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A Comparative Study Between Early Enteral Feeding and Late Enteral Feeding Following Gastrointestinal Surgery

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Abstract

Background: There are certain differences between early and late feeding. The purpose of this study was to investigate how early eating influenced the emergence and persistence of paralytic ileus following gastrointestinal surgery. to research how early enteral feeding after digestive tract surgery affects anastomotic leak. To find out how early enteral feeding impacts wound infection is the goal of this investigation. the effect of tolerance on early enteral feeding should be examined. **Material and Methods:** Between August 2021 to July 2022, the trial included 100 patients with a range of conditions. After that, they had the option of having a late or early meal. The chi square test, Fischer's exact test, and the student "t" test were all used for statistical comparison. **Results:** The early feeding group consisted of 50 patients, while the late feeding group included 50 individuals. There are no statistically notable variations between the two groups. A 17-day average hospital stay and a 4-hour average operation time were found in the group with the same age distribution (45.26+14.89 versus 46.06+15.86, 1) = 0.798). 10.2% of late-feeding patients and 6.1% of early-feeding patients both experienced paralytic ileus, with 72% of these cases requiring the use of EA+GA (P=0.657). Patients who eat later develop astomotic leaks at a rate of 2.0% as opposed to 0% of patients who eat earlier (p=1). 14.3% of late feeders and 10.2% of early feeders had wound infections (p=0.317), whereas 12.2% of late feeders and 16.3% of early feeders had oral feeding intolerance. **Conclusion:** A shorter hospital stay was associated with early feeding, but late feeding was associated with the same level of paralytic ileus. Wound infection was less likely following an early meal than following a late feeding. With late feeding, anastomotic leak probability increased. With later meals, the patients' ability to tolerate oral feeding improved. There were no beneficial effects in this trial from either early or delayed enteral feeding.

Keywords: Acute Appendicitis, Chronic Cholecystitis, Pancreatitis, Anaesthesia.

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Introduction

One of the largest portions of the alimentary system, the stomach is located between the beginning of the small intestine and the lowest point of the oesophagus (Ventriculus or gaster). It is located in the left hypochondriac, epigastric, and umbilical regions of the abdomen. It is surrounded by the front abdominal wall and the sides of the upper abdominal viscera on the left and right. Both its form and position cannot be regarded as typical because of the viscera surrounding it and internal alterations.[1-3] In general, it has a capacity of 30 ml at birth, 1000 ml or so in adolescence, and 1500 ml or so in adulthood. The junction of the

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oesophagus and stomach is known as the "cardiac orifice." It is situated at the level of the eleventh thoracic vertebra, 2.5 cm beyond the 7th costal cartilage from its union with the sternum. It is roughly 40 cm (16 inches) from the incisor teeth and 10 cm (4 inches) from the front abdominal wall.

The opening into the duodenum is referred to as the "pyloric aperture," and its location is frequently marked by a circular groove on the surface of the organ called the "pyloric constriction," which designates where the pyloric sphincter is located. At the time of surgery, the prepyloric vein of Mayo, which runs vertically across its anterior surface, helps to detect it in the patient. Around 1-2 cm to the right of the transpyloric plane, which runs along the ninth costal cartilages at the level of the lower border of the first lumbar vertebra, the transpyloric plane crosses the median plane, where the pyloric orifice is located.[3,4]

The most popular and often used post-gastrointestinal surgery strategy is hunger, however this may not be advantageous. Nil by mouth and gastric decompression are utilised to protect the anastomosis and lessen post-operative nausea and vomiting. By doing this, the anastomosis has a chance to recover before being strained by food. Early eating, especially in malnourished individuals, may speed up wound healing and increase anastomotic power. In surgical patients, pre-existing malnutrition is a serious clinical problem. A primary cause of serious side effects following gastrointestinal surgery is nutritional deficiency. Regardless of nutritional state prior to surgery, early nutritional support was linked to a significantly lower incidence of post-operative complications.[4,5]

The advantages of post-operative enteral nutrition in surgical patients who are consistently fed show how malnutrition puts people at risk for problems including weariness and impaired muscle function. Early postoperative enteral feeding either did not outperform normal care or appeared to have negative consequences. Reduced intestinal permeability, bacterial translocation, and probable septic consequences may be helped by early postoperative enteral feeding. 10. Eating after surgery has an impact on intestinal permeability.[5,6]

Material and Methods

The investigation included all patients who underwent elective gastrointestinal surgery during August 2021 to July 2022 at Department of General Surgery, Dr.V.R.K. Women's Medical College, Teaching Hospital and Research Centre, Aziz Nagar, Moinabad, R.R Dist., Telangana - 500075, India.

A total of 100 individuals who had gastrointestinal tract surgery will be divided into two groups, depending on whether they should begin eating right away following surgery or wait until their bowel movements have resumed. General, spinal, and epidural anaesthesia were utilised in conjunction for all surgical procedures. Depending on the procedure type, an incision is made. Following surgery, all cases were followed up on in the outpatient department until they were allowed to leave. To compare early versus late feeding, the following data were gathered: length of hospital stay, surgery time, kind of anaesthesia, and issues including paralysed limbs, anastomotic leaks, wound infections, and oral feeding tolerance [7,8]. Paralytic ileus is described as the early post-operative absence of bowel sounds and growing abdominal distension. Intolerant eating induces vomiting that may or may not be followed by abdominal distension.

Inclusion Criteria

Patient permission for the inquiry and treatment

1. People having elective oesophagectomies, gastroplasties, appendicectomies, pancreatctomies, and bile duct exploration are addressed.
2. Mention is made of oral or nasogastric tube feeding.
3. Patients who ate or drank by mouth.

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Exclusion Criteria

1. Young people under the age of 12.
2. A person with peritonitis underwent surgery.

Results

Table 1: distribution of age

Group Statistics group		N	Mean	Std. Deviation	t
Age	Late feeding	49	45.2653	14.87556	.25600
	Early feeding	49	46.0612	15.86848	p=.798 ns

The average age of the participants in the two groups in the current study ranged from 45.26 to 46.06. Statistics show that the age gap is not statistically significant. (p=0.798)

Table 2: Distribution of Sexes

			GROUP		Total
			Late feeding	Early feeding	
sex	F	Count	22	18	40
		%	44.9%	36.7%	40.8%
	M	Count	27	31	58
		%	55.1%	63.3%	59.2%
Total		Count	49	49	98
		%	100.0%	100.0%	100.0%

a. X2=.676 p=.411 ns

The sex distributional difference is not statistically significant. (p=0.411).

Table 3: Hospital stay duration

GROUP	N	Mean	Std. Deviation	t
Late feeding	49	17.6939	9.33007	3.08400
Early feeding	49	12.7347	6.29741	p = . 0 0 3 h s

There were 40 participants in the current study, comprising 22 patients who ate later than usual (44.9%) and 18 patients who ate earlier than usual (36.7%). 28 patients, or 58 patients (59.2%), received late feeding, whereas 31 patients, or 63.3 percent, received early feeding. In the current study, the average hospital stays for the two groups were 17.69 and 12.7 days, respectively. The median hospital stay does not significantly deviate from zero. (p=0.003).

Table 4: Presents the disputes

Symptoms	Late		Early		P value
	n	%	n	%	
Pain abdomen	46	93.9%	46	93.9%	P=359(ns)
Nausea, vomiting	26	53.1%	22	44.9%	P=419(ns)
Mass abdomen	2	4.1%	0	0.0%	P=0.495(ns)
Distension	0	0.0%	1	2.0%	P=1(ns)
Constipation	7	14.3%	9	18.4%	P=0.393(ns)
Bleeding per rectum	7	14.3%	3	6.1%	P=0.182(ns)

In the current study, 46 patients (93.9%) who had late feeding and 46 patients (93.9%) who had early feeding both reported experiencing abdominal pain. Both patients reported feeling

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nauseous in circumstances of late feeding (26 patients; 53%) and early feeding (22 patients; 44.9%). In 2 (4.1%) cases of late feeding and in 0 (0% of cases) of early feeding, patients had tumours in their abdomens. Distention was seen in 0 (0%), 1 (1%), and both late and early feeders. Constipation was also observed by seven (14.3%) late eaters and nine (18.4%) early eaters. Patients who were late feeders (7 (14.3%) and early feeders (3 (6.1%) both experienced rectal haemorrhage. The diverse ways that complaints are expressed are not statistically significant.

Table 5: Duration of Surgery

			GROUP		Total
			Late feeding	Early feeding	
	1H	Count	11	11	22
		%	22.4%	22.4%	22.4%
	2H	Count	4	3	7
		%	8.2%	6.1%	7.1%
	3H	Count	5	12	17
		%	10.2%	24.5%	17.3%
	4H	Count	15	16	31
		%	30.6%	32.6%	3.5%
	5H	Count	13	4	17
		%	26.5%	8.2%	17.3%
	6H	Count	0	4	4
		%	.0%	8.2%	4.1%
	8H	Count	1	0	1
		%	2.0%	.0%	1.0%
Total		Count	49	49	98
		%	100.0%	100.0%	100.0%

a. X2=11.632 p=.054 ns

While it varied from one hour to eight hours for various operations, the average operation time in the current study was four hours. The statistics showed that the length was not statistically significant (p=0.054).

Table 6: Anaesthesia Type

			GROUP		Total
			Late feeding	Early feeding	
Anaesthesia	EA+GA	Count	33	36	69
		%	67.3%	73.5%	70.4%
	GA	Count	4	2	6
		%	8.2%	4.1%	6.1%
	SA	Count	12	11	23
		%	24.5%	22.4%	23.5%
Total		Count	49	49	98
		%	100.0%	100.0%	100.0%

a. x2=.841 p=.657 ns

In the current study, 36 patients (67.3%) received late feeding operations while 36 patients (73.3%) underwent early feeding surgeries under EA+GA. A GA surgery was performed on 4 (8.2%) patients who had late feeding and 2 (4.1%) patients who had early feeding. Both patients who were early feeders (22.4%) and late feeders (12.5%) underwent surgeries under

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SA. There were no statistically significant differences between the various anaesthesia types (p=0.657).

Table 7: Classification of diagnoses

		GROUP		Total
		Late feeding	Early feeding	
Diagnosis ACUTE APPENDICITIS	Count	12	12	24
%		24.5%	24.5%	24.5%
CARCINOMA COLON	Count	12	12	24
%		24.5%	24.5%	24.5%
CARCINOMA RECTUM	Count	3	3	6
%		6.1%	6.1%	6.1%
CARCINOMA STOMACH	Count	10	10	20
%		20.4%	20.4%	20.4%
CHRONIC CHOLECYSTIT Count		7	7	14
%		14.3%	14.3%	14.3%
CHRONIC PANCREATITIE Count		5	5	10
%		10.2%	10.2%	10.2%
Total	Count	49	49	98
%		100.0%	100.0%	100.0%

In the latest research, 12 (24.5%) of the 49 patients in each group had acute appendicitis, and 12 (24.5%) had colon cancer. Recticular cancer was discovered in 3 (6.1%) of the patients. In contrast, 10 patients (20.4%) had stomach cancer, while 7 patients (14.3%) had chronic cholecystitis. 5.2% of the patients had a chronic pancreatitis diagnosis.

Table 8: Ileus paralyticus (complication)

Diagnosis			GROUP		Total
			Late feeding	Early feeding	
ACUTE APPENDICITIS	.00	Count	12	12	24
		%	100.0%	100.0%	100.0%
	Total	Count	12	12	24
		%	100.0%	100.0%	100.0%
CARCINOMA COLON	.00	Count	10	10	20
		%	83.3%	83.3%	83.3%
	1.00	Count	2	2	4
		%	16.7%	16.7%	16.7%
	Total	Count	12	12	24
		%	100.0%	100.0%	100.0%
CARCINOMA RECTUM	.00	Count	2	3	5
		%	66.7%	100.0%	83.3%
	1.00	Count	1	0	1
		%	33.3%	.0%	16.7%
	Total	Count	3	3	6
		%	100.0%	100.0%	100.0%
CARCINOMA	.00	Count	8	9	17

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STOMACH		%	80.0%	90.0%	85.0%
	1.00	Count	2	1	3
		%	20.0%	10.0%	15.0%
	Total	Count	10	10	20
		%	100.0%	100.0%	100.0%
CHRONIC	.00	Count	7	7	14
CHOLECYSTITIS		%	100.0%	100.0%	100.0%
	Total	Count	7	7	14
		%	100.0%	100.0%	100.0%
CHRONIC	.00	Count	5	5	10
PANCREATITIS		%	100.0%	100.0%	100.0%
	Total	Count	5	5	10
		0/0	100.0%	100.0%	100.0%

In the current study, 2 (16.7%) of the patients with late feeding and 2 (16.7%) of the patients with early feeding both had paralytic ileus and colon cancer.0 patients with rectus cancer received early feeding, compared to 1 (33.3%) who received late feeding. Two patients (20.0%) who were on late feeding and one patient (10.0%) who was on early feeding both had stomach cancer. Other illnesses such acute appendicitis, chronic cholecystitis, and chronic pancreatitis do not involve paralytic ileus. Between diagnosis groups, there is no statistically significant difference in the paralytic ileus (complication). (p=0.175).

Table 9: Wound infections types

Diagnosis				**GROUP**		**Total**
				Late feeding	**Early feeding**	
ACUTE APPENDICITIS	WI	.00	Count	12	11	23
			%	100.0%	91.7%	95.8%
		1.00	Count	0	1	1
			%	.0%	8.3%	4.2%
	Total		Count	12	12	24
			%	100.0%	100.0%	100.0%
CARCINOMA COLON	WI	.00	Count	9	11	20
			%	75.0%	91.7%	83.3%
		1.00	Count	3	1	4
			%	25.0%	8.3%	16.7%
	Total		Count	12	12	24
			%	100.0%	100.0%	100.0%
CARCINOMA RECTUM	WI	.00	Count	2	2	4
			%	66.7%	66.7%	66.7%
		1.00	Count	1	1	2
			%	33.3%	33.3%	33.3%
	Total		Count	3	3	6
			%	100.0%	100.0%	100.0%
CARCINOMA STOMACH	WI	.00	Count	8	10	18
			%	80.0%	100.0%	90.0%
		1.00	Count	2	0	2
			%	20.0%	.0%	10.0%

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	Total		Count	10	10	20
			%	100.0%	100.0%	100.0%
CHRONIC	WI	.00	Count	6	7	13
CHOLECYSTITIS			%	85.7%	100.0%	92.9%
		1.00	Count	1	0	1
			%	14.3%	.0%	7.1%
	Total		Count	7	7	14
			%	100.0%	100.0%	100.0%
CHRONIC	WI	.00	Count	5	5	10
PANCREATITIS			%	100.0%	100.0%	100.0%
	Total		Count	5	5	10
				100.0%	100.0%	100.0%

Chi-Square Tests

Diagnosis		**p**
ACUTE APPENDICITIS	Fisher's Exact Test	1.000
CARCINOMA RECTUM	Fisher's Exact Test	1.000
CARCINOMA COLON	Fisher's Exact Test	1.000
CARCINOMA STOMACH	Fisher's Exact Test	.474
CHRONIC	Fisher's Exact Test	1.000

In the current investigation, 0 (0%), late-feeding cases, and 1 (8.3%) of the early-feeding cases with wound infection had acute appendicitis. Colon cancer affected one patient on early feeding (83%) and three (25%) patients on late feeding. Compared to the other patient, who ate earlier, the patient with rectum cancer ate later. Stomach cancer was found in two (20%) late-feeding patients and one (0% of early-feeding patients), respectively. One (14.35) late feeders and 0 (0% of patients) early feeders, respectively, both had chronic cholecystitis. None of the individuals with chronic pancreatitis had any wounds that became infected. (p=0.317) The P value is not significant between groups.

Table 10: Group in Anastomotic leaks (Fisher's Exact Test)

Diagnosis	**p**
CARCINOMA COLON	1.000
CARCINOMA RECTUM	1.000
CARCINOMA STOMACH	1.000

AL* GROUP

Diagnosis			**GROUP**		**Total**
			Late feeding	**Early feeding**	
CARCINOMA COLON AL	.00	Count	11	12	23
		%	91.7%	100.0%	95.8%
	1.00	Count	1	0	1
		%	8.3%	.0%	4.2%
Total		Count	12	12	24
		%	100.0%	100.0%	100.0%
CARCINOMA STOMA (AL	.00	Count	10	10	20
		%	100.0%	100.0%	100.0%

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Total		Count	10	10	20
		%	100.0%	100.0%	100.0%
CHRONIC AL	.00	Count	5	5	10
PANCREATITIS		%	100.0%	100.0%	100.0%
Total		Count	5	5	10
			100.0%	100.0%	100.0%

As in latest study, anastomotic leak was discovered in 1 (8.3%) of late-feeding patients and 0 (%0) of early-feeding patients who had been diagnosed with colon cancer. No one in the other 2 groups of patients—those with chronic pancreatitis and stomach cancer—experienced an anastomotic leak during a late or early feeding. Anastomotic leak group differences are not statistically different (p=1).

Table 11: Tolerance for oral feeding groups (Fisher's Exact Test)

Diagnosis	p
ACUTE APPENDICITIS	1.000
CARCINOMA COLON	.590
CARCINOMA STOMACH	.628
CHRONIC	1.000
CHRONIC	1.000

T *GROUP

Diagnosis				GROUP		Total
				Late feeding	Early feeding	
ACUTE APPENDICITIS	T	.00	Count	11	12	23
			%	91.7%	100.0%	95.8%
		1.00	Count	1	0	1
			%	8.3%	.0%	4.2%
	Total		Count	12	12	24
			%	100.0%	100.0%	100.0%
CARCINOMA COLON	T	.00	Count	11	9	20
			%	91.7%	75.0%	83.3%
		1.00	Count	1	3	4
			%	8.3%	25.0%	16.7%
	Total		Count	12	12	24
			%	100.0%	100.0%	100.0%
CARCINOMA RECTUM	T	.00	Count	3	3	6
			%	100.0%	100.0%	100.0%
	Total		Count	3	3	6
			%	100.0%	100.0%	100.0%
CARCINOMA STOMACH T		.00	Count	8	6	14
			%	80.0%	60.0%	70.0%
		1.00	Count	2	4	6
			%	20.0%	40.0%	30.0%
	Total		Count	10	10	20

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			%	100.0%	100.0%	100.0%
CHRONIC	T	.00	Count	6	7	13
CHOLECYSTITIS			%	85.7%	100.0%	92.9%
		1.00	Count	1	0	1
			%	14.3%	.0%	7.1%
	Total		Count	7	7	14
			%	100.0%	100.0%	100.0%
CHRONIC	T	.00	Count	4	4	8
PANCREATITIS			%	80.0%	80.0%	80.0%
		1.00	Count	1	1	2
			%	20.0%	20.0%	20.0%
	Total		Count	5	5	10
				100.0%	100.0%	100.0%

In the trial process, one patient (8.3%) who is currently feeding exhibits intolerance to oral feeding. 0% of patients who underwent an appendectomy for appendicitis experienced fatal injuries. Three (25.0%) of the patients with a diagnosis of colon cancer ate breakfast, compared to one (91.7%) who ate late. Two (20%) late-feeding patients and four (40%) early-feeding patients had stomach cancer diagnosed. Chronic cholecystitis was present in one (14.3%) of the late-feeding patients and in none (%) of the early-feeding patients. The remaining cancer rectum group consisted of one patient (20.0%) who was late feeding and one patient (20%) who was early feeding and had a diagnosis of chronic pancreatitis. Without any problems, all patients tolerated early and late feeding. The oral feeding group's tolerance difference is not statistically significant (p=0. 564).

DISCUSSION

Still, many surgeons recommend waiting a while before eating following gastrointestinal surgery. The benefits of hunger and bowel rest for wound healing and maintaining the anastomotic seal are not well established. Early feeding has benefits such as a decreased chance of wound infection, paralytic ileus, and anastomotic leak, as well as a shorter hospital stay and faster recovery. The primary points of discussion are that early feeding may be advantageous for these patients and that keeping patients' nausea under control with oral intake following an elective gastrointestinal resection does not seem to be obviously beneficial.[9-11] This study examined the average ages of the early and late feeding groups (45.26 and 46.06). Statistics show that the age difference is likewise not statistically significant. In this study, there was no statistically significant difference in the distribution of sexes (p=0.411), with males making up 27 of the late feeders and females making up 31 of the early feeders. There were 22 female late feeders and 18 female early feeders. There were no statistically significant differences in the lengths of hospital stays between the two groups (17.699.33 vs. 12.736.29, respectively); p=0.003.

90% of people reported having stomach ache, just like in recent research. The average time needed for surgery was approximately 4 hours, which was not statistically significant (1=0.054). The time needed for surgery might range from 1 hour to 8 hours. Compared to GA and SA, both groups performed the majority of surgeries under epidural anaesthesia; however, this difference is not statistically significant (p=0.657). Of the 49 participants in this study, acute appendicitis was found in 24.5% of them. In 24.5% of patient instances, colon cancer is found. Rectal cancer affected 6% of people, whereas stomach cancer affected 24 people. 10.2% of people get chronic pancreatitis, and 14.3% of people experience chronic cholecystitis.[11,12] Even though early feeding is unusual, it has a lower overall incidence of postoperative problems than late feeding. Reports of paralytic ileus accounted for 5.8%

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(10.2%) of all cases. This difference between 3 (96.1%) of the 49 patients who received early feeding and 49 patients who had late feeding (both receiving 100%) is not statistically significant (p=0.715). After gastrointestinal surgery, anastomotic leak is the most serious side effect and is linked to significant mortality and morbidity. In the current study, there were 27 patients, and an anastomotic leak was found in 2.0% of late-feeding patients with colon cancer. Early enteral feeding patients showed a reduction in infection risk across the board, with wound infections showing the biggest reduction. In the current trial, 98 patients (100%) were involved, and a total of 10 (10.1%) of them experienced wound infections. This included 3 of the 49 patients who received early feeding and 7 (14.3%) of the 49 patients who received late feeding. (p=0.317) Statistics contradict this. In another trial, comparable outcomes were seen.[12-14].

In the 49 patients (100%) who ate late in the current study, oral eating intolerance was observed in 6 (12.2%), and in the 49 patients (100%) who ate early in the study, in 8 (16.3%). Although this is not statistically significant, 14 (14.3%) of the 98 participants (100%) did not tolerate oral feeding. (p=0.564). After abdominal surgery, the passage of flatus or a bowel movement has typically served as the clinical justification for beginning an oral diet. Following gastrointestinal anastomosis, patients are typically kept "nil by mouth" until flatus has passed. Traditionally, one of the main objectives of postoperative care has been to provide sufficient nutrition. The effects of nutritional depletion and its implications are now better recognised when oral meals are withheld for a few days following surgery in such cases. According to Lewis et almeta-analysis of 11 trials and several more investigations, early eating after gastrointestinal anastomosis increased wound healing, elevated immunocompetence, lowered septic sequelae, and perhaps improved anastomotic strength.[14,15]

Within 48 hours of surgery, enteral feeding was commenced, and it was well tolerated in 22 (73.33%) instances in group A and 25 (16.67%) cases in group B. Eight patients (26.67%), eight instances (26.67%), and five cases (16.67%) (groups B and A, respectively) were unable to tolerate early enteral feeding. All of the patients were able to consume a limited amount of food after oral feeding had to stop for the following 6 to 12 hours. In studies done before this one, patients were fed 48–72 hours after surgery, and they tolerated the food. The current study's findings on tolerance for early oral feeding are comparable to those from prior studies.[16-18] Because Stewart et al investigation .'s was conducted within 4 hours following surgery, when anaesthetic drug residual effects were still in effect, the tolerance to early oral feed was much lower (65%) than in previous studies. Even though oral feeding was initiated as soon as 48 hours after surgery in the current study and between 24 and 72 hours following surgery in all previous investigations, tolerance to oral feeds has remained stable throughout the bulk of earlier trials, which is another crucial result. As a result of the anaesthetic medications' effects having worn off by that point, oral feeding can be initiated 48 hours after surgery with good tolerability.[18]

CONCLUSION

Initial feeding decreased the length of the patient's hospitalisation. Both early and later feeding shared the same incidence of paralytic ileus. Wound infection has been less common after earlier feeding when compared to later feeding. In late feeding, anastomotic leak was much frequent. With subsequent feeding, the patient's oral feeding capacity increased. Even though the experiment was unable to show any advantages of early feeding, this was unambiguously observed that enteral feeding should not be delayed.

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