

Altered Gut Microbiota in Preterm Newborns with Necrotizing Enterocolitis Using High-Throughput Sequencing

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Objectives: Recent studies have shown that pathophysiology of NEC includes intestinal microbial dysbiosis and mucosal barrier disruption. This study tends to investigate intestinal microbiota in preterm newborns with NEC.

Methods: Our prospective study enrolled 24 preterm newborns admitted to the NICU in Shanghai Children's Medical Center from March 2013 to August 2014, whose gestational age ranged from 29 to 33 weeks. Among the 24 preterm, 4 were diagnosed as NEC, while 3 were treated with antibiotics due to serious infections (infection group) and 17 without any infectious complications (normal group). Totally 192 longitudinal fecal samples were collected right from admission until discharge day. The intestinal microbiota composition and its longitudinal trend were analyzed using Illumina-MiSeq high-throughput sequencing.

Results: At phylum level, *Firmutes* and *Proteobacteria* dominated respectively in three groups, while *Proteobacteria* abundance of NEC group significantly ranked first (NEC vs Infection vs Normal: 59.84% vs 42.97% vs 44.13%, $p=0.048$). At class level, three groups shared the same domination microorganisms which are *Bacilli*, *Clostridia* and *Gammaproteobacteria*, and *Gammaproteobacteriae* abundance of NEC group is significantly the highest (NEC vs Infection vs Normal: 53.63% vs 33.96% vs 39.46, $p=0.018$).

Longitudinal comparison showed different microbial colonization pattern among three groups. Notwithstanding the same microbial development mode shared by three groups from *Bacilli* to *Gammaproteobacteria* within two weeks after birth, *Bacilli* and *Clostridia* domination from the 14th to 30th day of life and *Clostridia* domination after the 30th day of life in NEC group was distinctive and noticeable.

Conclusions: Abnormal intestinal microbiota at early life might account for NEC. However, more longitudinal studies with larger sample sizes are needed to reveal microbial dysbiosis at different stages before and after the onset of NEC, hopefully to provide evidence for its early recognition and prevention.

Key Words: Preterm newborns, necrotizing enterocolitis, gut microbiota, microbial dysbiosis, high-throughput sequencing

Biography:

Dr. Li Hong is Professor of Pediatric Surgery at the Shanghai Children's Medical Center, Shanghai Jiaotong University School of Medicine, and Director of the Department of Clinical Nutrition.

Dr. Hong got her surgical training in Cincinnati Children's Hospital and Chicago Comer Children's Hospital, US, from 2007-2008. She also got her nutritional training as a clinical observer in Children's Hospital of Los Angeles in 2010, and Boston Children's Hospital from 2014-2015.

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