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Original Research Article

Assessment of Improvement in General Condition of Burn and Critically Ill Surgical Patients on Glutamine.

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Abstract

Background & Methods: The aim of the study is to assess of improvement in general condition of burn and critically ill surgical patients on Glutamine. The patients were assigned randomly to study and control groups. Study group included 51 patients who were provided with parenteral glutamine along with the routinely prescribed parenteral nutrition regime. Oral intake was also started if not contraindicated

Results: Pus and Blood Cultures were assessed in Cellulitis and Burn patients, which included a total of 10 patients in the Glutamine group and a total of 14 in the control group. 7 out of 14 (50%) patients on Day 3 and 6 out of 14 (43%) on Day 7 showed positive Pus cultures in the Control group while corresponding figures in the Glutamine group were 4 out of 10 (40%) and again 4 out of 10 (40%) respectively ($p < 0.05$). For blood culture, 5 of 14 (36%) patients on Day 3 and 2 (14%) on Day 7 were positive in the Control group while 3 of 10 (30%) on Day 3 and none (0%) on Day 7 were positive in the Glutamine group. ($p > 0.05$).

Conclusion: The effects on infectious complications are again found to be beneficial in the form of decreased infection rates. This emphasizes the immunomodulatory role of glutamine. Hence the overall clinical and biochemical benefits of glutamine, observed in this study, provide enough evidence for suggesting parenteral Glutamine as an essential nutritional supplement for burn, critically ill and malnourished surgical patients.

Keywords: burn, surgical & glutamine.

Study Design: Observational Study.

Introduction

Glutamine is the most prevalent free proteic amino acid in the human organism. In extracellular fluid it constitutes 25% while in skeletal 60%, of the tissue free amino acid pool corresponding to about 240 g of muscle glutamine store. Plasma concentrations of glutamine [1]. Its concentration in the plasma is around 0.5 – 0.8 mmol/l while it is up to about 20 mmol/l intracellularly. Thus plasma concentrations do not necessarily reflect the all so vital intracellular concentrations [2].

Glutamine represents an important metabolic fuel for the cells of the GI tract. In fact, recent overwhelming evidence establishes that all rapidly proliferating cells, mainly those of immune system an even the skin epithelium depend on the availability of glutamine as energy source. Recent observations suggest that glutamine is involved in the regulation of muscle protein balance: the striking direct correlation between muscle glutamine and the rate of protein synthesis and the positive effect on protein anabolic processes in vitro [3].

Recent studies underlined that glutamine deprivation is mainly caused by trauma induced alterations in inter organ glutamine flow. Numerous experimental studies done in animals support this hypothesis [4]. Glutamine supplemented enteral or parenteral nutrition was associated with increased intestinal mucosal thickness, DNA and protein content, reduced bacterial translocation following radiation, weakened adverse effects of experimentally

induced enterocolitis, preserved intestinal mucosal during parenteral nutrition, enhanced rat mucosal hyperplasia after small bowel resection and improved glutamine metabolism in the small bowel of septic rats [5].

Material and Methods

A total of 91 patients were studied. The patients included: Critical post-op patients who underwent major surgical procedures. Patients with various degrees of superficial and deep salvageable burn patients (up to 60%). Patients with low to moderate output enterocutaneous fistulas. Other critical surgical patients like those in septicemia.

The patients were assigned randomly to study and control groups. Study group included 51 patients who were provided with parenteral glutamine along with the routinely prescribed parenteral nutrition regime. Oral intake was also started if not contraindicated.

Glutamine was administered at a dosage of 2ml/kg in the form of 20% solution (0.4g/kg of glutamine), over 2hours,through central/peripheral I/v line for 07 consecutive days. Besides these patients also received 1.1 g/kg of amino acids through regular amino acid preparations along with 30 kcal/kg/day of energy.

Result

Table 1

Case	On Glutamine	Control
Perforation peritonitis	18	12
Burn	8	8
Cellulitis	2	6
Acute Intestinal Obstruction	2	3
Entero cutaneous Fistula	8	6
Periampullary Carcinoma	5	2
Pyoperitoneum	2	1
Adenocarcinoma Transverse Colon	1	-
Carcinoma Stomach	3	-
Necrotizing Pancreatitis	1	-
Superior Mesenteric Ischemia	2	-
Ruptured Uterus	1	-

We studied total of 91 of cases of which 53 were administered Glutamine (Dipeptiven) while 38 were isonitrogenous controls. The patient distribution was as follows:

Table 2: Mean Total Duration of Stay in Hospital

	Days in ICU
Glutamine	04
Control	04

Table 3: Mean Hospital Stay in Burn and Cellulitis Patients

	Glutamine	Control
Total days in Hospital	**19**	**22**

Table 4: Infection

	Glutamine	Control	Significance
Pus C/S Day 3	40%	50%	$p < 0.05$
Pus C/S Day 7	40%	43%	$p< 0.05$
Bld. C/S Day 3	30%	36%	$p > 0.05$
Bld. C/S Day 7	0%	14%	$p > 0.05$

Pus and Blood Cultures were assessed in Cellulitis and Burn patients, which included a total of 10 patients in the Glutamine group and a total of 14 in the control group. 7 out of 14 (50%) patients on Day 3 and 6 out of 14 (43%) on Day 7 showed positive Pus cultures in the Control group while corresponding figures in the Glutamine group were 4 out of 10 (40%) and again 4 out of 10 (40%) respectively ($p < 0.05$). For blood culture, 5 of 14 (36%) patients on Day 3 and 2 (14%) on Day 7 were positive in the Control group while 3 of 10 (30%) on Day 3 and none (0%) on Day 7 were positive in the Glutamine group. ($p > 0.05$).

Discussion

In this study we found the mean duration of ICU stay among various patients of the glutamine as well as control group to be 4 days ($p< 0.05$). This seems to be in congruence with the findings in their study on 33 patients of secondary peritonitis had observed a mean ICU stay of 5 days in the glutamine as well as the control group[6]. Besides

we also noted that the mean duration of total hospital stay was 19 days in the glutamine group while it was 22 days in case of patients of the control group, though this was not statistically significant ($p > 0.05$); still a similar observation was made in 2001 [7]. This suggests that parenteral glutamine alone does not alter the clinical parameters so much as to have an effect on duration of intensive care requirement though it might have an effect on the on the long term outcome in terms of total hospital stay and mortality as suggested in the study, similarly noted a reduced hospital stay. This calls for further evaluation on more specific guidelines and a larger patient base [8].

On recording the change in weight of the patients through the treatment phase it was found that there was a mean decrease in weight of 13% on Day 7 of treatment as compared to the weight on Day 1 (start of treatment) in the patients on glutamine as compared to 17% decrease in patients of the control group ($p < 0.05$) [9]. Thus glutamine administration seems to improve the nutritional status of the patients as reflected in the decreased magnitude of otherwise inevitable weight fall. This supports the reported anti-catabolic effects of glutamine.

Conclusion

The effects on infectious complications are again found to be beneficial in the form of decreased infection rates. This emphasizes the immunomodulatory role of glutamine. Hence the overall clinical and biochemical benefits of glutamine, observed in this study, provide enough evidence for suggesting parenteral Glutamine as an essential nutritional supplement for burn, critically ill and malnourished surgical patients.

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