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EFFECTIVENESS OF ORAL WITH NASO-GASTRIC FEEDING (ONGF) OVER ORAL FEEDING (OF) ALONE IN PATIENTS WITH BURN INJURIES

***Saumya Mishra¹, Robert James² and Jessie James³**

¹*Department of Physiology, King George's Medical University Lucknow*

²*Department of Medicine, Maharishi Markandeshwar Medical College and Hospital, Solan, India*

³*Department of Anatomy, Maharishi Markandeshwar Medical College and Hospital, Solan, India*

**Author for correspondence*

ABSTRACT

Burn patients develop patho-physiological alterations in metabolic response to severe nature of burn trauma, which include markedly increased metabolic rate, decreased nutritional intake, extensive nitrogen loss, consequent malnutrition and immunologic suppression. This predisposes burn patients to frequent infections, poor wound healing, increased length of hospitalization and increased mortality. By means of early nutritional management it is possible to modulate the inflammatory response, immune status and to promote burn wound healing. Early enteral feeding also preserves the intestinal mucosal barrier, decreases the chance of bacterial translocation in systemic circulation and reduces the chances of enterogenic infections, which, therefore leads to better chance of wound healing and reduced hospital stay. The caloric requirements are greatly increased in patients having more than 20% of burn area. In such conditions oral feedings alone may not be able to meet the nutritional requirements of burnt patients, who are either too sick to take orally or reluctant to take orally due to loss of appetite, nausea and vomiting. They may require mandatory naso-gastric feeding supplements as well to fulfil the adequate nutritional requirements.

A comparative study was done on 110 burn patients to see the effectiveness of Oral with naso-gastric feeding over oral feeding. The patients were assessed on various parameters like tolerance, percentage of calories and protein delivered, weight changes, plasma albumin levels, changes in A/G ratio and finally the survival rates. We concluded that we were able to meet the nutritional requirements to a greater extent in patients who received naso-gastric feeding as compared to those who were on oral feeding alone.

INTRODUCTION

Burn injuries are a major problem throughout the world and more so in India. Extensive and deep burns cause severe metabolic, hormonal, immunologic and circulatory disturbances (Wolfe, 1996). Thermal injury induces hyper metabolism of varying intensity and duration depending on the extent and depth of the body surface affected, on the presence of infection and on the efficacy of early treatment. The increase in the basal metabolic rate varies from patient to patient and decreases progressively during the recovery period. During the first days after the injury (flow phase), energy requirements approach physiological limits exceeding by as much as 100% the basal energy required by healthy persons (Cunningham *et al.*, 1989). This increased energy expenditure contributes to malnutrition with severe body weight loss and negative nitrogen balance. In fed severely burned patients, the losses of body proteins may exceed 40 g N/d, (Goodwin, 1993) which is 10-fold higher than by a protein-starved healthy person (Crim and Munro, 1994). These nitrogen losses occur mainly by protein exudation through the burned skin. Because of catabolic stress, body proteins are used for the production of 15-20% of the total energy required (Goodwin, 1993). Due to this the caloric and protein requirements of the patients are increased two to three times of the daily requirements. Early initiation of enteral feeding is helpful in decreasing the high catabolic response, translocation and survival of translocated bacteria, and prevention of malnutrition and hypotrophic changes of the intestine (Gianotti *et al.*, 1994). The enteral rather than the parenteral route is preferred for most burn patients because it maintains trophism of the gastrointestinal tract by promoting the release of intestinal hormones and growth factors (Ziegler, 1996). It also permits administration of

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more balanced and individualized nutritional support eliminates catheter contamination problems and is less costly. Critically ill patients who receive parenteral nutritional support experience more infectious complications (Kudesk *et al.*, 1992; Moore *et al.*, 1992).

Aim of the study:

The main aim of this study is to find out whether oral feeding along with naso-gastric feeding is more effective than oral feeding alone or not.

MATERIALS AND METHODS

Selection of Subjects: In this study we enrolled 110 burn patients who were admitted in the Burn Unit of Sushrut Institute of Plastic Surgery Burn and Trauma Centre.

Inclusion criteria

- Patients who gave consent for their participation in the study.
- Patients between the age group of 18 – 60 years of both the sexes.
- Patients with 25% to 50% burn injuries.

Exclusion criteria

- Patients who did not give consent.
- Patients with less than 25% and more than 50% of burn injuries.
- Patients with pregnancy or any other severe complications.
- Patients on Total Parenteral Nutrition

Methodology

The patients were selected on the basis of percentage of burn. The total body surface area burnt was calculated at the time of admission by using the Lund and Browder's classification for burns.

The selected patients were kept on OF and ONGF randomly. Feeding was initiated within 24 hrs of burn injury as soon as the patient was fit to take oral and NG feeds. The nutritional requirements of the patients were calculated individually according to their percentage of burn by using the following formulas:

CALORIES: The caloric requirements were calculated by using the CURRERI FORMULA:

$25 \text{ kcal} \times \text{Body weight (Kg)} + 40 \text{ Kcal} \times \% \text{ TBSA}$ (Using a maximum of 50% burn)

PROTEINS: The protein requirements were calculated by using the BACHELOR'S FORMULA:

$1 \text{ gm protein per Kg pre-burn body weight} + (3 \text{ gm protein} \times \% \text{ TBSA})$

The carbohydrate requirement remained 60% of the total calories while the proportion of fat was about 15-20% of the total calories. Along with this B-complex, vitamin C, Calcium Magnesium, Iron, omega 3 fatty acids were also supplemented to the patient for better wound healing. Since burn patients are prone to electrolyte losses (sodium and potassium losses), these were also supplemented according to the individual requirement of the patient.

The patients on OF were advised to take high calorie high protein diet as per their requirement. The diet mainly included of locally available foods like chapattis, daliya, rice, pulses, soyabean, paneer, dry fruits, milk and milk products, fruits, egg, meat, fish and chicken.

The patients on ONGF were advised high calorie, high protein diet, along with naso – gastric feeding. The feeds were provided by the hospital. The feeds were made indigenously by using high calorie and high protein foods like milk, pulses, butter, sugar, egg, soyabean powder, milk powder etc. These feeds were provided at 3-4 hr intervals, so that the patient got sufficient time to have his oral diet as well.

Daily charting of the diet consumed by the patients was done and the percentage of calories and proteins delivered was calculated each day. Initial weight of the patient was taken at the time of admission and it was monitored bi-weekly. The patient's tolerance level was rated on a scale of 1-5 which ranged from poor to good tolerance. During the course of study other parameters like Hemoglobin, Total Leukocyte Count, Differential Leukocyte Count, Total protein, serum albumin and A/G ratio were assessed bi-weekly and the changes were observed in OF and ONGF.

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Conclusion

Adequate nutrition is required for wound healing, immune-competence and ultimately patient's survival. The patients with less percentage of body surface area burnt have lesser caloric and protein needs as compared with patients having a higher TBSA. Hence, their nutritional demands can be met easily with the OF alone, while in patients with a higher TBSA OF alone is not sufficient to meet the nutritional demands and ONGF becomes essential for such patients. Through ONGF we can provide healthy and nutritious foods to the patients which they would not eat otherwise. There are lesser concerns for individual likes and dislikes for foods in ONGF while in OF the patients mostly prefer to eat what they like and because of this the healthy foods which should be supplemented in diet are not consumed as food. It can be concluded from this study that ONGF provides better nutrient delivery, which reflects in better weight gain better wound healing. This also leads to improvement in the protein levels and hence improves the chances of recovery and survival.

RESULTS AND DISCUSSION

NUTRIENT DELIVERY

The total amount of calories and proteins delivered were calculated daily and it was observed that the percentage of calories and protein delivered was about 110-120% of the daily requirement when the patients took ONGF while it was only 80-90% when the patients were on OF alone (Figure 1.1). There are many patho-physiological and psychological factors which affected patient's oral intake. The patho-physiological factors included nausea, vomiting, diarrhea, constipation, paralytic ileus, oral burns, pain due to injury and dressing, fever, altered sensorium etc and the psychological factors like stress, depression, poor self esteem, fear of dying etc played a major role in patients with OF. These factors tend to reduce the overall intake of the nutrition orally. However, these factors did not affect the patients with ONGF as they were administered feeding at their fixed time irrespective of their status which ultimately helped in improving their nutritional status.

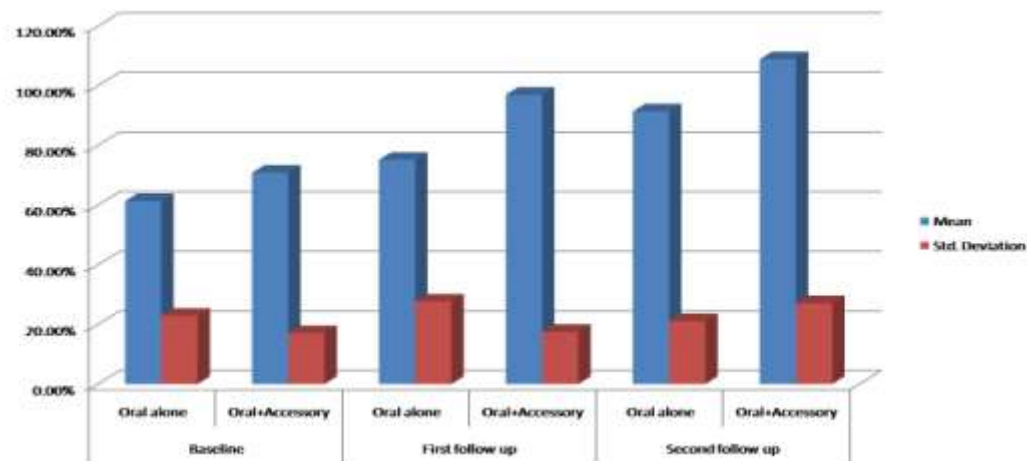


Figure ure 1.1: Graph Showing the percentage of nutrient delivery in OF and ONGF

Weight Changes

Initial weight of the patients was taken at the time of admission but this cannot be stated as the actual weight of the patient as there had been a lot of fluid loss due to poor nutrition and extravasation through the burn sites or there was edema present at the time of admission due to hypoalbuminemia and protein loss. However as these conditions resolve, there are changes in weight of the patient and accordingly changes are made to the caloric intake of the patient. It was observed that there was a subsequent increase in weight of the patients with ONGF as compared to those with OF alone since the nutritional requirements were met to a greater extent in patients with ONGF.

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Tolerance Level

The caloric requirements of burn patients are 2-3 times higher than that of a normal person hence patient's ability to tolerate this high amount plays an important role in nutrient delivery. The major problems faced by the patients were diarrhoea, constipation and vomiting. These problems were more common in patients with ONGF and mainly in the initial phase but later on they tolerated oral as well as NG feeding easily and their appetite also improved gradually. Mobilization of the patient also affected the tolerance of the patient as it helped in the proper bowel movement.

Total Protein, Albumin, A/G Ratio

There is a decrease in the initial protein, albumin and A/G ratio due to increased rate of catabolism in burn patients. It can be improved by meeting the caloric and protein needs of the patients and bringing them into a state of positive nitrogen balance. During the course of study it was found that the levels of total protein, albumin A/G ratio improved in patients with ONGF as compared to those with OF. (Figure 1.2 and Figure 1.3)

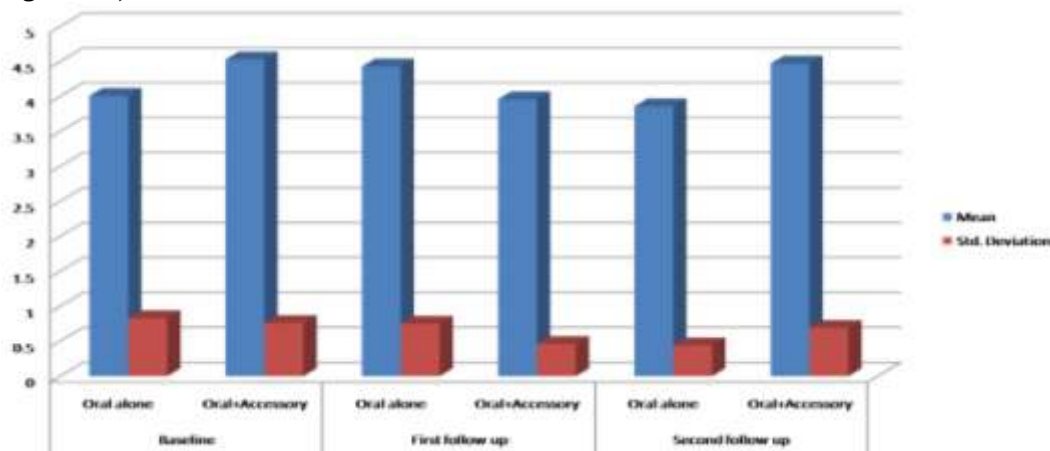


Figure 1.2 Graph showing comparison of Albumin levels in OF and ONGF

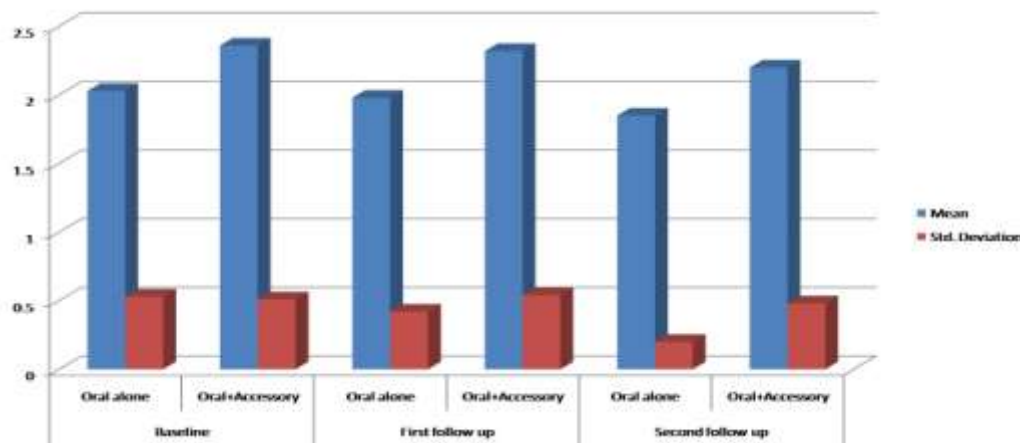


Figure 1.3 Graph showing A/G ratio in OF and ONGF

Learning Points/Take Home Messages

- 1) Enteral feeding should be initiated in burn patients as early as possible.
- 2) Naso-gastric feeding should not be delayed in patients with poor oral intake and in patients with facial burn injuries.

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- 3) Daily monitoring of calorie and protein intake should be done to maintain the nutritional status which ultimately leads to better wound healing.
- 4) A well planned naso-gastric feed helps in delivering all the required nutrients in balanced amounts to the burn patients.

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