

“Role of early enteral feeding in acute pancreatitis”

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Abstract: Objective: 1. To assess the occurrence of infective and non-infective complications in cases of acute pancreatitis on early enteral nutrition.**2.** To assess the need for surgical intervention in cases of acute pancreatitis on early enteral feeds.**3.** To assess the average duration of hospital stay with early enteral nutrition.

Materials and methods: This prospective study was conducted on patients admitted to Subharti hospital with symptoms suggestive of acute pancreatitis from August 2016 to September 2018 on 50 patients. Patients with clinical picture consistent with the diagnosis of acute pancreatitis, along with more than 3 fold elevation of serum amylase and elevated serum lipase were considered to have acute pancreatitis. Two groups were made with equal number of patients in each group one containing patients with initiation of early enteral feeding (within 72hours of onset of symptoms) and one with late enteral feeding (after 72 hours of onset of symptoms)

Results: Serum amylase and lipase levels dropped significantly in patients in which early enteral feeding was started as compared to those in which late feeding (Bowel rest was given). Amongst 50 patients present in the study, in 25 patients early enteral feeding was started, it was found that patients' Amylase and lipase levels after 7 days of initiation of feed reduced to normal levels whereas in those patients in which late enteral feeding was started there was no significant reduction in the serum amylase and lipase levels.

Date of Submission: 20-03-2019

Date of acceptance: 06-04-2019

I. Introduction

Acute pancreatitis is a common disorder. The data available are mainly from US and UK. It has been noticed in most of the studies that there is an increase in the disease by a factor of 10 in the past three decades. The reason for the increase is speculated to be due to increase in alcohol abuse and an improved ability to diagnose the disease. But the disease has been a cause of significant morbidity and mortality[5,6]. Both sexes are equally affected. Acute pancreatitis is related to alcohol or biliary tract stone disease in 80% of cases. The remaining 10% is related to metabolic factors, drugs and other conditions and 10% are idiopathic[3,6]. However the variation in the frequency of different forms of pancreatitis from source to source is quite marked and depends on country of origin and the population studied. Mild acute pancreatitis is defined as inflammation of the pancreas with minimal remote organ involvement[7]. Since the disturbance in the homeostatic mechanism of the body is minimal, the treatment is aimed at supporting the native reparative processes of the body. One of the main supportive mechanisms is adequate and safe nutritional supplementation. Acute pancreatitis is a hypermetabolic state marked by increased energy expenditure, proteolysis, gluconeogenesis, and insulin resistance. Nutritional supplementation in acute pancreatitis is complicated by these diverse pathophysiologic derangements associated with the disease. In the past, patients with acute pancreatitis were not given any form of enteral nutrition, because it was believed that any stimulation of the exocrine pancreas would affect the disease course negatively. Now it is known that the pancreas is already at rest during pancreatitis, and restoring secretion would be a much more physiological strategy than resting the organ. Increasing evidence suggests that enteral feeding maintains the intestinal barrier function and prevents or reduces bacterial translocation from the gut. Furthermore, enteral nutrition eliminates some of the complications of parenteral nutrition such as catheter related sepsis, thrombosis, thrombophlebitis, catheter related embolism and pneumothorax. There is also a significant reduction in the incidence of stress induced hyperglycemia. The risk of adversely affecting humoral immunity, as seen with TPN, is not seen with enteral nutrition. Additionally, the cost of enteral nutrition is only 15% of the cost of TPN[8,16]. These findings along with the fact that enteral nutrition is clearly not harmful in pancreatitis make it an increasingly accepted treatment modality.

Aims and objectives

To determine the feasibility, advantages and disadvantages of early enteral nutrition in acute pancreatitis of mild and moderate variety.

II. Materials and methods

This prospective study was conducted on 50 patients admitted to Subharti hospital with symptoms suggestive of acute pancreatitis from August 2016 to September 2018. Patients with clinical picture consistent with the diagnosis of acute pancreatitis, along with more than 3 fold elevation of serum amylase and elevated serum lipase were considered to have acute pancreatitis. All the cases considered for the study underwent a comprehensive evaluation as follows:

1) Thorough clinical history and examination with emphasis on age, character of pain abdomen, radiation to the back, history of alcoholism / gallstone disease and treatment history.

2) Biochemical investigations relevant for Ranson’s scoring which include:

- On admission:

Random blood sugar(RBS), total leucocyte count (TLC), serum lactate dehydrogenase (LDH), serum aspartate transaminase (AST) , haemoglobin and packed cell volume (PCV), blood urea nitrogen (BUN) , serum creatinine, arterial blood gas analysis (ABG).

- After 48 hours of admission:

Serum calcium, Repeat PCV, BUN, ABG.

3) Imaging modalities: Chest x-ray, Ultrasound abdomen, contrast enhanced CT scan abdomen.

Based on the Ranson’s score, the severity of acute pancreatitis was graded

Initial diagnosis and assessment was done by the treating unit in surgery and the patients were admitted in the surgical wards. Patients were duly informed regarding the study and after obtaining the consent, a 16 gauge Nasogastric Ryle’s tube was inserted for all patients included in the study.

Assessment Of Nutritional Requirement:

The nutritional requirement was calculated based on the weight of the patient and the recommended caloric intake for that weight. The weight was measured at the time of admission or approximated using the recumbent height if patient’s condition did not permit a formal measurement.

The formulae used to calculate the nutritional requirement are as follows:

Caloric intake: 35 Kcal/kg/day (target caloric delivery)

Protein intake: 1.5 gm/kg/day

Fat intake :< 15% of the total calories required per day.

The goal of achieving the target nutrition delivery was achieved in four steps:

Step 1: initiation of clear liquids only

Step 2: delivering 15 Kcal/kg/day

Step 3: delivering 25 Kcal/kg/day

Step 4: delivering 35 Kcal/kg/day

The stepwise initiation of feeds was designed to minimize pain and to avoid metabolic complications due to nutritional overload in a sub optimally functioning digestive system.

NUTRITIONAL PREPARATION USED: The nutritional requirement was fulfilled using a standardized preparation to avoid differences in nutrient composition and rates of absorption. Ensure powder was used.

Nutritional composition of the preparation used

Nutrient	Per 100mg
Calories	511.9Kcal
Protein	24mg
Fat	2.3mg
Carbohydrate	60mg
Calcium	100meq
Magnesium	40meq
Selenium	9mcg

Grams of Ensure powder required per day = Kcal required for 24 hours × 100/ 511.9

The time taken to achieve the target nutrition was calculated. Mild exacerbations of pain were treated by analgesics and antispasmodics. The patient was closely monitored for any infective and non-infective complications. Once the target nutrition was achieved and patient had normal bowel sounds on auscultation, the nasogastric tube was removed and the patient started on normal oral feeds.

Inclusion criteria:

- Age < 70 yrs
- Cases of mild (Ranson score ≤1) and moderate (Ranson score 2-3) acute pancreatitis.
- Systolic blood pressure > 90 mmhg.
- Serum Creatinine ≤ 2 mg/dl

EXCLUSION CRITERIA:

- Age > 70 yrs
- Cases of severe acute pancreatitis (Ranson’s score > 3)
- Serum Creatinine > 2mg/dl
- Signs of shock at time of presentation
- Complications of acute pancreatitis like:
Peri-pancreatic abscess
Pancreatic necrosis
Drug induced pancreatitis
Post ERCP pancreatitis

Observations and results:

50 patients with various symptoms of acute pancreatitis admitted to different departments of subharti medical college, meerut were included in the study. Out of 50 patients 33 were under 40 years old, 15 were between the age of 40-60 years and 2 were more than 60 years old. The study population was predominantly male , with males constituting 88% of the cases. Most common etiology was alcohol in 38(76%) patients, gallstones in 5(10%) patients, while no cause could be ascertained in 7 (14%) patients.

Etiology	No. of patients	Percentage
Alcohol	38	72%
Gall stones	5	10%
Idiopathic	7	14%

Serum amylase and lipase levels dropped significantly in patients in which early enteral feeding was started as compared to those in which late feeding (Bowel rest was given). Amongst 50 patients present in the study, in 25 patients early enteral feeding was started, it was found that patients’ Amylase and lipase levels after 7 days of initiation of feed reduced to normal levels whereas in those patients in which late enteral feeding was started there was no significant reduction in the serum amylase and lipase level.

The mean Serum Amylase levels for the patients before initiation of feeding was 720.68, and mean serum Lipase levels for the patients before the initiation of feeding was 640.4.

The mean serum Amylase levels in patients in which early enteral feed was started was 150.2 and the Mean serum Lipase levels in patients in which early feed was started was 161.48.

The mean serum amylase levels in patients in which enteral feed was not started was 703.6. and the mean serum lipase levels in patients in which early enteral feed was not started was 610.16.

III. Discussion:

The management of acute pancreatitis is in a state of constant change as our understanding of the intricate pathogenetic mechanisms responsible for the disease evolves. Extensive research has revealed the important role of nutritional support in the multidisciplinary treatment of acute pancreatitis. Total parenteral nutrition was the mainstay of nutritional support in acute pancreatitis. However it has been proved by multiple well conducted trials that the duration of hospital stay, incidence of infective and non infective complications and cost of nutrition is higher in patients on TPN as compared to total enteral nutrition[1,2,3]. Hence, total parenteral nutrition has been overshadowed by the emergence of enteral nutrition in this setting. However, the logistics of enteral feeding are still controversial and have become the subject of multitude of trials and research. One of the first trials to employ enteral nutrition in acute pancreatitis was conducted by Windsor et al[4], which utilized nasojejunal feeding in acute pancreatitis. The significant improvements noted in this study prompted other researchers to use enteral nutrition in more grave scenarios like severe acute pancreatitis with good results. Eatock et al[5] tested the feasibility of nasogastric feeding in acute pancreatitis, the results of which were comparable to that of nasojejunal feeding. The study population included in the present study is comprised mostly of males (88%). This conforms to the gender distribution in study conducted by Mc Clave et al[6]. This can be attributed to increased alcohol consumption in males. Alcohol was found to be the most common etiological agent in our study, constituting 76% of the cases as compared to 20% in the study by Banks et al[7] and 75% in the study by Mc Clave et al[6]. 42% of the cases included in the study, which belonged to mild degree of acute pancreatitis, were started on enteral feeding immediately on diagnosis. The remaining 58% of

the cases were started on enteral feeding within 48 hours suggesting that feeding should be started as early as possible in patients with mild and moderate acute pancreatitis. These findings concur with the derivations of the study conducted by McClave et al[6]. In the studies conducted by Windsor et al[4] and McClave et al[6] amongst the patients who were randomized to enteral feeding via nasojejunal route, the mean duration of hospital stay was 12.5 and 9.7 days respectively. The mean duration of hospital stay in our study for patients fed by nasogastric route was 9.08 days \pm 3.07 days, the mean Ranson's score being comparable with the study conducted by McClave et al. In the study conducted by Kalfarentzos et al[8] the mean duration of hospital stay was 40 days which can be attributed to selection of only cases with severe acute pancreatitis.

Target nutritional delivery by the enteral route was achieved in 88% of the cases included in our study. In the remaining 12%, enteral feeding had to be restricted and then gradually reinstated due to intolerable pain during feeding.

The process of oral refeeding in acute pancreatitis has been studied by Levy et al[9] in a multivariate multicentric prospective study involving 116 patients.

The incidence of oral feeding pain severe enough to stop feeding was 21% in the above-mentioned study. The average time required to initiate oral feeding in our study was 7.5 \pm 2.22 days. Abou-Assi et al[10] concluded that early initiation of enteral feeding facilitated the return to oral feeding and hence reduced the morbidity of the patient, a finding which was reiterated in our study.

The incidence of infective complications in our study was 6% with none of the infections involving the pancreas itself. This is in comparison to published data by Abou-Assi et al[10] and Kalfarentzos et al[8] who described infective complication rates of 11.1% and 27.7% respectively. The lack of pancreatic infections in our study can be attributed to the selection criteria which included mild and moderate degree pancreatitis only.

The incidence of non infective complications in our study was 12% with 6% involving the pancreas proper and the rest being instances of diarrhea. The incidence of non infective complications extracted from published data vary widely from 0% in the study by Windsor et al[4] to 74.4% in the study by Abou-Assi et al[10]. Amongst the 50 cases included in the study, 3 patients (6%) had diarrhea which resolved by reducing the amount of feed. In the study conducted by Kalfarentzos et al[8], 33% of the cases randomized to enteral feeding had diarrhea.

The average cost of nasogastric feeding was much lower than the published data for nasojejunal feeding [11,12]. The average cost of nasogastric feeding per day was Rs. 300 at our hospital.

IV. Conclusion:

- i. Use of early enteral feeding does not influence the incidence of infective and non-infective complications in mild and moderate acute pancreatitis.
- ii. Early enteral feeding does not increase the need for surgical intervention in cases of mild and moderate acute pancreatitis.
- iii. Early initiation of enteral feeding in mild and moderate pancreatitis reduces the duration of hospital stay.
- iv. Early initiation of nasogastric and oral feeding in mild and moderate pancreatitis has an outcome, which is comparable to nasojejunal feeding in terms of hospital stay, change in serum amylase and lipase levels, infective and non-infective complications.
- v. Early enteral feeding delivers nutrition, in a simpler and more cost effective manner than nasojejunal feeding, without compromising on the benefits of enteral nutrition.
- vi. Nasogastric and oral feeding reduces the morbidity of the patient by accelerating return to normal activities.

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Dr.M.K Maheshwari “Role of early enteral feeding in acute pancreatitis” *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, vol. 18, no. 4, 2019, 06-10.