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Early versus delayed enteral nutrition after gastrointestinal anastomosis in children: A Systematic Review and Meta-Analysis

Submitted for Partial Fulfillment of Master Degree in ***General Surgery***

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List of Abbreviations

Abb.	Full term
ARM	*Anorectal malformation*
CI	*Confidance interval*
DEF	*Delayed enteral feeding*
DEN	*Delayed enteral nutrition*
DF	*Delayed feeding*
EEA	*End-to-end anastomosis*
EEF	*Early enteral feeding*
EEN	*Early enteral nutrition*
EF	*Early feeding*
EN	*Early nutrition*
ERAS	*Enhanced recovery after surgery*
ESA	*End-to-side anastomosis*
GI	*Gastro-intestinal*
LOS	*Length of stay*
MD	*Mean difference*
MMC	*Migrating motor complex*
NG	*Nasogatsric*
NS	*Non specified*
NSAIDs	*Nonsteroidal anti-inflammatory drugs*
OR	*Odds ratio*
POD	*Postoperative day*
PRISMA	*Preferred reporting items for systematic reviews and meta-analysis*
RCT	*Randomised controlled trials*
SSA	*Side-to-side anastomosis*
SSI	*Surgical site infection*

INTRODUCTION

Elective intestinal anastomosis is a frequently used surgical procedure in pediatric surgery. This option is used to restore intestinal continuity (ileostomy or colostomy closure), resolve an inflammatory disease or functional or anatomic congenital malformation. Some aspects must be considered to perform a good anastomosis. Many factors can affect anastomosis site healing or leakage, for example intraoperative contamination, circulation of intestinal bounds, anemia, surgical technique, type of surgery (elective or emergency), tension in suture line; a meticulous effective anastomosis technique is necessary to optimize surgical outcome and minimize anastomotic complications ***(Pérez et al., 2013).***

It is a common practice to avoid oral feeding in children after intestinal anastomosis surgery, even though there is little scientific evidence supporting this practice ***(Mamatha and Alladi, 2015).*** This is justified by the perception that the fasting would protect the anastomosis from any complication such as abdominal distention, vomiting, ileus, anastomotic dehiscence or leaks, wound infection and would allow a hermetic closure of the anastomosis before the beginning of enteral feeding ***(Perez et al., 2013).***

The duration of post-operative fasting is variable but can range from 0 to 5 days depending on the operation. The ramifications of this period of fasting are not insignificant and

may include prolonged length of stay, increased use of parenteral nutrition (PN), social effects and significant costs to the health system. In neonates and infants there are additional issues with delayed feeding including cholestatic jaundice, sepsis, delayed gut development, and metabolic disease ***(Peng et al., 2021).***

Over the past decade a significant number of studies have been published in the adult surgical literature, showing that early postoperative feeding does not increase the number of complications, but actually improves intestinal motility, and enhances the patient's recovery. Consequently, early feeding has become widely accepted practice following gastrointestinal surgery in the adult population. Relevant pediatric surgical literature to support early enteral nutrition is scarce and indicates that traditional postoperative starvation strategies remain standard practice in children. Studies in animal models also suggest that early feeding may improve wound healing and anastomotic strength and reduce morbidity from sepsis ***(Braungart and Siminas, 2020).***

Most of the clinical research into the beneficial effects of early feeding has occurred in adult patients. In infants, there is conclusive evidence in favor of early feeding after one operation - pyloromyotomy. This has changed practice such that many centers now advocate for feeding within 4 hours, with a significant reduction in length of stay. However, evidence regarding the safety and benefits of EEN in the

recovery from other abdominal procedures in children is less common ***(Sullivan et al., 2016).***

The concept of Enhanced Recovery after Surgery (ERAS) has increasingly been embraced by our adult surgical colleagues, but has been slow to crossover to pediatric surgical subspecialties. ERAS® improves outcomes through multiple, incremental steps that act synergistically throughout the entire surgical journey including EEN. There are increasing numbers of surgical teams exploring ERAS® in children and there is mounting evidence that this approach may improve surgical care for children across the globe. The first World Congress in Pediatric ERAS® in 2018 has set the stage for a new era in pediatric surgical safety ***(Brindle et al., 2019).***

Aim of the Work

The aim of this study is to determine whether early enteral nutrition following elective gastro-intestinal (GI) anastomosis surgery in children leads to improved patient outcome measures; such as time to first bowel movement, time to full intake and length of hospital stay and to assess whether this practice increases the risk of postoperative complications; such as surgical site infection, fever, anastomotic dehiscence, nausea, vomiting and abdominal distension, according to literature published in the period from 2010- 2020.