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Babies benefit from a little food in their tummies, hepatologist says

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When a child is born prematurely, providing nutrition intravenously can be lifesaver. Unfortunately it can also cause liver damage down the road.

Ajay Jain, M.D., medical director of the pediatric liver transplant program at SSM Health Cardinal Glennon Children's Medical Center and a SLUCare pediatric hepatologist and gastroenterologist, received a $150,000 grant from the North American Society for Pediatric Gastroenterology Hepatology and Nutrition (NASPGHAN) to study preventative strategies for total parenteral nutrition associated disorders.

Total Parenteral Nutrition (TPN) involves providing all nutritional needs intravenously for patients who cannot get nutrition through their gut. TPN is a solution containing carbohydrates, proteins, lipids, vitamins, minerals and other nutrients essential for normal nutrition. People receive TPN when part, or all, of their digestive system doesn't function normally.

TPN is a common and critical therapy for sick babies, children and adults all around the world. Despite being a life saver, TPN causes several complications, Jain said, including a life threatening and potentially fatal liver and bowel disease—especially in fragile NICU babies.

"Patients on extended TPN can experience severe jaundice and liver scarring also called fibrosis/cirrhosis," said Jain. "Accompanying the progressive liver failure, impairment of blood flow through the liver

leads to a condition called portal hypertension. This causes illness so severe that patients may require a liver transplantation for survival. Additionally, paradoxically, there is also significant gut atrophy with TPN use."

Jain's work has identified unique molecules and pathways that are altered during TPN. In this project, Jain will assess these molecules and devise strategies and pharmacological therapies to correct the defect and mitigate complications.

Normal circulation of bile acids in the gut and liver are disrupted with TPN.

"Our hypothesis is that during TPN infusion the normal gut-to-liver cross talk gets disrupted leading to multi-organ dysfunction," Jain said. "This stems from the simple fact that parenteral nutrition related injury is minimal if at least some nutrition is delivered via the gut."

"We believe that our unique hypothesis and strong preliminary data can eventually bring strategies to fruition, which could mitigate serious complication of a critical life-saving therapy," Jain said. "Tragically TPN related complications affect one of our most vulnerable and precious populations—newborn babies—which is rather disheartening. As no effective therapy currently exists there is a high priority need for developing treatments to ameliorate these unfortunate complications."

Provided by Saint Louis University