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Prospective Study On The Role Of Early Enteral Feeding In Gastric / Duodenal Perforation.

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ABSTRACT

Perforation of the gut is one of the common surgical emergencies encountered in clinical practice. Patients with gastric /duodenal perforations present with severe peritonitis and septicemia. 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. Contrary to the commonly known opinion the oral feeds following perforation closure surgeries would increase the risk of leak and also worsen the ileus of the bowel, early feeds are absorbed well and also have a faster recovery of paralytic ileus, cause lesser septic complications, improve nutrition and lesser hospital stay. To derive conclusions about the efficacy of Early Enteral Feeding in Patients with Gastric /Duodenal Perforation using a nasojejunal tube and its impact on the recovery of patients after surgery. Two groups of patients with 25 in each are put up as study and control groups. Patients in the study group are inserted into a nasojejunal tube during surgery and started on early enteral feeding with a liquid diet following the feeding protocol. Control groups are managed by conventional nil per mouth and late enteral feeding. The parameters monitored are patient hemoglobin, Total count, electrolytes, S. albumin, duration of paralytic ileus, time taken to start oral feeds, duration of hospital stay, and surgical site infections. In my study, there is a significant improvement in vital parameters and biochemical parameters in the early-fed group. Also, there is a reduction in the length of hospital stay and a reduction in complications. In any patient with Gastroduodenal perforation starting early enteral feeding via NJ tube is an effective option that has a direct impact on the outcome of the patient both in recovery and in preventing postoperative complications.

Keywords: Enteral nutrition, gut perforation, nasogastric tube

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INTRODUCTION

Perforation of the gut is one of the common surgical emergencies encountered in clinical practice. Patients with gastric/duodenal perforations present with severe peritonitis and septicemia. Upper GI perforations need immediate repair mostly by Omental patch closure [1]. Following surgical repair of the perforation, patients will be observed postoperatively regarding the improvement of vitals, return of normal bowel movements, and improvements in biochemical parameters for the planning of the introduction of oral feeds [2]. Previously it was considered that the introduction of oral feeds may interfere with the healing of the perforation site and also may lead to prolongation of post-operative ileus [3]. Conventionally patients who 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 [4]. This practice of delayed introduction of oral feeds following perforation surgery has been questioned in recent times and considered to prolong the recovery of the patients due to deficient calorie supply during periods of starvation. Withholding enteral feeds after 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 the intravenous route. This intravenous supplementation requires expertise and to be monitored accordingly [5]. The intravenous supplementation is planned according to the biochemical values and condition of the patient [6]. Even though supplemented with utmost accuracy, the IV supplements in no way match the physiological enteral absorption in correcting biochemical derangements. 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 a negative nitrogen balance [7]. Many recent trials regarding the concept of early feeding in case of abdominal surgeries proved that delayed feeding is of no benefit for the outcome of the general condition of the patient. Also, early feeding was found to result in shift recovery of the patients thereby leading to reduced hospital stay [8].

Early feeding post-operatively can be started by many methods. A 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 noninvasive method of starting feeding [9]. 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 for the perforated site.

MATERIALS AND METHODS

Patients presenting with gastric/ duodenal Perforation in K.A.P.V Government Medical College, Trichy, in the year 2024 were recruited in this study. A total of 50 patients 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. 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 6 to 8. 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. All the patients were operated for gastric/ duodenal perforation and omental patch closure done. Patients among the study group were inserted with nasojejunal (NJ) tube of size 12FR & 120 cm intraoperatively through the same nostril in which Ryle's tube was 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 nasojejunal tube.

A patient with Gastric perforation is inserted Nasojejunal (NJ) Tube intraoperative Nasojejunal tube seen through perforation

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Tip of the nasojejunal tube seen entering the jejunum

Patient on POD 1

In the postoperative period patient among study group were started with enteral feeds through the NJ tube. Initially the feeds include 30ml /hr continuous infusion of ORS preparation via NJ tube. Later the feeds were steped 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, powdered cereals with water or milk, multivitamin syrups in therapeutic doses etc. Any patient developing Ileus, distension, nausea/ vomiting are withheld from enteral feeds for 24 hours 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 which will be usually on POD 6 to 8. Patients were monitored with vital parameters and biochemical investigations serially on POD 3 and POD 7. The clinical and investigation data's 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 Hemoglobin, WBC count, Urea, Creatinine, Na+ and K+, serum albumin levels. All their parameters are recorded on admission, on POD 3 and POD 7.

OBSERVATION AND RESULTS

R-Programming, SPSS 20.0 version and MS-Excel were used to analyse the empirical data. Frequency distribution and percentage were used to represent categorical variable whereas mean (standard deviation) / median (inter-quartile range) were used to represent numerical variable. Chi-square test / Fisher's exact test was applied to ascertain the association between two categorical variables. Independent sample t test was applied to analyse the difference between two categories with respect to mean and standard deviation. One-way repeated measures ANOVA was used to analyse the more than two repeated numerical measures. Five percent level of significance was considered statistically significant ($P<0.05$).

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Table 1: Demographic details of the patients

	NJ tube insertion		FE P-value
	Experimental Group	Control Group	
Sex			
Male	20 (80.0%)	22 (88.0%)	0.702
Female	5 (20.0%)	3 (12.0%)	
Total	25 (100.0%)	25 (100.0%)	
Age	45.16±16.65	44.68±18.19	0.923
Duration of Perforation			
1	3 (12.0%)	6 (24.0%)	0.526
2	12 (48.0%)	11 (44.0%)	
3	10 (40.0%)	8 (32.0%)	
Total	25 (100.0%)	25 (100.0%)	
Diagnosis			
Gastric perforation	21 (24.0%)	23 (92.0%)	0.667
Duodenal perforation	4 (16.0%)	2 (8.0%)	
Total	25 (100.0%)	25 (100.0%)	

The frequency distribution reveals that the majority of the male patients participated in the study. In addition, there was no statistically significant difference in the male proportions among the experimental group and control group (P=0.702>0.05). Similarly, the mean age of the patients did not significantly differ in the experimental group and control group (P=0.923>0.05). I.e., on an average, patients' age was around 45(±18) years old. Also, duration of perforation was not significantly differed in the both group patients.

Table 2: Hemodynamic and biochemical parameters comparison between experimental group and control group during the admission

Parameters	Experimental Group	Control Group	P-value
	Mean ± SD		
SBP	92.00±9.13	93.20±13.14	0.709
DBP	59.20±8.12	59.04±6.98	0.941
PR	122.36±9.78	128.72±9.96	0.027*
RR	21.44±2.96	22.60±2.96	0.172
HB	12.16±2.41	11.77±1.43	0.484
WBC	15920.00±5355.92	18392.00±5899.92	0.127
UREA	56.36±24.62	60.60±27.01	0.565
CREATININE	2.06±0.73	1.95±0.68	0.579
SR. ALBUMIN	2.68±0.41	2.50±0.52	0.191
Na+	137.80±5.73	136.32±6.88	0.413
K+	3.76±0.52	3.56±0.77	0.291

On the basis of the five percent level of significance (P>0.05), the hemodynamic parameters such as systolic blood pressure, diastolic blood pressure and respiratory rate were not significantly differed among the patients of experimental group and control group. Analogously, the biochemical parameters such as haemoglobin, WBC, urea, creatinine, serum albumin, sodium and potassium levels were not varied in the experimental group patients and control group patients. However, pulse rate was statistically differed in experimental group and control group (P=0.027<0.05).

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Table 3: Hemodynamic and biochemical parameters comparison between experimental group and control group on postoperative day 3

Parameters	Experimental Group	Control Group	P-value
	Mean ± SD		
SBP	98.00±9.57	98.69±7.57	0.783
DBP	64.00±8.16	65.65±5.07	0.409
PR	114.48±9.40	114.09±21.22	0.933
RR	19.12±3.37	20.26±3.09	0.229
HB	12.09±2.31	11.67±1.42	0.453
WBC	14016.00±4038.94	16678.26±4868.17	0.044*
UREA	46.44±15.41	49.52±15.37	0.492
CREATININE	1.54±0.58	1.50±0.54	0.787
SR. ALBUMIN	2.66±0.41	2.47.42	0.127
Na+	139.80±3.01	137.91±4.59	0.097
K+	3.89±0.46	3.81±0.52	0.559

On the basis of the five percent level of significance (P>0.05), the hemodynamic parameters such as systolic blood pressure, diastolic blood pressure, pulse rate and respiratory rate were not significantly differed among the patients of experimental group and control group. Analogously, the biochemical parameters such as hemoglobin, urea, creatinine, serum albumin, sodium and potassium levels were not varied in the experimental group patients and control group patients. However, WBC was statistically differed in experimental group and control group (P=0.044<0.05).

Table 4: Hemodynamic and biochemical parameters comparison between experimental group and control group at POD.7

Parameters	Experimental Group	Control Group	P-value
	Mean ± SD		
SBP	106.25±8.24	105.22±6.65	0.640
DBP	70.83±7.17	69.57±3.67	0.448
PR	100.42±11.54	107.74±11.07	0.032*
RR	16.08±1.82	18.39±3.34	0.006**
HB	12.38±2.22	11.59±1.43	0.007**
WBC	12195.83±2460.38	15869.57±5868.67	0.009**
UREA	37.42±7.19	42.17±10.12	0.069
CREATININE	1.13±0.39	1.35±0.59	0.145
SR. ALBUMIN	2.93±0.36	2.60±0.42	0.006**
Na+	141.62±1.99	139.13±2.45	0.001**
K+	4.09±0.26	3.94±0.46	0.179

On the basis of the five percent level of significance (P>0.05), the hemodynamic parameters such as systolic blood pressure and diastolic blood pressure were not significantly differed among the patients of experimental group and control group. Analogously, the biochemical parameters such as urea, creatinine and potassium levels were not varied in the experimental group patients and control group patients. However, the experimental group patients had low levels of pulse rate, respiratory rate and WBC compared to that of the control group patients whereas the experimental group patients had high levels of haemoglobin, serum albumin and sodium compared to that of the control group patients.

Table 5: Comparison of duration of ileus, time of starting feeds and duration of hospital stay between experimental group and control group

	Group	Median (Q3-Q1)	P-value
Duration of Ileus	Experimental Group	3 (3-2)	0.010**
	Control Group	3 (3.5-3)	
Time of Starting feeds	Experimental Group	3 (3-2)	0.001**
	Control Group	6 (6-5)	
Duration of hospital stay / death	Experimental Group	11 (12-10)	0.016*

	Control Group	12 (15-11.5)	

From the statistical significance value (P<0.05), it is inferred that there was a significant difference between the experimental group patients and control group patients with respect to duration of ileus, time of starting feeds and duration of hospital stay.

Table 6: Comparison of incidence of surgical site infection among the experimental group and control group

Surgical Site infection	NJ tube insertion		P-value
	Experimental Group	Control Group	
No	19 (76.0%)	15 (60.0%)	0.225
Yes	6 (24.0%)	10 (40.0%)	
Total	25 (100.0%)	25 (100.0%)	

On the basis of the five percent level of significance, there was no significant difference in the experimental group and control group based on the incidence of surgical site infection (P=0.225>0.05). I.e., the incidence of surgical site infection in the control group was 40% whereas the experimental group's incidence rate was only 24%.

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. Singh G, Ram RP, Khanna SK. et al study in 1998 reported that immediate postoperative feeding through the feeding jejunostomy is feasible in patients with perforative peritonitis. In our study none of the patients developed intolerant features of EEF and hence it is well tolerated in Gastro Duoedenal 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 septicemic complications, pulmonary complications are evidently reduced in EEF group of patients. Hyung soon Lee et al., study conducted in 2013 also reported in support of the above observation. 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. 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. In the study conducted there is no difference in the mortality rate among the study group and the control group. Malhotra et al., study conducted in 2003 is in favour of the results of our study. 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 [10-21].

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 nutrition of the patients. NasoJejunal tube placement is a 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 6-8.The long stay 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 control group. Post operative major complications are evidently reduced in enteral fed group compared to the control 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. Delay in starting orals in LEF group due to any other complications necessitated total parenteral nutrition which in EEF group is not needed, hence it is cost effective Although the complication rates are lower in enteral fed group there is no significant reduction in mortality compared to the control 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.

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