



## A Study On Impact Of Early Enteral Nutrition In Patients Following Exploratory Laparotomy

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### Abstract

**Background:** Early postoperative enteral feeding has been demonstrated to improve the outcome of patients who underwent surgery for gastrointestinal (GI) malignancies, trauma, perforation, and/or obstruction. Thus, this study was conducted to assess the efficacy of early postoperative enteral nutrition (EN) after emergency surgery in patients with GI perforation or strangulation. In advent of same, the present study was planned with an aim to study the impact of early enteral nutrition (in 48 hours) on post operative patients of exploratory laparotomy. Also, assessment of the effects of early enteral nutrition on recovery and complications in post operative patients of exploratory laparotomy was also evaluated.

**Material & Methods:** This prospective study was conducted in Index Medical College, Hospital & Research Centre, Indore, M.P., India in the period of September 2020 to August 2021. A total of 80 patients were selected according to the inclusion and exclusion criteria. On an alternate basis patients received early enteral nutrition (in 48 hours) and routine enteral nutrition modality following surgery and then evaluated for outcome.

**Results:** In this study we observed a faster recovery period, significant decrease in complications (paralytic ileus in 10.0%, anastomotic leak in 10.7, SSI in 13.3%) and reduced length of hospital stay in comparison with other group.

**Conclusion:** Early enteral nutrition leads to faster recovery and decreases complications in patients who underwent exploratory laparotomy.

**Keywords:** Enteral feeding, exploratory laparotomy, GI perforation, surgery

### Introduction

*“If the blood doesn’t stop flowing after a vascular anastomosis, why should the intestines be devoid of nutrition after a GI surgery??”*

The concept of nil by mouth or a period of starvation is common practice after any gastrointestinal surgery (exploratory laparotomy) to provide GI tract time to heal before being stressed by food. The stomach, most of the times, is decompressed with a nasogastric tube and intravenous fluids are given, with oral feeding being introduced after and as the gastric dysmotility resolves.<sup>1</sup> The rationale behind the

practice is concern of exacerbating postoperative ileus, to prevent postoperative nausea and vomiting and to protect the anastomosis, allowing it time to heal. It is, however, unclear whether deferral of enteral feeding is beneficial.<sup>2</sup>

Contrary to widespread opinion, evidence from clinical studies and animal experiments suggests that initiating feeding early is advantageous. Postoperative dysmotility predominantly affects the stomach and colon, with the small bowel recovering normal function 4-8 hours after laparotomy.<sup>1</sup> Feeding

within 24 hours after laparotomy is tolerated and the feed absorbed.<sup>3,4</sup> Gastrointestinal surgery is often undertaken in patients who are malnourished,<sup>5,7</sup> which in severe cases is known to increase morbidity.<sup>8</sup> In animals, starvation reduces the collagen content in anastomotic scar tissue<sup>9,10</sup> and diminishes the quality of healing,<sup>11,12</sup> whereas feeding reverses mucosal atrophy induced by starvation and increases anastomotic collagen deposition and strength.<sup>13</sup> Experimental data in both animals and humans suggest that enteral nutrition is associated with an improvement in wound healing.<sup>14</sup> Finally, early enteral feeding may reduce septic morbidity after abdominal trauma<sup>15</sup> and pancreatitis.<sup>16</sup>

The human body produces roughly 500-1000 ml of bile/day. If the daily bile aspirate following the surgery comes lesser than that it shows that the rest is being absorbed the body and that the intestines can tolerate feeding whether the period being less than 24-48 hours. Most of the patient undergoing surgeries are either already nutritionally deficient or are in need of supplements following surgery. Along with systemic delivery of nutrients, enteral nutrition performs a critical function in supporting the alimentary tract. Mucosal exposure to it provides direct high concentration nutrients (e.g., glutamine, alanine), stimulates enteric blood flow, maintains barrier function by preserving tight junction integrity, and induces production and release of mucosal immunoglobulin and critical endogenous growth factors. It is useful during the inflammatory and metabolic phase, assisting in the improvement of a patient's outcome after surgery. In particular, enteral nutrition (EN) has been shown to reduce the length of hospital stay and postoperative complications after elective gastrointestinal (GI) surgery in recent meta-analysis.<sup>17-19</sup>

Recent studies have suggested that early EN (EEN) is also feasible and/or beneficial after emergency GI surgery,<sup>20-23</sup> if there are no contraindications to EEN such as intestinal obstruction, malabsorption, multiple fistulas with high output, intestinal ischemia, severe shock with impaired splanchnic perfusion, and fulminant sepsis.<sup>8</sup> However, although the provision of EEN has been demonstrated to show several beneficial effects in surgical patients, the majority of these studies have focused primarily on elective GI surgery. Thus, this study was conducted to assess the

efficacy of early postoperative EN (in 48 hours) on post operative patients of exploratory laparotomy. Also, assessment of the effects of early enteral nutrition on recovery and complications in post operative patients of exploratory laparotomy was also evaluated.

## Materials & Methods

After approval from the institutional ethical committee, the present prospective study was conducted in Index Medical College, Hospital & Research Centre, Indore, M.P., India in the period of September 2020 to August 2021. A total of 80 patients aged 18-70 years were selected according to the inclusion and exclusion criteria after taking an informed written consent. On an alternate basis patients received early enteral nutrition (in 48 hours) and routine enteral nutrition modality following surgery and then evaluated for outcome.

### Inclusion criteria:

Patients aged 18-70 years who are scheduled to undergo laparotomy for emergency or elective reasons were included in the study.

### Exclusion Criteria:

Patients excluded from study were with:

1. Age less than 18 years or more than 70 years.
2. Gross contamination of peritoneal cavity prior to surgery.
3. Re-laparotomies.
4. Multiple anastomoses.
5. Patients who do not consent to be included in the study.

## Statistical Analysis

All data were recorded on a structured proforma and tabulated. Statistical analysis of the demographic data was performed using SPSS Software Version 20.0. The differences in the variables between the were analyzed by Student t test and chi square test.  $P < .05$  was considered to be statistically significant.

## Results

We had 80 patients in the study with age ranged from 18 to 70 years with maximum patients (20) lying in the age group of 30 to 40 years. Among total patients, 42 were male and 38 patients were female with a

percentage of 52.5% and 47.5% respectively. Different types of surgeries in exploratory laparotomy has been take into consideration in the study group including anastomosis and stoma formation. Among which most common procedure was Perforation repair with a percentage of 25%. In this study we observed a faster recovery period, significant decrease in complications (paralytic ileus in 10.0%, anastomotic leak in 10.7, SSI in 13.3%) and reduced length of hospital stay in comparison with other group.

Complications like Burst abdomen (5%), paralytic ileus (15%) and surgical site infection (12.5%) showed statistically significant (P value <0.05) lower incidences in patients receiving early enteral nutrition. Pulmonary complications (37.5%) and anastomotic leak (10.5%) in patients who underwent anastomotic surgery were also fewer in patients with early enteral feed. However, it was statistically insignificant. (P>0.05) Comparison of Hospital Stay postoperatively showed that Mean days of postoperative stay in the hospital were less for early enteral nutrition as compared to late enteral nutrition i.e., 8 days and 14.2 days respectively.

## Discussion

In this study, we saw that there was a significant decrease in the complications like burst abdomen (5%) (due to better wound healing), surgical site infection (12.5%) following administration of early enteral nutrition (EEN) within 48 hours from the completion of exploratory laparotomy. We also found that after early enteral nutrition, bowel sounds, flatus and stools appeared in a significant shortened period of time leading to decreased incidence of paralytic ileus (15%). The total duration of postoperative hospital stay (8 days) was significantly shorter in patients who received early enteral feed. Pulmonary complications had a lesser incidence in patients receiving early enteral feed. In patients who underwent anastomotic surgeries, complications like anastomotic leak were in fewer patients as compared to those who received conventional delayed enteral feed.

EN has several benefits, such as modulating the metabolic and systemic immune response, as well as preserving gut integrity.<sup>24</sup> For these reasons, EN has been recommended to be initiated as early as possible unless contraindicated.<sup>25</sup> Moreover, previously

published meta-analysis with regard to this concept showed that EEN was associated with significant reductions in total complications compared with traditional postoperative feeding practices, and does not negatively affect outcomes such as mortality, anastomotic dehiscence, resumption of bowel function, or hospital length of stay. Another meta-analysis showed that enteral feeding that started within 24 hours after the surgery may be of benefit, such as assisting in a reduction of infection risk or reduction of length of hospital stay.<sup>18</sup>

However, these results primarily focused on elective GI surgery. To date, the study comparing EEN and LEN in patients undergoing emergent surgery was rarely reported. Of these, a retrospective study concluded that early feeding within 48 hours after emergency GI surgery may be feasible in patients without severe shock or bowel anastomosis instability.<sup>20</sup> Moreover, one prospective study reported that immediate postoperative feeding through the feeding jejunostomy is feasible in patients with perforative peritonitis, which may reduce septic morbidity.<sup>23</sup> Another prospective study showed that early enteral feeding through a nasogastric tube is well tolerated by patients with nontraumatic perforation peritonitis, improving energy and protein intake. It also showed that EEN reduces the amount of NG aspirate, the duration of postoperative ileus, and the risk of serious complications.<sup>21</sup>

## Conclusion

Institution of early enteral nutrition after major GI surgery (exploratory laparotomy) minimizes the risk of post op under-nutrition. In a post-surgical patient in whom enteral nutrition initiated within 48 hours is associated with lower rates of complications and infections leading to decreased length of hospital stay.

## Declarations

## Conflicts of interest

There is no conflict of interest with publication of manuscript or an Institution or product that is mentioned in the manuscript and/or is important to outcome of study presented.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

### Ethical Approval

This was prospective study involving collection of patient data who were undergoing standard treatment protocols and hence there was no direct risk to the participants. This study was approved by Hospital Ethics Committee.

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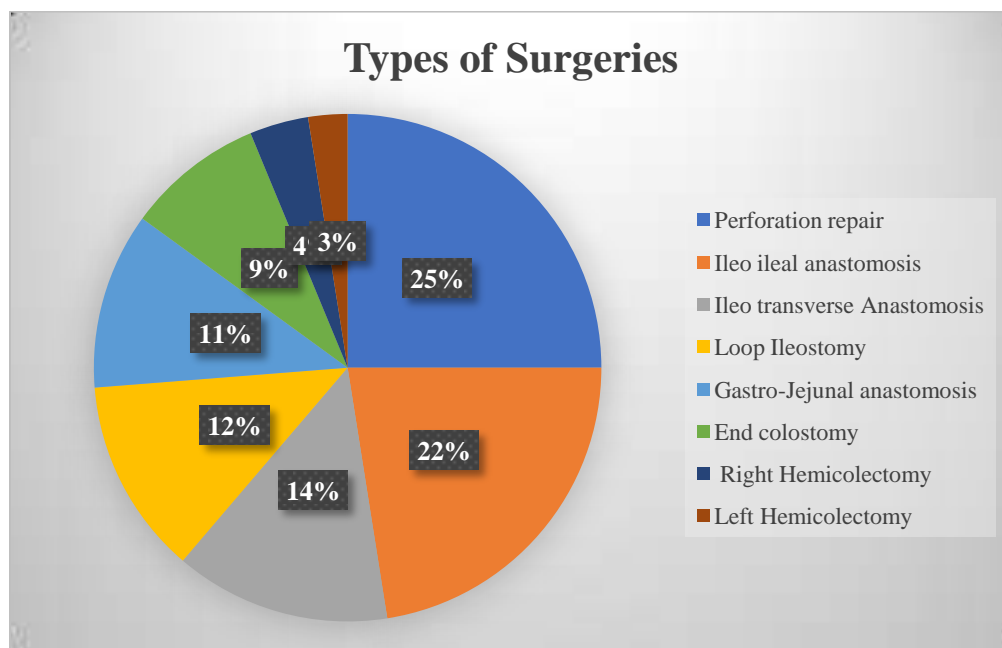
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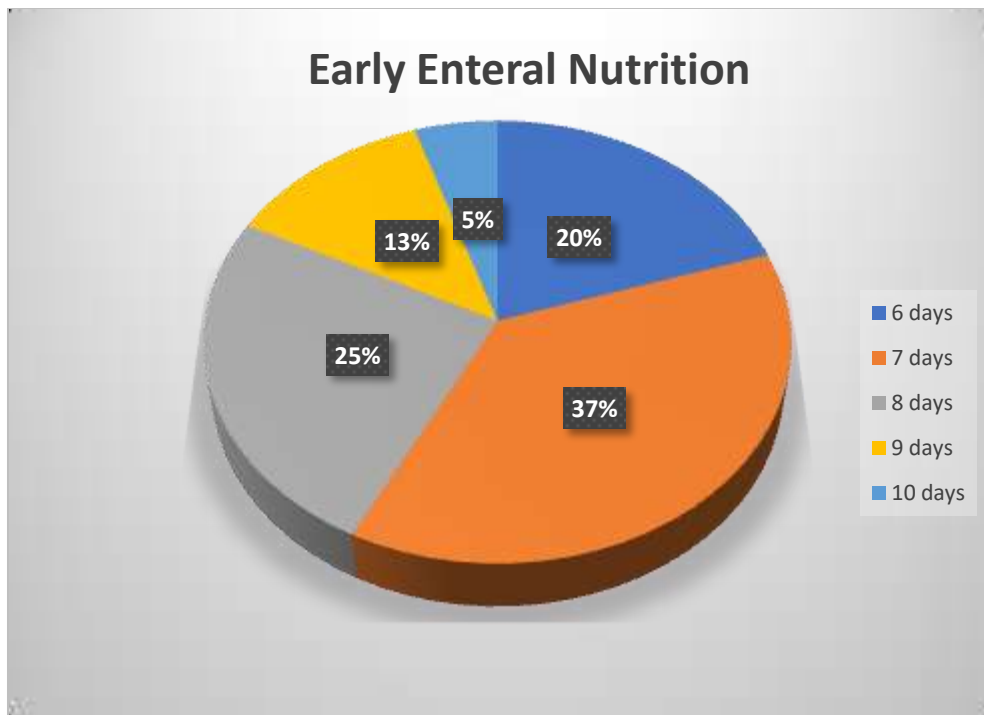
**Figure And Tables**

**“Graph 1: Distribution of study participants depending upon type of Surgery”**

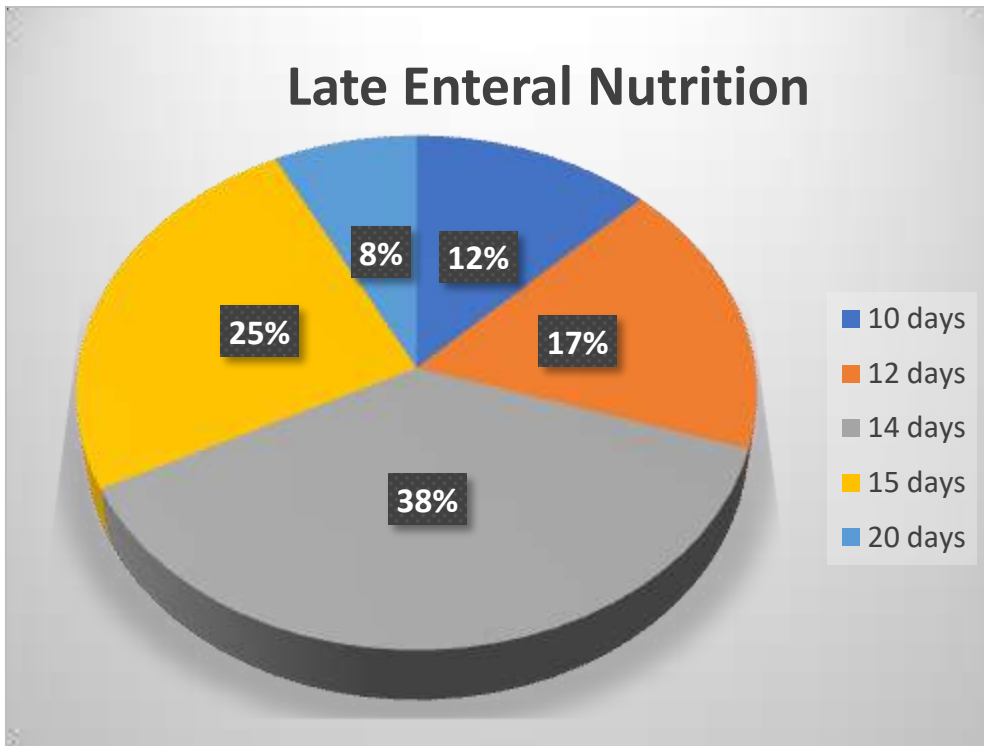


**“Graph 2: Post operative Hospital Stay (early enteral nutrition)”**





“Graph 3: Post operative Hospital Stay (Late enteral nutrition)”



“Table 1: Age & Sex Distribution”

<i>Age(years)</i>	<i>Sex</i>		<i>Total</i>
	<b>Male</b>	<b>Female</b>	
</=20	3	5	8
21-30	6	7	13
31-40	11	9	20
41-50	8	6	14
51-60	9	8	17
61-70	5	3	8
	<b>42(52.5%)</b>	<b>38(47.5%)</b>	<b>80(100%)</b>

“Table 2: Complications (Pt’s with early enteral nutrition)”

<b>Complications</b>	<b>Present</b>		<b>Absent</b>	
	<b>Number</b>	<b>Percentage</b>	<b>Number</b>	<b>Percentage</b>
Burst Abdomen	5	12.5%	35	87.5%
Paralytic ileus	11	27.5%	29	72.5%
Anastomotic leak	3	15.7%	13	84.3%
SSI	10	25%	30	75%
Pulmonary Complications	18	45%	22	55%

“Table 3. Complications (Pt’s with late enteral nutrition: >48 hours)”

<b>Complications</b>	<b>Early enteral nutrition</b>	<b>Late Enteral Nutrition</b>	<b>p-Value (significant &lt;0.05)</b>
Burst Abdomen	5%	12.5%	0.0477
Paralytic ileus	15%	27.5%	0.0251
Anastomotic leak	10.5%	15.7%	0.3030

SSI	12.5%	25%	0.0307
Pulmonary Complications	37.5%	45%	0.3173