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Rapid Progression of Parenteral Nutrition-associated Liver Disease on Liver Biopsies of Pediatric Patients with Short-gut Syndrome: a Case Series

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Introduction: The rate of parenteral nutrition-associated liver disease (PNALD) development in short-bowel syndrome (SBS) children on total parenteral nutrition (TPN) is unknown. We present the first case series of pediatric SBS patients on TPN with rapid progression of their PNALD on liver biopsies (LB) obtained <12 months (m) after TPN initiation.
Methods: Charts of 81 children with a history of TPN use at a single institution between 2009-2019 were reviewed for inclusion criteria: 1) SBS diagnosis 2) LB obtained <12 m after TPN initiation and 3) No underlying liver disease. Clinical history, nutritional support, and liver function markers (direct bilirubin [Dbili], aspartate aminotransferase [AST], alanine aminotransferase, international normalized ratio, AST to Platelets Ratio Index, ultrasound elastography and LB) were collected via retrospective chart review approved by our institutional review board. Liver pathology was graded by one pathologist.
Results: 10 patients fulfilled criteria; the mean duration on TPN prior to LB was 4m (range 1-10.8m) with half on Intralipid, and the other half on an alternative lipid emulsion. Seventy percent also received enteral feeds. Forty percent patients had elevated Dbili.
All LBs showed moderate to marked bile ductular reaction associated with a mixed, portal-predominant inflammatory infiltrate of lymphocytes, neutrophils, and occasional eosinophils of mild to moderate severity. Inflammatory infiltration of interlobular bile ducts was a rare finding in a subset of cases; plasma cells were not a prominent feature. Most samples showed some degree of cholestasis, usually canalicular. Lobular inflammation and hepatocyte necrosis were typically mild and nonzonal/spotty though some showed diffuse ballooning hepatocellular injury. No significant steatosis was observed. Fibrosis on trichrome stain was variable, typically portal-predominant; few cases demonstrated pericellular fibrosis.
Based on the LB pathology, 70% had a change in medical care such as changing the lipid emulsion.
Conclusion: The progression of PNALD in SBS children on LBs <12 months from TPN initiation was more rapid than previously hypothesized. LBs taken at the time of another surgical procedure may be warranted for SBS pediatric patients on TPN.

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Impact of Antibiotic Stewardship on Gut Microbiome in Short Bowel Syndrome (SBS) Pediatric Patients

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Introduction: Patients with Short Bowel Syndrome (SBS) has alterations in anatomy and physiology that predispose to bacterial overgrowth, leading to gastrointestinal and systemic symptoms and mucosal alteration. Antimicrobial stewardship is the mainstay of therapy, but it remains largely empirical. The aim of the study is to demonstrate changes in the bacterial constituents of microbiome with different antimicrobial therapies.
Methods: Stool specimens have been collected from SBS pediatric patients and stored at -20°C until DNA extraction (DNeasy PowerLyzer PowerSoil Kit). To explore changes in the Bacterial and Fungal community in relation to the different phases of antibiotic therapy, targeted metagenomics on the 16S rRNA gene and on the ITS region, respectively, was employed. Specimen also underwent chemical-physical analysis and short chain fatty acids content.
Results: The study demonstrate that oral antibiotic therapy influences microbiome composition in its microbic and fungal communities and these changes relate to the length of treatment. The use of
cyclical antibiotic stewardship avoids resistant species selection and can contributes to prevent
bacterial overgrowth in SBS patients.
Conclusions: We recommend the routinely use of faecal microbiome analysis in patients with high risk of dismicrobism to adapt the antibiotic therapy based on the bacterial communities detected.