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PROSPECTIVE STUDY ON ROLE OF EARLY ENTERAL FEEDING IN GASTRIC / DUODENAL PERFORATION

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ABSTRACT

BACKGROUND: Perforation of gut is one of a common surgical emergency encountered in clinical practice. Patients with gastric / duodenal perforations presents with severe peritonitis and septicaemia. Upper GI perforations need immediate repair mostly by omental patch closure. Following surgical repair of the perforation patients will be observed postoperatively regarding the improvement of vitals and return of normal bowel movements and improvements in biochemical parameters for planning of introduction of oral feeds. Many recent trials regarding the concept of early feeding in case of abdominal surgeries conducted proved that the delayed feeding is of no benefit for the outcome of general condition of the patient. Also, early feeding found to result in shift recovery of the patients thereby leading to reduced hospital stay.

AIM AND OBJECTIVE: The study was undertaken to determine the effects and advantages of "EARLY ENTERAL FEEDING IN GASTRIC / DUODENAL PERFORATION".

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To derive conclusions about efficacy of EARLY ENTERAL FEEDING IN PATIENTS WITH GASTRIC/ DUODENAL PERFORATION and its impact on recovery of patients after surgery monitored by clinical and biochemical parameters

PATIENTS AND METHODS: About 50 patients above the age of 20yrs presenting with Gastric / Duodenal perforation with duration not more than 3 days during February 2023 to November 2023 and underwent surgery at M K C G Medical College and Hospital Berhampur were included in the study. After taking proper consent the 50 patients were randomly divided into two groups each group consisting of 25 patients. The study group includes patients who were inserted with Naso jejunal tube intraoperatively and started with enteral feeding on POD 1. The second group includes patients who were started on oral feeds after appearance of bowel sounds and passage of flatus which will be around POD 5 to 7. Data was collected in a prescribed format and compare all parameters on admission, POD 3 and POD 7 days.

RESULTS: All clinical parameters on admission were not revealed statistically significant difference in their baseline values ($p>0.05$). However, on POD 3 all the parameters showed a significant difference between study and control group($P<0.05$). On POD 7 there is statistical significance only in PR and other parameters show no statistical significance. All biochemical parameters on admission were not revealing any statistically significant difference ($p>0.05$) between both groups. However, on POD 3 Hb%, urea, Na, and K values showed a significant difference between both groups($P<0.05$). WBC count and Creatinine levels remains same in both the groups. On POD 7 there is statistical significance only in Hb, & urea values& other values show no statistical significance. The patients among the study group are shifted from ICU to general ward on an average one day prior to patients among the control group. Bowel sounds appearance, Ryle's tube removal, Passage of flatus on an average in the study group is one day prior to control group. Among the study group 32% of them are with major complications whereas among the control group 76% are with major complications. Patients under study group got discharged on an average about 3 days prior to patients under the control group.

CONCLUSION: In any patient with Gastroduodenal perforation starting early enteral feeding via NJ tube is a safer and effective option which has direct impact on the outcome of the patient both in recovery and in preventing postoperative complications.

KEYWORDS: Enteral feeding, Gastric Perforation, Duodenal Perforation.

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INTRODUCTION:

Perforation of gut is one of a common surgical emergency encountered in clinical practice. Patients with gastric / duodenal perforations presents with severe peritonitis and septicaemia. Upper GI perforations need immediate repair mostly by omental patch closure.

Following surgical repair of the perforation patients will be observed postoperatively regarding the improvement of vitals and return of normal bowel movements and improvements in biochemical parameters for planning of introduction of oral feeds.

Previously it is considered that introduction of oral feeds may prolong the duration of naso gastric aspirations and may interfere with the healing of perforation site and also may lead to prolongation of post operative ileus. Conventionally patients underwent surgery for gastric / duodenal perforations will be kept nil per oral for about 5-7 days based on the return of bowel sounds postoperatively and passage of flatus postoperatively. This practice of delayed introduction of oral feeds following perforation surgery is questioned in recent times and considered to prolong recovery of the patients due to deficient calorie supply during periods of starvation. Withholding enteral feeds after an elective gastrointestinal surgery is based on the hypothesis that this period of "nil by mouth" provides rest to the gut and promotes healing.

During the period of 'nil by mouth' patients will be provided calories, electrolytes and hydration through intravenous route. This intravenous supplementation requires expertise and to be monitored accordingly. The intravenous supplementation are planned according to the biochemical values and condition of the patient. Even though supplemented with utmost accuracy, the IV supplements are no way match to the physiological enteral absorption in correcting biochemical dearrangements. Also, during the period of nil by mouth the enteral immunity will be depressed which may delay the outcome of the patient and lead to negative nitrogen balance.

Many recent trials regarding the concept of early feeding in case of abdominal surgeries conducted proved that the delayed feeding is of no benefit for the outcome of general condition of the patient. Also, early feeding found to result in shift recovery of the patients thereby leading to reduced hospital stay. Early feeding post operatively can be started by many methods. Few examples are through Feeding jejunostomy, feeding gastrostomy, Naso enteral feeding etc. In my study I have adopted the method of Feeding nasojejunal tube which is a non-invasive method of starting feeding. I have adopted this method of early feeding in patients who have undergone surgery for repair of Gastric/ Duodenal perforations. This method involves the delivery of food directly into jejunum, it is safe and the perforated site in not being delayed from healing and also not considered to increase the duration of naso gastric aspiration. Patients treated by surgery for Gastric / Duodenal perforations are categorized into two groups.

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One group of patients were started with enteral feeding earlier than conventional duration by using Naso enteral tube and the second group of patients were started with routine method of feeding following reappearance of normal bowel movements. Both the groups were compared clinically, biochemically and recovery of the patients were assessed in this study.

AIM OF THE STUDY

The study was undertaken to determine the effects and advantages of "EARLY ENTERAL FEEDING IN GASTRIC / DUODENAL PERFORATION"

OBJECTIVES:

To derive conclusions about efficacy of EARLY ENTERAL FEEDING IN PATIENTS WITH GASTRIC/ DUODENAL PERFORATION and its impact on recovery of patients after surgery monitored by clinical and biochemical parameters.

ELIGIBILITY CRITERIA:

A.Inclusion criteria:

- Patients more than 20 years of age groups in both sexes presenting with Gastric /duodenal Perforation.
- Patients with duration of perforation not more than 3 days.
- Patients with Perforation upto the level of first part of duodenum.
- Patients with both traumatic and atraumatic perforations.
- Patients consented for inclusion in the study according to designated Proforma.

B.Exclusion criteria:

- Patients less than 20 years of age.
- Patients with malignant perforation undergoing major resections.
- Patients with perforation beyond the level of first part of duodenum.
- Patients with duration of perforation more than 3 days.
- Patient not consented for inclusion in the study.

Materials Used: Naso Jejunal Tube

Methodology:

Patients presenting with gastric/ duodenal Perforation to M K C G Medical College and Hospital Berhampur from February 2023 to November 2023 were recruited in this study. A total of 50 patients

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with gastric/duodenal perforation were included in the study. The 50 patients were randomly divided into two groups each group consisting of 25 patients. The study group includes patients who were inserted with Naso jejunal tube intraoperatively and started with enteral feeding on POD 1. The second group includes patients who were started on oral feeds after appearance of bowel sounds and passage of flatus which will be around POD 5 to 7.

Following consent, a questionnaire will be filled to record the patient's demographic data, duration of perforation, comorbidities if any, time of medical attention and relevant history. Then the patient's clinical status assessed and vitals recorded. Blood investigations done on admission are recorded.

Mannheim Peritonitis Index score calculated for each patient and the severity of presentation evaluated. All the patients were operated for gastric/duodenal perforation and omental patch closure done with thorough peritoneal lavage. Patients among the study group were inserted with nasojejunal(NJ) tube of size 12FR & 120 cm intraoperatively through the other nostril in which Ryle's tube was not inserted and the position of the nasoenteral(NJ) tube checked directly during the intraoperative period. Patients among the control group were done with omental patch closure and they are not inserted with naso jejunal tube.

In the postoperative period patient among study group were started with enteral feeds through the NJ tube on POD 1. Initially the feeds include 30ml /hr continuous infusion of ORS preparation via NJ tube. Later the feeds were stepped up both in quantity and quality. Usual feeds include ORS preparations, boiled milk, protein powder dissolved in milk, homemade starch preparations, white of egg with milk, powered cereals with water or milk, multivitamin syrups in therapeutic doses etc. Any patient develops Ileus, distension, nausea/ vomiting are withheld from enteral feeds for 24 hrs and then restarted. If intolerance persists IV prokinetics are administered and EN continued. Once the return of bowel movements and passage of flatus and improvement in general condition NJ tube removed and started with oral feeds.

Patients in control group were started with oral feeds after passage of flatus and return of bowel sounds which will be usually on POD 5 to 7. Patients were monitored with vital parameters and biochemical investigations serially on POD 3 and POD 7. The clinical and investigation data were recorded and outcomes of both the groups compared. Patients presenting with postop complications were treated accordingly and data regarding the outcome of patients were recorded and compared. Clinical parameters assessed includes Pulse rate, BP, Respiratory rate. Biochemical parameters assessed includes Haemoglobin, WBC count, Urea, Creatinine, Na+ and K+ levels. All these parameters are recorded on admission, on POD 3 and POD 7.

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RESULTS AND DATA ANALYSIS:

A total number of 50 patients were randomly divided into 2 groups with each group containing 25 patients. Incidentally all the patients belonged to male gender. One group (Test group) of 25 patients were started enteral feeding on POD 1 via Nasojejunal tube inserted intra operatively. Another group (control group) of 25 patients were started feeding conventionally after appearance of bowel sounds and passing flatus on POD 5-7.

Table 1 - Serial comparison of Clinical parameters on admission, POD 3 and POD 7 between group

	Study group (N=25)				**Control group (N=25)**				
	Mean	Std. Deviation	Median	IQR	Mean	Std. Deviation	Median	IQR	p value
Values on admission									
PR(/min)	110.6	9.206	107	11.5	114.48	11.292	109	18	0.193
SBP (mm Hg)	112.8	28.507	100	50	102.8	22.8254	100	20	0.242
DBP (mm Hg)	**67.6**	**29.195**	**70**	**30**	**61.2**	**25.8715**	**70**	**20**	**0.256**
RR(/min)	**26.4**	**3.719**	**25**	**2**	**27.28**	**3.4098**	**27**	**4**	**0.265**
Values on POD 3									
PR(/min)	**90.8**	**9.009**	**88**	**8**	**102.12**	**12.015**	**98**	**11**	**0.001**
SBP (mm Hg)	**116.8**	**18.868**	**120**	**40**	**106.8**	**18.1934**	**100**	**15**	**0.034**
DBP (mm Hg)	**74.4**	**18.502**	**70**	**20**	**68.8**	**11.299**	**70**	**5**	**0.026**
RR(/min)	**18.64**	**4.358**	**18**	**4**	**21.4**	**3.4881**	**21**	**4**	**0.001**
Values on POD 7									
PR(/min)	**76.96**	**4.903**	**77**	**7**	**82.864**	**16.7397**	**86**	**7**	**0.001**
SBP (mm Hg)	**120.4**	**10.65**	**120**	**2**	**120**	**15.119**	**120**	**2**	**0.627**
DBP (mm Hg)	**77.83**	**7.359**	**80**	**10**	**75.455**	**5.9580**	**75**	**10**	**0.288**
RR(/min)	**14.74**	**1.054**	**14**	**1**	**15.455**	**1.6541**	**15**	**3**	**0.151**

Mann whitney U test; Shows (*$p<0.05$)

Above table depicts that all clinical parameters on admission were not revealed statistically significant difference in their baseline values ($p>0.05$). However, on POD 3 all the parameters showed a significant difference between study and control group($P<0.05$). On POD 7 there is statistical significance only in PR and other parameters show no statistical significance

Table 2 - Serial comparison of biochemical parameters on admission, POD 3 and POD 7 between groups

Biochemical parameters	**Study group (N=25)**				**Control group (N=25)**				
	Mean	Std. Deviation	Median	IQR	Mean	Std. Deviation	Median	IQR	p value
Values on admission									
Hb(g%)	**10.552**	**1.724606**	**10.6**	**1.25**	**9.928**	**.06889**	**9.8**	**0.75**	**0.099**
WBC Count ($x10^3/mm^3$)	**9.83**	**2.699**	**9.1**	**3.45**	**9.984**	**3.4632**	**8.9**	**2.6**	

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Creatinine (mg%)	**66.12**	**29.015**	**50**	**39.5**	**61.12**	**19.1818**	**51**	**28.5**	**0.647**
Na^+ (meq/L)	**129.12**	**2.587**	**129**	**2.5**	**130.08**	**4.2615**	**129**	**3.5**	**0.428**
K^+ (meq/L)	**3.256**	**0.5116**	**3.2**	**0.2**	**3.18**	**0.3266**	**3.1**	**0.45**	**0.453**
Values on POD 3									
Hb(g%)	**10.872**	**0.817272**	**10.9**	**0.6**	**10.14**	**0.6994**	**10.1**	**0.6**	**0.002***
WBC Count ($x10^3/mm^3$)	**9.396**	**2.958953**	**8.5**	**2.2**	**10.492**	**4.2898**	**9.1**	**5.2**	**0.298***
Creatinine (mg%)	**1.044**	**0.5205**	**0.8**	**0.3**	**1.116**	**0.6263**	**0.9**	**0.8**	**0.914***
Na^+ (meq/L)	**140.76**	**4.065**	**141**	**4**	**135.24**	**4.1761**	**134**	**6**	**0.001***
K^+ (meq/L)	**4**	**0.4**	**3.**	**0.2**	**3.444**	**0.2973**	**3.4**	**0.5**	**0.001***
Values on POD 7									
Hb(g%)	**10.61**	**0.783**	**11**	**1**	**10.136**	**0.7743**	**10**	**1**	**0.027***
WBC Count ($x10^3/mm^3$)	**8.13**	**2.262**	**8**	**4**	**7.318**	**2.4955**	**6.5**	**2**	**0.145***
Creatinine (mg%)	**0.73**	**0.25**	**0.72**	**0.1**	**0.69**	**0.35**	**0.7**	**0.1**	**0.681**
Na^+ (meq/L)	**141.43**	**3**	**141**	**5**	**140**	**2.9**	**140**	**3**	**0.115**
K^+ (meq/L)	**3.6**	**1.9**	**3.8**	**1**	**3.4**	**1.3**	**3.6**	**1**	**0.285**

Student t test a; Mann whitney U test; Shows (*$p<0.05$)

Above table depicts that all biochemical parameters on admission were not revealing any statistically significant difference ($p>0.05$) between both groups. However, on POD 3 Hb%, urea, Na, and K values showed a significant difference between both groups ($P<0.005$). WBC count and Creatinine levels remains same in both the groups. On POD 7 there is statistical significance only in Hb, & urea values& other values show no statistical significance.

Table 3 - Comparison of Post-operative monitoring findings between groups

	Study group (N=25)				**Control group (N=25)**				
Post-operative monitoring	Mean	Std. Deviation	Median	IQR	Mean	Std. Deviation	Median	IQR	p value
Feeding started on POD	**1**	**0**	**1**	**0**	**5.318**	**0.5679**	**5**	**2**	**0.001***
Shift to ward on POD	**1.5**	**0.887**	**1**	**1**	**2.636**	**1.4975**	**2**	**3**	**0.041***
Bowel sounds on POD	**3.52**	**0.73**	**3**	**1**	**4.455**	**0.8004**	**4**	**0**	**0.001***
Ryles tube removed on POD	**5.52**	**0.73**	**5**	**1**	**6.455**	**0.8004**	**6**	**0**	**0.001***
Passed Flatus on POD	**4.52**	**0.73**	**4**	**1**	**5.5**	**0.8018**	**5**	**0**	**0.001***

Mann whitney U test; Shows (*$p<0.05$)

The patients among the study group are shifted from ICU to general ward on an average one day prior to patients among the control group. Bowel sounds appearance, Ryle's tube removal, Passage of flatus on an average in the study group is one day prior to control group.

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Table 4 - Comparison of Post op Major complications among test and control group

Post OP complications	**Test group**		**control group**		P value
No complication	**15**	**60%**	**3**	**12%**	
Burst abdomen	**1**	**4%**	**1**	**4%**	
Pneumonia	**1**	**4%**	**4**	**16%**	**0.021***
Septicemia	**1**	**4%**	**2**	**8%**	
Wound gaping	**1**	**4%**	**3**	**12%**	
Wound nfection	**4**	**16%**	**9**	**36%**	
Mortality	**2**	**8%**	**3**	**12%**	

Chisquare test; *shows (p,0.05)

Among the study group 32% of them are with major complications whereas among the control group 76% are with mojor complications. This indicates there is significant reduction in complications among the study group. Mortality among the study group is 8% and among the control group is 12% and thus there is no significant difference among the both groups regarding mortality.

Table 5 - Comparison of outcome

Day of Discharge or Death	Mean	Std. Deviation	Median	IQR	p value
Study group	**13.78**	**3.089**	**13**	**2**	**0.003***
Control group	**16.591**	**1.0315**	**15**	**4.75**	

Mann whitney U test; Shows (*p<0.05)

Patients under study group got discharged on an average about 3 days prior to patients under the control group which indicates that there is significant reduction in length of hospital stay among the study group.

DISCUSSION:

Gastro duodenal perforation is a common cause of acute abdomen presenting in the emergency department and surgery is the definitive treatment to cure the patients. Universally the most common procedure for Gastroduodenal perforation is omental patch repair. Septic complications and mortality are high for perforative peritonitis even after adequate medical care.

In our setup Gastro duodenal perforation is commonly encountered and treated. Hence this study of Early Enteral Feeding (EEF) using Naso Jejunal tube in Gastic/ Duodenal perforation is carried out and its outcomes are observed. Early enteral feeding has proven to be a safe and feasible method of providing nutrition to post operative patients who undergo emergency GI surgeries.

Lee HS, Shim H, Jang JY, et al. study in 2014 concluded that early feeding within 48 hours after emergency GI surgery may be feasible in patients without severe shock or bowel anastomosis instability [(1)]. Singh G, Ram RP, Khanna SK. et al study in 1998 reported that immediate postoperative feeding

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through the feeding jejunostomy is feasible in patients with perforative peritonitis [2]. In our study none of the patients developed intolerant features of EEF and hence it is well tolerated in Gastro Duodenal perforations.

Early Enteral Feeding (EEF) aids in normalization of the vital parameters and the biochemical values of the operated patients earlier than the late enteral feed patients. The ICU free days, Ventilator free days, infectious and septicaemic complications, pulmonary complications are evidently reduced in EEF group of patients. Hyung soon Bisgaard T et al., study conducted in 2013 also reported in support of the above observation [3]. The patients who received EEF recovered earlier than the LEF patients as observed by means of appearance of bowel sounds, passage of flatus, removal of Ryle's tube and shift from ICU to general ward. Moore et al., study conducted on 1999 reported in favour of the above observation [4]. The length of hospital stay is considerably reduced among the patients under EEF group than that of the LEF group of patients. Lewis SJ et al., study in 2009 reported in favour of the above observation. [5]

In the study conducted there is no difference in the mortality rate among the study group and the control group. Kaur N et al., study conducted in 2003 is in favour of the results of our study[6]. The observations of our study reveals that the EEF group of patients who underwent emergency surgery for Gastro Duodenal perforations were benefited in recovery and also in cost effectiveness than the LEF group of patients who underwent similar surgery for Gastro Duodenal perforations.

CONCLUSION:

Early Enteral feeding is a safe and effective intervention among Gastro/ Duodenal perforation patients following surgical repair of the perforation in avoiding post-surgical malnutrition of the patients. NasoJejunal tube placement is an easy and safe method for administering enteral feeds in post operative patients.

Early enteral feeding has a better outcome in patients operated for gastroduodenal perforation than conventional feeding of postoperative patients. Patients who were fed early through enteral route showed earlier improvement in both clinical and biochemical parameters than the other group of patients who were fed only after passing flatus on POD 5-7.

The length of monitoring at the ICU is shortened in Early Enteral fed group. Also, early enteral fed group showed earlier bowel movements and early passage of flatus and also early removal of Ryle's tube than the other group. Post operative major complications are evidently reduced in enteral fed group compared to the other group. The length of hospital stay is shortened in the enteral fed group. Hence the cost of medical expenses is grossly reduced among enteral fed group both directly and indirectly.

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Although the complication rates are lower in enteral fed group there is no significant reduction in mortality compared to the other group. In any patient with Gastroduodenal perforation starting early enteral feeding via NJ tube is a safer and effective option which has direct impact on the outcome of the patient both in recovery and in preventing postoperative complications. As the study undertaken contains a sample size of 50, high chances of sampling error are present. So further studies in a large scale, from different institutions and a longer follow up are recommended

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