
Abstract

Background—Inflammatory events within the intestinal muscularis, including macrophage activation and leukocyte recruitment, have been demonstrated to participate in causing postoperative ileus. Recently, glycine has gained attention due to its beneficial immunomodulatory effects in transplantation, shock and sepsis.

Objective—The purpose of this study was to determine if pre-operative glycine administration would attenuate postoperative ileus in rodents.

Methods—Muscularis glycine receptors were investigated by immunohistochemistry. Gastrointestinal motility was assessed by in vivo transit distribution histograms with calculated geometric center analysis and jejunal circular smooth muscle contractility in a standard organ bath. The impact of glycine on the muscularis inflammatory responses to surgical manipulation of the intestine were measured by real time PCR, nitric oxide Griess reaction, prostaglandin ELISA, Luminex and histochemistry.

Results—Glycine-gated chloride channels were immunohistochemically localized to muscularis macrophages and postoperative infiltrating leukocytes. Pre-operative glycine treatment significantly improved postoperative gastrointestinal transit and jejunal circular muscle contractility. Pre-operative glycine injection significantly reduced the induction of IL-6, TNF-α, iNOS and ICAM-1 mRNAs, which was associated with the attenuation in postoperative leukocyte recruitment. Nitric oxide and prostanoid release from the postsurgical inflamed muscularis was diminished by glycine. The secretion of the inflammatory proteins IL-6, MCP-1 and MIP-1α were also significantly decreased by glycine pretreatment.

Conclusion—The data indicate that pre-operative glycine reduces postoperative ileus via the early attenuation of primal inflammatory events within the surgically manipulated gut wall.