causes the disease, they can't tell which infants will be hardest hit, Dutta said. "At present, we're managing all cases the same way without addressing the concept that the child with heart disease may have a different underlying cause of NEC than the child with prematurity alone. We're giving support, but not really curing the disease."

To gain insight into how necrotizing enterocolitis starts, Dutta and his collaborators investigated whether a pre-existing medical problem — congenital heart defects — affected the course of the disease. They reviewed medical records from 76 infants who had a congenital heart defect together with necrotizing enterocolitis and 126 infants who had necrotizing enterocolitis alone. All study subjects were patients at Packard Children's between May 1999 and August 2007.

The researchers found that babies who had both necrotizing enterocolitis and a congenital heart defect fared better than those who had necrotizing enterocolitis alone. Even premature babies with heart defects did better than those who were premature alone. Babies who had heart defects were less likely than other affected infants to suffer intestinal perforation or abnormal narrowing of the bowel. They also were less likely to need surgery to resolve infection, to require an artificial drain through the abdominal wall for managing bowel perforation or to require removal of portions of diseased intestine.

The findings suggest that infants with heart defects may be getting the disorder because of reduced blood flow to the bowel, while those with normal hearts may get the disease for other reasons, such as a bad reaction to oral feeding in premature infants with an underdeveloped gut. Both poor blood flow and gut immaturity have been blamed for NEC before, but the relative importance of each factor has been unclear.

Another possibility suggested by the researchers is that the close medical

monitoring given to infants with heart defects helps physicians detect the intestinal problem early and thus institute therapy more quickly.

Although necrotizing enterocolitis is relatively rare, "it's a disease that has a huge impact on society," Dutta said. "These kids can get very sick and die, or suffer permanent injury to the bowel." Infants who survive often require repeat hospitalizations and expensive treatments throughout their lives.

And the disease is worth studying for another reason. "It's essentially an inciting event that leads to a septic episode," or a severe blood infection capable of sweeping the body and shutting down organ systems, he said.

"Sepsis is very hard to treat. It's one of the few consistent killers of young people." Learning how to heal the sepsis that results from necrotizing enterocolitis could help doctors get a better handle on sepsis cases in children and young adults.

Source: Stanford University Medical Center (news : web)