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EARLY FEEDING VERSUS LATE FEEDING IN PATIENTS UNDERGOING GASTROINTESTINAL EMERGENCY SURGERIES IN TERTIARY CARE CENTER: RANDOMIZED-CONTROL OBSERVATIONAL STUDY

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ABSTRACT

BACKGROUND: As per the routine protocol followed in most of the hospitals even now is keeping the patient nil by mouth till the function of the intestines are regained. But the recent evidence based studies have shown that initiating enteral feeding in early post-operative period is beneficial to the patient and also gives patient a necessary push to recovery by both means I.e, metabolically and immunologically.

AIMS & OBJECTIVE: This observational study is done to evaluate the outcomes of the patients who under went emergency gastro intestinal surgery by providing enteral nutrition within 24-48 hours of surgery compared with conventional delayed approach

MATERIAL & METHODS: The study conducted between June 2022 to June 2024 is a randomised control prospective study done in a tertiary care hospital. The study included all the gastrointestinal emergencies in which patient were operated for hollow viscus perforation, intestinal obstruction and obstructed hernia.

RESULTS: Mean age of the study group was 44.87 years with 20% cases being less than 40 years and 62.9% and 17.1% in their fifth and sixth decade respectively. Out of total 70 cases, 43 (61.4%) were males and 27 (38.6%) were females. Most common indication for surgery was hemicolectomy (24.3%) and small bowel resection (17.10%). Mean duration of ileus was significantly more in cases of delayed feeding (5.6 vs 4.23 days).Overall complication rate was significantly more in cases with delayed feeding (20% vs 5.7%; $p<0.05$). GI reactions (14.3% vs 5.7%), wound infections (11.4% vs 2.9%) and rate of anastomotic leak (8.6% vs 0%) were observed to be higher with delayed feeding group.

CONCLUSION: Present study showed that early feeding after bowel surgery has better outcome than delayed feeding in terms of lower complications like anastomotic leak and wound infections. Early feeding was equally well tolerated by patients and enables shorter length of hospital stay, leading to lower cost of treatment. However, we need a larger multi-centric study to demonstrate statistically significant difference in the outcomes to further validate the study findings.

INTRODUCTION:-

A period of starvation (nil orally) is a common practice after most gastrointestinal surgeries. Postoperative dysmotility predominantly affects the stomach and colon, with the small bowel's normal function recovers 4-8 hours following surgeries [1]. The reason for keeping the patient "nil orally" is to prevent postoperative nausea and vomiting and to protect the patient's anastomosis repair, allowing time to heal before being stressed by food. Adynamic ileus after any abdominal surgery is characterized by absent motility caused by neuromuscular inhibition with sympathetic over activity. Motility returns in the small bowel within 24 hours, in the stomach within 48 hours, and in the colon within 3 to 5 days after all abdominal procedures. Patients have been traditionally treated after surgery with nasogastric decompression until bowel function has returned, after which a liquid diet is started and advanced to a regular diet over 4-5 days [2,3] . On the flip side, the prolonged malnutrition may worsen the health status of the patients. Gastrointestinal surgery is typically associated with postoperative morbidity such as wound infection, leak, intra-abdominal sepsis and other extra intestinal complications. Malnutrition state may increase the post-operative morbidity rates, mortality rates; duration and cost of hospital stay [4] . Delayed feeding has been practiced for fear of physical stress disrupting the anastomosis but Gastrointestinal secretions are present at the anastomotic site with a volume load of approximately 6 to 8 Litres per day irrespective of early or delayed feeding. Nausea and vomiting however occur more commonly after upper gastrointestinal surgery than resection of the small intestine and colon. There is no evidence that the bowel rest and a period of starvation are beneficial for healing of wounds and anatomic integrity. Indeed, the evidence is that luminal nutrition may enhance wound healing and increase anastomotic and perforation repair strength and with better rate of healing, particularly in malnourished patients [5] . Early feeding after gastrointestinal anastomosis can prevent morphologic and functional trauma related alterations of the gut [6] and will help to modulate immune and inflammatory responses [7] , besides being less expensive than total parenteral nutrition [8] . Early Enteral Nutrition can reduce pulmonary complications in patients with emergency gastrointestinal surgery [9, 10] . Several trials have reported that early feeding have lower incidence of infectious complications and faster wound healing. The immediate advantage of energy intake (carbohydrates, protein and fat) could enhance recovery with fewer complications and this warrants a randomized trial. In present hospital based comparative study, we thus aimed to study the effect of early versus late enteral feeding in post-operative period after small and large bowel surgery on: incidence of anastomotic leak, onset and duration of paralytic ileus, wound infection rate, tolerance of enteral feeding and hospital stay.

AIM AND OBJECTIVES :-

To study the effect of early versus late enteral feeding in post-operative period after small and large bowel surgery on:

1)Incidence of anastomotic leak.
2)Onset and duration of paralytic ileus.
3) Wound infection rate
4) Tolerance of enteral feeding
5) Hospital stay

MATERIAL AND METHODS :-

• Study Area - Department of General Surgery, S S Institute of Medical Sciences, Davangere, Karnataka
• Study Population - Patients undergoing small and large bowel surgeries.
• Study Design - A Prospective, Double Blinded Randomized-control Observational study
• Study Duration 2 years

• Inclusion Criteria:-

All the patients undergoing Surgery of Small and large bowel including -

1. Resection and anastomosis
2. Patients with early perforation
3. Diverticuli of bowel

• Exclusion Criteria:-
1. Patients less than 18 years.
2. Pregnant female patients
3. Gross intra-abdominal contamination
4. Post-operative patients requiring ventilator support
5. ASA grade 4 above
6. Re-laparotomies following anastomosis
7. Laparoscopic Procedures
8. Sustained bowel ischemia

• Methodology :-
Informed consent was taken from patients participating in the study.
A total of 70 patients were enrolled in this study and were divided into two groups for the study.
1. Group A- patients were given early feeding (24-48 hours)
2. Group B- 35 patients were given late feeding i.e. conventional feeding after surgery or sometimes even more depending upon return of full peristaltic sounds.

Post operatively Group A patients were offered Ryle's tube blockade and enteral feeding within first 24-48 hours,starting with sips of water. Ryle's tube was taken out as and when patients tolerate liquids. Group B patients were kept nil by mouth until the passage of flatus and appearance of active bowel sounds. The dietary composition was of polymeric in nature as guided by hospital nutritionist. Subsequent feeding rate was dependent on patient's acceptance and status. Patients of both the groups were followed in post-operative period for their drain output, any nausea, vomiting, significant abdominal distension, prolonged ileus, anastomotic leakage, any infective complications, duration of post-operative hospital stay.

RESULTS :-
Mean age of the study group was 44.87 years with 20% cases being less than 40 years and 62.9% and 17.1% in their fifth and sixth decade respectively.

Age group (yrs)	N	%
<=40	14	20.0%
41-50	44	62.9%
51-60	12	17.1%
Total	70	100.0%
Mean age = 44.87 +/- 6.7 years		

Table 1.Distribution of study groups as per ageOut of total 70 cases, 43 (61.4%) were males and 27 (38.6%) were females.

Gender	N	%
Female	27	38.6%
Male	43	61.4%
Total	70	100.0%

Table 2. Distribution of study groups as per genderMost common indication for surgery was hemicolectomy (24.3%) and small bowel resection (17.10%).

Indication of Surgery	N	%
Hemicolectomy	17	24.3%
Proctocolectomy	6	8.6%
Pyloric perforation	5	7.1%
Small bowel resection	12	17.1%
Total	70	100.0%

Table 3. Distribution of study groups as per indication of surgeryMean age was comparable between early and delayed feeding group (45.09 vs 44.66 years)

Variables	Start of Feeding	N	Mean	SD
Age (yrs)	Early	35	45.09	6.35
	Late	35	44.66	7.18

Table 4. Association of timing of feeding with ageBoth the early and delayed feeding groups were comparable with respect to gender distribution.

Gender	Start of Feeding		Total
	Early	Late	
Female	16	11	27
	45.7%	31.4%	38.6%
Male	19	24	43
	54.3%	68.6%	61.4%
Total	35	35	70
	100.0%	100.0%	100.0%

Table 5. Association of timing of feeding with genderBoth the early and delayed feeding groups were comparable with respect to type of surgery (p-0.59)

type of surgery	Start of Feeding		Total
	Early	Late	
Hemicolectomy	7	10	17
	20.0%	28.6%	24.3%
Proctocolectomy	2	4	6
	5.7%	11.4%	8.6%
Pyloric perforation	2	3	5
	5.7%	8.6%	7.1%
Small bowel resection	6	6	12
	17.1%	17.1%	17.1%
Total	35	35	70
	100.0%	100.0%	100.0%
p- value - 0.59			

Table 6. Association of timing of feeding with type of surgeryIntolerance to feeding was seen in 2 cases (5.7%) of early feeding group as compared to 1 (2.9%) cases of late feeding group (p-1.0)

Tolerance to Feeding	Start of Feeding		Total
	Early	Late	
No	2	1	3
	5.7%	2.9%	4.3%
Yes	33	34	67
	94.3%	97.1%	95.7%
Total	35	35	70
	100.0%	100.0%	100.0%
p- value - 1.0			

Table 7. Association of timing of feeding with tolerance to feedingMean duration of ileus was significantly more in cases of delayed feeding (5.6 vs 4.23 days).

Variables	Start of Feeding	N	Mean	SD	p- value
Duration of Ileus (days)	Early	35	4.23	1.26	<0.01
	Late	35	5.60	1.40	

Table 8. Association of timing of feeding with duration of ileus

Overall complication rate was significantly more in cases with delayed feeding (20% vs 5.7%; p<0.05). GI reactions (14.3% vs 5.7%), wound infections (11.4% vs 2.9%) and rate of anastomotic leak (8.6% vs 0%) were observed to be higher with delayed feeding group.

Complications	Start of Feeding		Total	p-value
	Early	Late		
Gastrointestinal (N/V/D)	2	5	7	0.42
	5.7%	14.3%	10.0%	
Anastomotic leak	0	3	3	0.07
	0.0%	8.6%	4.3%	
Wound Infections	1	4	5	0.16
	2.9%	11.4%	7.1%	

Table 9. Association of timing of feeding with associated complications

Mortality was seen in in 2 cases (5.7%) of delayed feeding group as compared to none in early feeding group (p-0.49).

Mortality	Start of Feeding		Total
	Early	Late	
No	35	33	68
	100.0%	94.3%	97.1%
Yes	0	2	2
	0.0%	5.7%	2.9%
Total	35	35	70
	100.0%	100.0%	100.0%
p- value - 0.49			

Table 10. Association of timing of feeding with mortality

Mean hospital stay was significantly shorter in cases where early feeding was started in comparison to delayed feeding group (5.74 vs 7.11 days; p<0.01).

Variables	Start of Feeding	N	Mean	SD	p- value
Hospital Stay (days)	Early	35	5.74	1.44	<0.01
	Late	35	7.11	1.23	

Table 11. Association of timing of feeding with hospital stay

DISCUSSION

A period of starvation (nil orally) is a common practice after most gastrointestinal surgeries.Postoperative dysmotility predominantly affects the stomach and colon, with the small bowelrecoversits normalfunction upto4to8hoursafterlaparotomy [1].

Delayedfeedinghasbeenpracticedtraditionallyafterbowelsurgeries(tilltheresolution of ileus) for fear of physical stress disrupting the anastomosis. Early feeding

aftergastrointestinalanastomosiscanpreventmorphologicandfunctionaltraumarelatedalterations of the gut [6]and will help to modulate immune and inflammatory responses [7],besidesbeing lessexpensive thantotalparenteral nutrition[8].

Although several trials have reported lower incidence of infectious complications andfaster wound healing upon early feeding, other trials have shown no effect. In present hospitalbased comparative study, we thus aimed tostudy the effect of early versus late enteralfeedinginpost-operativeperiodaftersmallandlargebowelsurgeryon:incidenceofanastomotic leak, onset and duration of paralytic ileus, wound infection rate, tolerance ofenteralfeedingand hospital stay.

Study included a total of 70 patients undergoing bowel surgery were enrolled in thisstudy. These patients were divided into two groups for the study based on their choice for thegroupheywanttoparticipateini.e.earlyfeeding(24-48hourspost-op)orlatefeedinggroup (72 hours after surgery or sometimes even more depending upon return of full peristalticsounds).

- **BaselineData**

Mean age of the study group was 44.87 years with 20% cases being less than 40 years and62.9% and17.1%in theirfifth andsixthdecaderespectively.Outof total70cases, 43(61.4%) were males and 27 (38.6%) were females. Both the early and delayed feeding groupswere comparable with respect to age and gender distribution (p>0.05). Most common type ofsurgery was colostomy closure (42.9%) followed by hemicolectomy (24.3%) and small bowelresection(17.1%).

- **Tolerancetofeeding**

Inpresentstudy,bothearly(94.3%)anddelayedgroup(97.1%)toleratedfeedingwell.Intolerance to feeding was seen in 2 cases (5.7%) of early feeding group as compared to 1(2.9%)caseof latefeedinggroup(p-1.0).

Nematihonar B et al. [11]intended to determine the safety and feasibility of an earlypost-op oral intake protocol. The majority of patients (93%) tolerated the early feeding. Dag Aetal.[12]observedthat85.9%ofpatientstoleratedtheearlyfeedingschedule.Inthestudyby Reissman et al. [13], 79% of the early feeding group tolerated the introduction of a normaldiet quicker, which is crucial to improve recovery postoperatively. Similar results were alsoobservedbyother author.

- **Resolution ofileus**

Inpresentstudy,weobservedthatmeandurationofresolutionofileuswassignificantlylessincasesofearly feeding (4.23 vs 5.6days).

Nematihonar B et al. [11]in a similar study also observed resolution of ileus faster inearlyfeeding group (2.66 days vs. 3.9 days).In thestudy by DagA et al.[12],resolutionofileus was in 2.48±0.85 days in early feeding group and in 4.77±1.81 days in delayed feedinggroup respectively. Reissman P et al. [13] in their study also observed faster resolution of ileuswithearlyfeedinggroup(3.8vs4.1days).SimilarfindingswerealsoseenbyBajwaRSetal. [14] andVaishnaniBetal.[15].

- **Hospitalstay**

Mean hospital stay in present study was significantly shorter in cases where early feeding wasstartedin comparisonto delayedfeedinggroup(5.74 vs7.11days;p<0.01).

Hospital stay was also significantly shorter in the early feeding group in a study byNematihonar B et al. [11] (4.0 days vs. 6.1 days). Hospitalization (5.55±2.35 vs. 9.0±6.5) wasalso observed to be significantly shorter in the early feeding group by Dag A et al. [12] study.Mean difference in length of hospital stay in both the groups was also significant as observedbyJabeenZetal.[16]

i.e.5.23+0.72daysand6.40+1.67daysrespectively.Hospitalstayinthe study by Reissman et al. [13]was 6·2±0·2 in early and 6·8±0·2 days in delayed grouprespectively. Herbert G et al. [17] in a meta-analysis observed that mean length of stay (LoS)rangedfromfourdaysto16daysintheearlyfeedinggroupsandfrom6.6daysto23.5daysin the control groups. Mean difference (MD) in LoS was 1.95 (95% CI, -2.99 to -0.91, P <0.001) days shorter in the early feeding group. Zhuang CL et al. [18] in another meta-analysisobserved thatearlyoralfeedingreducedthelengthofhospitalstay(weightedmeandifference -1.58 days; 95% CI -2.77 to -0.39; p = 0.009). Similar findings were also seen with otherstudieswith shorter duration of hospital stay in the early feeding group. This isprobably due to the lower rate of complications and faster recovery in this group, leading toquickdischarge.

- **Complications**

Overall complication rate was significantly more in cases with delayed feeding (20% vs 5.7%;p<0.05).GIreactions(14.3%vs5.7%),woundinfections(11.4%vs2.9%)andrateofanastomotic leak (8.6% vs 0%) were observed to be higher with delayed feeding group.Mortalitywasseeninin2cases(5.7%)ofdelayedfeedinggroupascomparedtononeinearlyfeedinggroup (p-0.49).

In the study by Nematihonar B et al. [11],anastomosis leakage and abscess formationwere not seen in early feeding group. The patient's satisfaction (visual analogue scale) in theearly feeding group was higher than delayed feeding group (8.56 ± 1.16 vs. 7.06 ± 1.59, P <0.001). Vaishnani B et al. [16] also observed lower incidence of complications such as woundinfection (12% vs 44%), wound dehiscence (4% vs 0%) and anastomotic leak (8% vs 16%).Reissman P et al. [13],Braga M et al. [19] and Stephen J et al. [20] also observed lower incidenceof anastomotic leak with early initiation of feeding. The improved nutritional intake could havecontributedtothe lower incidenceofanastomotic leak.Zhuang CL et al. [18] in their meta-analysis observed that compared with traditional oralfeeding, early oral feeding reduced the total postoperative complications (relative risk 0.70;95%CI0.50-0.98;p=0.04).Therewerenosignificantdifferencesintheriskofanastomotic dehiscence,pneumonia,woundinfection,rateofnasogastrictubereinsertion,vomiting,or mortality.

Thus to summarize, early feeding after bowel surgery has better outcome than delayedfeeding in terms of lower complications like anastomotic leak and wound infections. Earlyfeeding was equally well tolerated by patients and enables shorter length of hospital stay,leadingto lower costoftreatment.

CONCLUSION

Present study showed that early feeding after bowel surgery has better outcome than delayedfeeding in terms of lower complications like anastomotic leak and wound infections. Earlyfeeding was equally well tolerated by patients and enables shorter length of hospital stay,leading to lower cost of treatment. However, we need a larger multi-centric study todemonstrate statistically significant difference in the outcomes to further validate the studyfindings.

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