Provision of Amniotic Fluid During Parenteral Nutrition Increases Weight Gain With Limited Effects on Gut Structure, Function, Immunity, and Microbiology in Newborn Preterm Pigs - DTU Orbit (11/12/2018)

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Background: Small enteral boluses with human milk may reduce the risk of subsequent feeding intolerance and necrotizing enterocolitis in preterm infants receiving parenteral nutrition (PN). We hypothesized that feeding amniotic fluid, the natural enteral diet of the mammalian fetus, will have similar effects and improve growth and gastrointestinal (GI) maturation in preterm neonates receiving PN, prior to the transition to milk feeding. Materials and Methods: Twenty-seven pigs, delivered by cesarean section at ~90% of gestation, were provided with PN and also fed boluses with amniotic fluid (AF; n = 13, 24-72 mL/kg/d) or no oral supplements (nil per os [NPO]; n = 14) until day 5 when blood, tissue, and fecal samples were collected for analyses. Results: Body weight gain was 2.7-fold higher in AF vs NPO pigs. AF pigs showed slower gastric emptying, reduced meal-induced release of gastric inhibitory peptide and glucagon-like peptide 2, changed gut microbiota, and reduced intestinal permeability. There were no effects on GI weight, percentage mucosa, villus height, plasma citrulline, hexose absorptive capacity, and digestive enzymes. Intestinal interleukin (IL)-1β levels and expression of IL1B and IL8 were increased in AF pigs, while blood biochemistry and amino acid levels were minimally affected.

Conclusion: Enteral boluses of AF were well tolerated in the first 5 days of life in preterm pigs receiving PN. Enteral provision of AF before the initiation of milk feeding may stimulate body growth and improve hydration in preterm infants receiving PN. Furthermore, it may improve GI motility and integrity, although most markers of GI maturation remain unchanged.

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