

## ROLE OF SUPPLEMENTAL PERIPHERAL PARENTERAL NUTRITION IN THE MANAGEMENT OF BURNS PATIENTS

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### ABSTRACT

Burns is one of the leading cause of death. There is an increase in the basal metabolic rate for up to two years after burns. This leads to increased nutritional demands which may not be completely achieved by enteral feeds. Hence these patients may require supplemental parenteral nutrition. Parenteral nutrition is traditionally given through central veins which may be associated with various complications and hence the modality of administering parenteral nutrition via peripheral line has been started. We would like to present our experience with supplemental peripheral parenteral nutrition [PPN] in management of patients with burns.

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### INTRODUCTION

Burns are fourth most cause of trauma worldwide, following traffic accidents, falls, and interpersonal violence <sup>[1,2]</sup>.

Mortality rate in burns in Indian patients is estimated to be 50% for >40% of burns <sup>[3]</sup>. The percentage of the total body surface area [TBSA] burnt in a patient is the most

important predictor of mortality <sup>[3]</sup>. However, the other factors include infection, higher metabolic rate and poor nutrition.

Studies have shown that the BMR in burns patients is elevated even up-to 2 years following burns <sup>[4]</sup>. This indicates that early and effective nutrition is required to prevent mortality and morbidity in burns patients. Also, outcome of rehabilitation and reconstruction in these patients may depend on the overall nutritional status of the patient.

After the initial resuscitation, the prevention and treatment of infection plays a significant part. Along with this, it is important to maintain and improve the nutritional status of the patient not only to meet the increased basal metabolic rate but also to help in prevention and treatment of infection.

Nutrition may be given by oral route, enteral nutrition, parenteral nutrition. Each of the routes have advantages or disadvantages. Even though oral route is the better modality for nutrition as increases the gut motility and prevents bacterial translocation <sup>[5]</sup>, most of the burns patients in their early days post burns will either be

not able to take orally or may be depressed to take adequate nutrition.

Nasogastric tube placement is uncomfortable, and has various complications. Enteral feeding may not be possible in some patients due to technical problems (i.e. access) and/or the severity of their illness. On the other hand TPN and PPN have potential benefits and disadvantages <sup>[6, 7]</sup>. TPN is an accepted and approved method for balancing caloric and nutritional needs in chronically hospitalized patients. Parenteral nutrition leads to various metabolic complications and is costly. It requires regular monitoring <sup>[8]</sup>.

So, we would like to share our experience with use of peripheral parenteral nutrition in our burns patients as a source of supplemental feeding along with oral route.

## METHODS

We have retrospectively analyzed all the patients admitted in our burns Centre with 30% TBSA burns or more who have been started on peripheral parenteral nutrition. 10 patients who received peripheral parenteral nutrition were included in the study [Table 1]. PPN was started after the acute resuscitation phase was complete and

the patient is hemodynamically stable. It is given along with oral nutrition.

The peripheral parenteral nutrition bag has the composition of 30% lipids, 10% dextrose and amino-acids to meet the calorie and protein requirements, with osmolarity of 800-1000 mOsm/dl [Figure 1]. The rate is

calculated according to the body weight and the calorie requirement of the patient and is individualized. Regular anthropometric measurements were taken. Weekly blood investigations were done to assess for anemia, hypoproteinemia, and electrolyte imbalances until the patient was discharged.

S.No	Age in Years	Gender	% of burns	Duration of PPN
1	22	Female	40	3 Weeks
2	41	Male	35	2 Weeks
3	60	Male	30	4 Weeks
4	50	Female	45	4 Weeks
5	31	Male	30	3 Weeks
6	25	Female	45	2 Weeks
7	47	Male	50	3 Weeks
8	24	Female	40	3 Weeks
9	26	Female	40	2 Weeks
10	18	Male	30	4 Weeks

**Table 1: Various parameters including, Hemoglobin, S. total proteins, Albumin, AST, ALT, Renal function tests [blood urea, Serum creatinine, serum electrolytes] have been monitored weekly**

## RESULTS

All patients were discharged after the complete treatment of the burn wounds. All patients showed satisfactory improvement in the weight. There was improvement in Hemoglobin, serum total protein, serum

albumin. None of the patients developed any renal dysfunction after the acute phase of the burns [Table 2]. Peripheral thrombophlebitis as noted in 3 patients, for which alternate peripheral access was established.

S.No	Age	Gender	Thrombophlebitis	Hemoglobin		S. Albumin	
				Before PPN	After PPN	Before PPN	After PPN
1	22	Female	Nil	9.9	11.5	2.2	3.8
2	41	Male	Nil	10.4	11.9	2.4	4.1
3	60	Male	Yes	10.8	13.1	2.3	3.9
4	50	Female	Yes	10.2	12.1	2.6	3.7
5	31	Male	Nil	9.8	11.8	2.1	3.8
6	25	Female	Nil	8.8	10.6	2.4	4.0
7	47	Male	Yes	10.3	12.4	2.5	3.9
8	24	Female	Nil	9.8	11.6	2.4	4.0
9	26	Female	Nil	11.9	12.8	2.3	4.1
10	18	Male	Nil	9.3	13.2	2.1	4.2

**Table 2: Various parameters before and after supplemental peripheral parenteral nutrition [PPN] in management of patients with burns**

## DISCUSSION

It is well established fact that parenteral nutrition improves the outcome of patients admitted to ICU and are unable to take adequate enteral feeds. Due to the various complications associated with total parenteral nutrition its use is not advocated over a prolonged period of time. A switch over to enteral feeds is recommended as soon as is feasible. In such situations parenteral nutrition may be given as a supplemental feed

to enteral feeds to improve the patients nutritional status and thereby improve the overall survival. Since giving it through central line is associated with various complications peripheral parenteral nutrition may be more safer and useful <sup>[9]</sup>. Peripheral parenteral nutrition is administration of glucose, amino-acids and lipids in specific concentrations through peripheral intravenous lines. Most of the formulations are commercially available, but may be customized if required. It is now considered as a safe and effective alternative to Total

parenteral nutrition through central veins. It avoids the risks associated with of central venous catheterization, makes nursing care simple, reduces cost and may also prevent delay in the initiation of nutritional support [10,11]. Most of the patients in our country especially belonging to low socio-economic status, [our patient demographic] are usually malnourished. In burns patients it is especially important to know the nutritional status, as these patients succumb very fast. In patients with burns, even though evidence suggests that enteral nutrition is better than parenteral nutrition, there are various factors which may prevent adequate intake. In such patients in whom enteral nutrition [either orally, NG feeds, or enteral feeds] is difficult parenteral nutrition is of value.

Initially parenteral nutrition was given through central line as the osmolarity of these preparation was very high. Now we have commercially available TPN with lower osmolarity, which may be given through the peripheral line.

This reduces the various complication associated with TPN as described above.

However, the most significant complication limiting the tolerance of PPN is the development of thrombophlebitis [12]. Another

important consideration is the anticipated duration of feeding, as the peripheral route becomes increasingly difficult to use after 10–14 days [13–16]. This possible may be overcome by the use of slightly larger veins and smaller cannulas [17] and topical application of heparin. The only significant complication our patients developed was thrombophlebitis which was treated according to standard care. We did find paucity of veins after the first two weeks, especially in larger areas of burns, but were able to secure peripheral lines by preventing unnecessary pricking of available veins.

## CONCLUSION

We would like to emphasize that supplemental peripheral parenteral nutrition may help in improving the outcomes of patients with burns, by meeting the increased nutritional requirements which may not be completely met by oral feeding. However, as our sample size is small larger randomized control trials are required to confidently establish the role of peripheral parenteral nutrition in burns management.

## Conflict of Interest Statement-

There is no conflict of interest.

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