



Outcome Analysis of Early Oral Feeding in Comparison with Traditional Feeding after Upper Gastrointestinal Surgeries

**Shashank Agrawal^{a≡*}, Shailendra Pal Singh^{a≡ϕ}, Vipin Gupta^{a≡ϕ},
Somendra Pal Singh^{a≡#} and Rajesh Verma^{a≡#}**

^a Department of Surgery UP-UMS, Saifai, Uttar Pradesh, India.

Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

Editor(s):

(1) Dr. Wagih Mommtaz Ghannam, Mansoura University, Egypt.

Reviewers:

(1) Md. Abdul Mazid, TMSS Medical College, Bangladesh.

(2) Vijay Kumar Chava, Narayana Dental College & Hospital, India.

(3) Rene M. Gordillo, Alfa General Hospital, Ecuador.

(4) D. Sandeep, Chebrolu Hanumaiah Institute Of Pharmaceutical Sciences, India.

Complete Peer review History, details of the editor(s), Reviewers and additional Reviewers are available here:
<https://www.sdiarticle5.com/review-history/79968>

Original Research Article

**Received 14 October 2021
Accepted 28 December 2021
Published 29 December 2021**

ABSTRACT

Background: The practice of starving patients in the immediate period after upper gastrointestinal surgery is widespread. It have shown that the early initiation of oral feeding is feasible and safe after upper gastrointestinal surgeries, and suggest that this practice may reduce infection related complications and length of hospital stay compared with the traditional approach "nothing by mouth" resulting in faster recovery.

Aim: To evaluate early starting of oral feeding in upper gastrointestinal surgeries is better in comparison to traditional feeding in terms of post operative leak, septic complications and length of hospital stay?

Material and Methods: A randomized control trial including 70 patients of both sex and over 18 years of age, who underwent upper gastrointestinal surgeries were included and were randomized in two groups, one who were given oral feed within 24 hrs of surgery were compared to one who

≡ Dr.;

ϕ Professor;

Associate professor;

*Corresponding author: E-mail: coolshanky19@gmail.com;

were traditionally given feed after return of bowel sounds in terms of convalescence of gastrointestinal function and were followed for bowel movements, and time of tolerance of solid diet, complications, and the length of hospitalization.

Results: With 35 patients in each group, considering the gastrointestinal recovery, earlier intestinal movements (2.17 days vs. 3.97 days, $p < 0.001$) and defecation (3.80 days vs. 6.57 days, $p < 0.001$) were observed in the early feeding group's patients. Moreover, the regular diet was tolerated by patients in the early feeding group significantly earlier (4.62 days vs. 7.26 days, $p < 0.001$). The mean hospital stay was significantly shorter in the early feeding group (7.77 days vs. 13 days, $p < 0.001$).

Conclusion: Early oral diet is safe and viable for patients undergoing upper gastrointestinal surgery.

Keywords: Upper GI surgeries; gastric perforation; duodenal perforation; eras; early feeding; early oral feeding.

1. INTRODUCTION

Post-Operative 'nil per mouth' is the most commonly practiced methodology after a patient undergoes upper gastrointestinal surgeries like gastrectomy, gastro-jejunal anastomosis and closure of perforated stomach or duodenum. The rationale behind that was to give time for the anastomosis to heal before being challenged by liquid or solid diets and to prevent post operative nausea and vomiting [1,2].

However it is a well known fact that the, GIT secretions present in the anastomotic site with a volume load of approximately 6.8 litres irrespective of delayed or early feeding [3]. These data suggest that the concept of postoperative ileus as a paralysis of the entire bowel with the complete absence of any functional contractile activity is misleading.

Postoperative ileus is defined as a transient impairment of intestinal motility occurring after abdominal surgery, as manifested by the absence of bowel sounds and are clinically non-significant. In addition in various prospective randomized trial it is found that insulin resistance and nitrogen loss to be diminished after postoperative enteral feeding [4]. Enteral feeding was also demonstrated to enhance wound healing and increase anastomotic strength [5,6]. Duration of ileus is shortened by early resumption of enteral intake [7].

A recent meta-analysis reviewing 11 prospective controlled trials in which enteral feeding was started within 24 hours after operation, demonstrated a reduction in septic complications [8]. Length of hospital stay was reduced in eight of eleven studies assessed, resulting in an overall statistically significant reduction of 0.84 day ($p < 0.001$). Similar meta-analysis of 15 studies with 2100 patients, who underwent upper

gastrointestinal surgeries showed favourable outcome with early oral feeding post operatively [9].

Because a clear rationale for delaying oral intake after upper gastrointestinal surgeries is lacking and there are potential benefits from early postoperative feeding, we planned a prospective randomized study.

2. MATERIALS AND METHODS

A randomized control trial including patients admitted to department of surgery for emergency as well elective laparotomy at UPUMS Saifai during period January 2017 to June 2018 was considered for the study. The study was approved by the Ethical Committee at the UP-UMS, Saifai, Etawah. Informed consent was obtained from all patients. Patient included were all over 18 years of age undergoing upper gastrointestinal operative procedures.

Patients, incompetent to provide informed consent, with spinal injuries, uncontrolled Diabetes Mellitus, or requiring post operative cardio pulmonary organ support (inotropes, mechanical ventilation etc) were excluded.

A total of 70 patients was included and were randomized in two groups Group A (n=35) those who were started on early feeding regimen (Table 1) within 24 hrs of upper gastrointestinal track surgery and Group B (n=35) were those who were on traditional practice of feeding on return of peristaltic sound.

Further evaluation of patients was done according to convalescence of gastrointestinal function and were followed for bowel movements, nasogastric tube reinsertion, and time of tolerance of solid diet, complications, and the length of hospitalization.

The presence of bowel movements was assessed daily by two independent investigators. Patients' examinations were conducted and recorded by the surgical unit doctors.

Patients in both groups were discharged once they fulfilled all the following discharge criteria, including the passage of flatus or stools, toleration of oral liquid and solid food, comfortable on oral analgesia and no complications that required hospital treatment.

The statistical analysis was done using SPSS (Statistical Package for Social Sciences) statistical Analysis Software. The values were represented in Number (%) and Mean±SD. P value less than 0.05 was considered significant.

3. RESULTS

Early feeding group included 32 males and 3 females with mean age of 46.88 yrs, whereas the regular feeding group consisted of 28 males and 7 female with mean age of 47.96 yrs. There was no significant difference between the two groups in terms of gender or age of the patients ($p=0.172$ and $p=0.256$, respectively).

In addition, there were no statistically significant differences between the two groups regarding patient's haematological or co-morbidities profile. The two groups were also similar on the basis of patients' diagnosis and the type of operation performed ($p = 0.233$) as shown in Table 3 and 4.

Table 1. Feeding regimen used

Post-Op Period	Feed with IV Fluids	Total Calorie
12hr-24hr	Water + IV Fluids	600
24hr-48hr	Water + Coconut water(250ml)+ Lentil Soup(250ml)	600+46+130
Day 2	Liquid diet consisting of coconut water, tea, coffee and lemonade	1000
Day 3	Liquid diet continued	1500
Day 4	Easily digestible diet	2100
Day 5	Normal diet	2500

Table 2. Gender ratio

Group	Gender		Total		
	Male	Female			
A	Age intervals	<30 years	6	0	6
			18.8%	.0%	17.1%
		30 to 50 years	17	3	20
			53.1%	100.0%	57.1%
	Above 50 years	9	0	9	
		28.1%	.0%	25.7%	
	Total	32	3	35	
		100.0%	100.0%	100.0%	
B	Age intervals	<30 years	2	0	2
			7.1%	.0%	5.7%
		30 to 50 years	15	5	20
			53.6%	71.4%	57.1%
	Above 50 years	11	2	13	
		39.3%	28.6%	37.1%	
	Total	28	7	35	
		100.0%	100.0%	100.0%	

Table 3. Diagnosis criteria

Diagnosis	Group A	Group B
Gastric Outlet Obstruction	2(6%)	1(3%)
Perforation Peritonitis	33(94%)	33(94%)
Perforation Peritonitis with diaphragmatic rupture	0	1(3%)
	35(100%)	35(100%)

Table 4. Surgical issues

		Group		Total
		A	B	
Surgery performed	Exploratory Laparotomy with Modified Grahms Patch Repair	30 85.7%	32 91.4%	62 88.6%
	Exploratory laparotomy with primary repair of gastric perforation with diaphragm repair with left ICD in situ	0 .0%	1 2.9%	1 1.4%
	Exploratory laparotomy with primary repair of jejunal perforation	3 8.6%	0 .0%	3 4.3%
	Exploratory laparotomy with primary repair of perforation at DJ-junction with feeding-J in situ	0 .0%	1 2.9%	1 1.4%
	Staplers assisted ante colic bypass gastro-jejunostomy	1 2.9%	0 .0%	1 1.4%
	Laparoscopic Staplers Assisted Gastro- Jejunostomy	0 .0%	1 2.9%	1 1.4%
	Exploratory Laparotomy with side to side Gastro-Jejunostomy	1 2.9%	0 .0%	1 1.4%
	Total	35 100.0%	35 100.0%	70 100.0%

Table 5. Group variability

Variables	Group A (Days)	Group B (Days)	P value
Time of Bowel Sound	2.17	3.97	<0.001
Time of 1 st flatus	2.54	4.77	<0.001
Time of 1 st motion	3.80	6.57	<0.001
Time to tolerate solid diet	4.62	7.26	<0.001
Wound complication	3	7	0.172
-Wound infection	(3)	(6)	
-Wound dehiscence	(0)	(1)	
Hospital stay	7.77	13.00	<0.001

Table 6. Post feed complications in cases

Post feed complications in cases	Cases = 35	Percentages %
Abdominal Cramps	8	22.85
Vomiting	2	5.71
Abdominal Distention	10	28.57
Naso-gastric tube re-insertion	0	0
Diarrhoea	0	0
No Complication	15	42.86

When considering the gastrointestinal recovery, earlier intestinal movements (2.17 days vs. 3.97 days, $p < 0.001$) and defecation (3.80 days vs. 6.57 days, $p < 0.001$) were observed in the early feeding group's patients as opposed to the regular feeding group's patients. Moreover, the regular diet was tolerated by patients in the early feeding group significantly earlier than those in the regular feeding group (4.62 days vs. 7.26 days, $p < 0.001$). There was no any anastomotic leak in either group. There was no significant difference observed in wound complication in either group ($p = 0.172$). The mean hospital stay was significantly shorter in the early feeding group when compared with the regular diet group (7.77 days vs. 13 days, $p < 0.001$). In post-op follow up of patients on early oral feed, 15(43%) had no complaints, while 10(28%) of patients complained of abdominal distension, followed by 8(23%) experienced abdominal cramps, 2(6%) had complaints of episode of nausea and vomiting, which were managed conservatively with reducing amount of feed, shown in Table 6.

4. DISCUSSION

The current practice related to the early onset of oral nutrition in the postoperative period was well established for several abdominal surgical procedures. Some randomized controlled trials and meta-analyzes have shown that the early initiation of oral feeding is feasible and safe after upper gastrointestinal surgeries, and suggest that this practice may reduce infection related to potential complications and length of hospital stay compared with the traditional approach "nothing by the mouth" [10,11]. Similar to some other studies [12,13], our study has demonstrated that there is no evidence to suggest that bowel rest and a period of starvation are beneficial for the healing of wounds and anastomotic integrity. Indeed, the evidence is that luminal nutrition may enhance wound healing and increase anastomotic strength. Keele et al. [14] found that supplementing "normal" oral diet in hospital wards with as little as 300 calories and 12 g of protein per day resulted in a reduction of postoperative complications in patients undergoing gastrointestinal surgery. In our study, in group A, about 60% patients were getting about 1500 calories by post-operative day (POD)-4 while about 87% of patients were getting over 2500 calories by POD-7, while none of the conventionally managed patient reached a daily intake of 1500 calories, which is consider to be a very essential for achieving a positive nitrogen

balance as stated by, Singh et al. [15] who achieved a positive nitrogen balance by the third and Hoover et al. [16] by the fourth postoperative day. The mean duration of paralytic ileus among the cases in group A was 2.17 days whereas in the group B was 3.97 days. This difference is significant and shows the advantage of early feeding. Surgical site infection is a common problem faced in post operative wards in the setup of government hospitals when compared to the more standardised private hospital setup.

Hence the need for preventive measures to reduce the rate of surgical site infection is the need of the hour. Among group B patients in the study about 7(20%) patients developed surgical site infection when compared to 3(8%) patients in group A. Although results were not statically significant but is similar to, Sierzega et al. [17] who also found low rates of surgical complications in their study; in the group of patients who received an early oral feeding there was a 15% rate compared to 24% of general surgical complications with a significant statistical difference; among these complications wound infections (12%) predominated in both groups. Side effects due to feeds were seen among 20(57%) patients of the study group A. Braga et al. [18] reported that early enteral feeding related gastrointestinal adverse effects (cramps, bloating, diarrhoea, vomiting, aspiration) were observed in 194/650 patients (29.8%). Fifty-eight (8.9%) subjects had to be switched to parenteral feeding because of refractory intolerance to early enteral feeding. In our study all patients were managed as per protocol by reducing the frequency of feeds transiently. None required cessation of feeding. In the meta-analysis by Liu et al. [19], six studies were compared in which patients underwent some type of gastrectomy. They were divided into two groups, where the majority started on an early oral feeding (water or other liquids) on the same of the surgery or on the 1st day after the surgery, and about 90% of the patients responded well. In this study we evaluated the acceptance of diets and gastrointestinal symptoms both for patients who were receiving oral and early enteral diets. In general, there was good acceptance during the first seven days of hospitalization, when the main gastrointestinal symptoms displayed were abdominal distension and vomiting, which were observed more frequently in patients receiving an enteral diet. Due to the above said statistically significant advantages of early feeding the mean duration of hospital stay among the patients of

the study group was 7.77 days whereas among those in the control group was 13.00 days. This difference is also significant and adds to the list of advantages of early oral feeding. Similar trend towards a shorter hospital stay has been observed previously when an early feeding regimen is followed [20-23].

5. CONCLUSION

On basis of above study, we may finally conclude that:-

- Duration of paralytic ileus and days for normal bowel sound to return is lesser in early feeding.
- Time taken to start oral feeds is lesser with early feeding.
- Rate of surgical site infections are less in early feeding.
- Anastomotic leak rate could not be compared in this study.
- Duration of hospital stay is lesser in early feeding.

This study clearly shows the advantages of starting early oral feeding in patients undergoing upper gastrointestinal surgeries over traditional customs.

ETHICAL APPROVAL AND CONSENT

The study was approved by the Ethical Committee at the UP-UMS, Saifai, Etawah. Informed consent was obtained from all patients.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Hotokezaka M, Mentis EP, Schirmer BD. Gastric myoelectric activity changes following open abdominal surgery in humans. *Digestive Diseases and Sciences*. 1996;41(5):864-9.
2. Hotokezaka M, Mentis EP, Patel SP, Combs MJ, Teates CD, Schirmer BD. Recovery of gastrointestinal tract motility and myoelectric activity change after abdominal surgery. *Archives of Surgery*. 1997;132(4):410-7.
3. Nachlas MM, Younis MT, Roda CP, Wityk JJ. Gastrointestinal motility studies as a

guide to postoperative management. *Annals of surgery*. 1972;175(4):510.

4. Soop M, Carlson GL, Hopkinson J, Clarke S, Thorell A, Nygren J, Ljungqvist O. Randomized clinical trial of the effects of immediate enteral nutrition on metabolic responses to major colorectal surgery in an enhanced recovery protocol. *British Journal of Surgery*. 2004;91(9):1138-45.
5. Haydock DA, Hill GL. Impaired wound healing in surgical patients with varying degrees of malnutrition. *Journal of Parenteral and Enteral Nutrition*. 1986;10(6):550-4.
6. Schroeder D, Gillanders L, Mahr K, Hill GL. Effects of immediate postoperative enteral nutrition on body composition, muscle function, and wound healing. *Journal of Parenteral and Enteral nutrition*. 1991;15(4):376-83.
7. Stewart BT, Woods RJ, Collopy BT, Fink RJ, Mackay JR, Keck JO. Early feeding after elective open colorectal resections: A prospective randomized trial. *Australian and New Zealand Journal of Surgery*. 1998;68(2):125-8.
8. Lewis SJ, Egger M, Sylvester PA, Thomas S. Early enteral feeding versus "nil by mouth" after gastrointestinal surgery: systematic review and meta-analysis of controlled trials. *Bmj*. 2001;323(7316):773.
9. Hao T, Liu Q, Lv X, Qiu J, Zhang HR, Jiang HP. Efficacy and safety of early oral feeding in postoperative patients with upper gastrointestinal tumor: A systematic review and meta-analysis. *World Journal of Gastrointestinal Surgery*. 2021;13(7):717.
10. Hosseini SN, Mousavinasab SN, Rahmanpour H, Sotodeh S. Comparing early oral feeding with traditional oral feeding in upper gastrointestinal surgery. *Turk J Gastroenterol*. 2010;21(2):119-24.
11. Jo DH, Jeong O, Sun JW, Jeong MR, Ryu SY, Park YK. Feasibility study of early oral intake after gastrectomy for gastric carcinoma. *Journal of Gastric Cancer*. 2011;11(2):101-8.
12. Schroeder D, Gillanders L, Mahr K, Hill GL. Effects of immediate postoperative enteral nutrition on body composition, muscle function, and wound healing. *Journal of Parenteral and enteral Nutrition*. 1991;15(4):376-83.
13. Haydock DA, Hill GL. Impaired wound healing in surgical patients with varying degrees of malnutrition. *Journal of*

- Parenteral and Enteral Nutrition. 1986;10(6):550-4.
14. 13. Keele AM, Bray MJ, Emery PW, Duncan HD, Silk DB. Two phase randomised controlled clinical trial of postoperative oral dietary supplements in surgical patients. *Gut*. 1997;40(3):393-9.
 15. Singh G, Ram RP, Khanna SK. Early postoperative enteral feeding in patients with nontraumatic intestinal perforation and peritonitis. *Journal of the American College of Surgeons*. 1998;187(2):142-6.
 16. Hoover HC, Ryan JA, Anderson EJ, Fischer JE. Nutritional benefits of immediate postoperative jejunal feeding of an elemental diet. *The American Journal of Surgery*. 1980;139(1):153-9.
 17. Sierzega M, Choruz R, Pietruszka S, Kulig P, Kolodziejczyk P, Kulig J. Feasibility and outcomes of early oral feeding after total gastrectomy for cancer. *Journal of Gastrointestinal Surgery*. 2015;19(3):473-9.
 18. Braga M, Gianotti L, Gentilini O, Liotta S, Di Carlo V. Feeding the gut early after digestive surgery: results of a nine-year experience. *Clinical Nutrition*. 2002;21(1):59-65.
 19. Liu X, Wang D, Zheng L, Mou T, Liu H, Li G. Is early oral feeding after gastric cancer surgery feasible? A systematic review and meta-analysis of randomized controlled trials. *PLoS One*. 2014;9(11):e112062.
 20. Binderow SR, Cohen SM, Wexner SD, Noguerras JJ. Must early postoperative oral intake be limited to laparoscopy?. *Diseases of the Colon & Rectum*. 1994;37(6):584-9.
 21. Hawalsi A, Schroder DM, Lloyd LR, Featherstone R. Elective conventional colectomy in the era of laparoscopic surgery. *The American surgeon*. 1996;62(7):589-92.
 22. Di Fronzo LA, Cymerman J, O'connell TX. Factors affecting early postoperative feeding following elective open colon resection. *Archives of Surgery*. 1999;134(9):941-6.
 23. Lassen K, Kjæve J, Fetveit T, Tranø G, Sigurdsson HK, Horn A, Revhaug A. Allowing normal food at will after major upper gastrointestinal surgery does not increase morbidity: A randomized multicenter trial. *Annals of surgery*. 2008;247(5):721-9.

© 2021 Agrawal et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

The peer review history for this paper can be accessed here:
<https://www.sdiarticle5.com/review-history/79968>