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Role of Glutamine Supplemented Total Parenteral Nutrition (Tpn) in Severe Acute Pancreatitis

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Abstract:
Aims and objectives: *We conducted this study to evaluate the role of glutamine supplemented total parenteral nutrition (TPN) in severe acute pancreatitis.*
Methods: *Forty patients with severe acute pancreatitis admitted at Rajendra institute of medical Sciences ,Ranchi, over a period of one year(July 2012 to June 2013) were randomly divided into two therapeutic groups. Patients in group 1(19 in no) and group 2 (21 in no.) were treated with standard TPN and glutamine supplemented TPN respectively. Patients were assessed for nutritional parameters, the incidence of complications, mortality, length of hospital stay(LOS) and length of TPN.*
Results: *Majority of patients were male in both groups(60 % in group 1 vs. 62% in group 2) and the average age of presentation was also same(41.13+ 4.46 years in group 1 vs.39+3.96 years in group 2). Gall stone was the most common etiological factor followed by alcohol. The incidence of complications in group 1 was much higher(40.25%) than those in group 2 (30%). Mortalities for group 1 and 2 were 15.78 %(3/19) and 9.52%(2/21) respectively. The length of hospital stay in group 1(21.08+2.80days) was longer than those of group 2 (19.33+2.62 days). The length of TPN was alsolonger in group 1 (14.47+2.72 days) than those of group 2 (10.56+2.21 days).*
Conclusion: *Glutamine supplemented TPN did not significantly decrease the mortality or rate of complications but it reduced the number of hospital days admission and duration of TPN. Further studies with large number of patients is needed in Indian setting.*

I. Introduction

Acute pancreatitis (AP) is defined as an acute inflammatory process of the pancreas, with variable involvement of other regional tissues or remote organ systems[1]. Current best evidence is in favour of early institution of enteral feeding in acute severe pancreatitis [2,3]. lutamine (GLN), which is synthesized in organs such as the skeleton, muscle, lungs, and brain, is the most abundant amino acid in the plasma and intracellular amino acid pools. Support of patients with acute pancreatitis with parenteral nutrition (PN) has been suggested to improve functioning of the gastrointestinal system and the pancreas[4]. The management of AP frequently includes parenteral nutrition, glutamine is not included in conventional TPN. This study was conducted to evaluate the role of glutamine supplemented TPN in AP and its outcome.

II. Materials And Methods

The experiment was designed as a prospective descriptive study of patients admitted with AP at RIMS Ranchi. The study period was from July 2012 to June 2013. Patients with suspected episodes of acute pancreatitis were studied to confirm the diagnosis. Acute pancreatitis was defined as an increase in serum amylase concentrations to a level 3-fold greater than basal levels, or abdominal pain and findings typical of acute pancreatitis upon abdominal ultrasound or computed tomography (CT). Patients were randomly divided into two therapeutic groups. Patients in group 1 (19 patients in total) and group 2 (21 patients in total) were treated with glutamine supplemented TPN and standard TPN respectively. *Inclusion Criteria* All patients with acute pancreatitis who required TPN. Patients without next of kin to consent for the study were excluded from the study.

III. Statistical Analysis

All the statistical analyses were performed using Statistical Package for Social Sciences (SPSS Inc., Chicago, IL, USA). Data was presented as mean ± SD and proportions as appropriate. Continuous data was

presented as mean ± SD. Categorical values were evaluated using chi-square or Fisher's exact test. *p*-value < 0.05 was considered statistically significant.

IV. Results

Clinical-Epidemiological Observations : We studied 47 patients with acute pancreatitis during the above period. Characteristics of the both groups are depicted in Table I.

Age	41.13+4.46	39+ 3.39	0.405
Sex			0.29
Male	60%	62%	
Female	40%	38%	
Height	159.1± 7.5	160.3± 8.4	0.28
Weight	60.4± 13.0	56.4± 13.2	0.30
Bmi	26.9± 3.2	26.1± 3.0	0.358
Etiology- Gall Stone Alcohol	 65% 24%	 67% 26%	
Bisap Score	> 3	>3	

Outcome:

Overall rate of complication was 30% in the study group and 40.25% in the control group but the difference was not statistically significant (p = 0.10). 2 deaths in study group and 3 deaths in control , no statistical difference (p=0.142).

Duration of stay was significantly less in group with glutamine TPN with a p vale of 0.020.

Length Of Stay	Study Group	Control Group	P Value
Icu	11(+/- 2.0)	13.2(+/- 2.0)	0.021
Hospital	21.08 (+/- 2.4)	19.33 (+/- 2.03)	0.018

Adverse events in both arms are depicted in Table III.

ADVERSE EVENT	STUDY GROUP N=19	CONTROL GROUP N=21	PVALUE
PNUEMONIA	3	4	0.30
SEPTIC SHOCK	1	4	0.028
RENAL FAILURE	3	5	0.12
DERANGED LFT	8	11	0.26
HYPER TRIGLYCERIDEMIA	6	8	0.4
HYPERGLYCEMIA	3	5	0.38

V. Discussion

Glutamine is involved in nitrogen transport, functions as a nitrogen donor for nucleotides and amino sugars, and is a key substrate for renal ammonia formation. [5] As the preferred fuel of enterocytes, reduces the risk of sepsis.[5,6] Cells of the immune system also use Glutamine as fuel and the amino acid contributes to antioxidant defense[7] through the production of glutathione.

A study by Zhao et al [8] compared a treatment group receiving PN with added parenteral Glutamine with a control group receiving conventional PN without Glutamine. Inflammatory markers decreased faster but no outcome parameters were evaluated in the 96 patients randomized in this study. De Beaux et al [9] evaluated PN with and without supplemental parenteral Glutamine. Levels of IL-8, an inflammatory

cytokine released by mononuclear cells, decreased in the GLN group, whereas levels increased significantly in controls receiving PN alone (P = .045). Xian-Li et al [10] concluded that PN with Glutamine was associated with significantly less pancreatic infection (0% vs 23.8%), fewer overall complications (20% vs 52.4%), and less mortality (0% vs 14.3%) compared with PN without supplemental glutamine.

Pearce et al[11] reported that after 3 days of feeding, in the study group with glutamine-supplemented TPN, 2/15 (13%) of patients had reduced their CRP by 40 mg/L or more. In the control group 6/16 (38%) of patients had reduced their CRP by this amount. This difference was found to be near the statistical significant limit (p = 0.220). Asrani et al[12] did a meta-analysis and twelve RCT that enrolled a total of 505 patients with acute pancreatitis were included in the final analysis. They reported overall, glutamine supplementation resulted in a significantly reduced risk of mortality (RR 0.30; 95% CI, 0.15 to 0.60; $p < 0.001$) and total infectious complications (RR 0.58; 95% CI, 0.39 to 0.87; p = 0.009) but not length of hospital stay (MD -1.35; 95% CI, -3.25 to 0.56, p = 0.17).

In our study Glutamine supplemented TPN did not significantly decrease the mortality or rate of complications but it reduced the number of hospital days admission and duration of TPN. Further studies with large number of patients is needed in Indian setting. Major limitation of this study is less number of patients.

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