

Accepted Manuscript

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PII: S0022-4804(17)30057-4

DOI: [10.1016/j.jss.2017.02.007](https://doi.org/10.1016/j.jss.2017.02.007)

Reference: YJSRE 14141

To appear in: *Journal of Surgical Research*

Received Date: 8 December 2016

Revised Date: 22 January 2017

Accepted Date: 14 February 2017

Please cite this article as: Lin Z-L, Tan S-J, Cheng M-h, Zhao C-Y, Yu W-K, He Y-I, Li J, Li N, Lipid-rich enteral nutrition controls intestinal inflammation, improves intestinal motility and mucosal barrier damage in a rat model of intestinal ischemia/reperfusion injury, *Journal of Surgical Research* (2017), doi: 10.1016/j.jss.2017.02.007.

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Lipid-rich enteral nutrition controls intestinal inflammation, improves intestinal motility and mucosal barrier damage in a rat model of intestinal ischemia/reperfusion injury

Zhi-Liang Lin, MD, PhD,^{a,b} Shan-Jun Tan, MD, PhD,^b Min-hua Cheng, MD, PhD,^b Chen-Yan Zhao, MD, PhD,^b Wen-Kui Yu, MD, PhD,^b Yu-long He, MD, PhD,^a Jieshou Li, MD,^b and Ning Li, MD,^{b,*}

^a Department of Gastrointestinal Surgery, First Affiliated Hospital of Sun Yat-sen University, Guangzhou, China

^b Research Institute of General Surgery, Jinling Hospital, Medical School of Nanjing University, Nanjing, China

* Corresponding author: Research Institute of General Surgery, Jinling Hospital, Medical School of Nanjing University, Nanjing 210002, Jiangsu Province, China. Tel.: 86 25 80860037; fax: 86 25 80860220. E-mail addresses: li_ningrjgs@126.com

Abstract

Background: It has been reported that lipid-rich enteral nutrition (EN) could ameliorate inflammation in various diseases. In this study, we investigated whether lipid-rich EN could control intestinal inflammation, improve intestinal motility and mucosal barrier injury after intestinal ischemia/reperfusion (I/R) injury. **Methods:** Male adult rats received saline, conventional EN, or lipid-rich EN via gavage before and after intestinal I/R injury. The superior mesenteric artery (SMA) was occluded for 60 min. The sham group underwent laparotomy without SMA occlusion and were administered saline. Intestinal motility was measured 4 h after intestinal I/R injury by FITC-Dextran transit assay; the intestinal and systemic inflammation were assessed by analyzing intestinal and serum concentrations of tumor necrosis factor (TNF)- α , interleukin (IL)-6, and IL-10, separately. The intestinal mucosal barrier injury was assessed by analyzing serum level of intestinal fatty acid binding protein (I-FABP), and intestinal mucosal tight junction (TJ) proteins. **Results:** The intestinal I/R injury decreased intestinal motility and intestinal mucosal TJs expression significantly when compared with the sham group ($P < 0.05$). The intestinal and systemic inflammatory parameters, and the serum I-FABP were also significantly higher in the I/R groups than in the sham group ($P < 0.05$). Both conventional and lipid-rich EN increased the intestinal motility and the intestinal mucosal TJs expression, and decreased intestinal and systemic inflammatory parameter and serum I-FABP levels to different degrees when compared with the I/R group ($P < 0.05$). However, lipid-rich EN significantly improved the negative alterations in these biochemical parameters when compared with the conventional EN ($P < 0.05$). **Conclusions:** These results suggest that lipid-rich EN might be able to control intestinal inflammation, improve intestinal motility and mucosal barrier injury after intestinal I/R injury. Thus, the administration of lipid-rich EN may be an effective treatment for promoting gastrointestinal function recovery after intestinal I/R injury.

Key words: Lipid-rich enteral nutrition; intestinal ischemia/reperfusion injury; intestinal inflammation; intestinal motility; intestinal mucosal barrier; animal experiment

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