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International Journal of Current Research
Vol. 9, Issue, 06, pp.53183-53185, June, 2017

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

REVIEW ARTICLE

EFFECTS OF PERIOPERATIVE PARENTERAL NUTRITION ON WEIGHT, SERUM ALBUMIN AND TOTAL LYMPHOCYTE COUNT: A RANDOMIZED CONTROLLED STUDY

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ARTICLE INFO

Article History:
Received 16th March, 2017
Received in revised form
27th April, 2017
Accepted 23rd May, 2017
Published online 30th June, 2017

Key words:

Parenteral nutrition, Total serum proteins, Serum albumin, Total lymphocyte count.

ABSTRACT

The present randomized controlled trial study was carried out over a period of one year to observe the effects of perioperative parenteral nutrition on weight, Serum albumin and total lymphocyte count. Hundred patients, admitted and operated were randomly divided into two groups of 50 each. Group A (Study group) and group B (Control group). Group A patients were given perioperative parenteral nutritional support whereas patients in the control group received no such treatment. Statistically significant increase in total serum albumin ($P<0.001$) was found in the study group. Total leucocyte count and weight was also better in the study group but it was not statistically significant. Parenteral perioperative nutritional support has a vital role in improving weight; serum albumin and total leucocyte count in surgical patients. It should be included in the management of surgical patients if affordable.

Citation: Dr. Ab. Rashid Ganie, Dr. Mohammad Saleem Itoo, and Dr. Rouf Hussain Rather, 2017. "Effects of Perioperative parenteral nutrition on Weight, Serum Albumin and total lymphocyte Count: A randomized controlled study", *International Journal of Current Research*, 9, (06), 53183-53185.

INTRODUCTION

Food is essential for growth and development of an individual right from conception till death. After proper digestion and absorption it provides energy for growth, development, physical activity and other metabolic needs. Nutrition is also important for maintaining good health and combating disease. The three major important components of our food are proteins, carbohydrates and fats. Adequate supply of nutrients and their digestion, absorption has great impact not only on the growth and development but also on the outcome of surgical patients. In contrast to normal individuals surgical patients have problems with digestion and absorption of nutrients even if they are provided in adequate quantities. So usually they present with signs of malnutrition which affects their weight, levels of serum proteins, lymphocyte counts, immunity and wound healing, complications and surgical outcome[1]. Besides it biochemical parameters like total serum proteins and immunity of these patients reflected by total lymphocyte count is also affected by malnutrition. In our present series of patients we compared the effects of total parenteral nutrition on Weight, serum albumin and total lymphocyte count in the study group with controls who were not provided with the total parenteral nutrition.

Before the introduction of parenteral nutrition, even highly know legible and experienced surgeons were unable to prevent the surgical complications and decrease morbidity and mortality resulting from malnutrition. Introduction of parenteral nutrition improves the biochemical parameters and decreases morbidity and mortality. Starvation induces catabolic changes in the body resulting in exhaustion of body reserves. Adequate Parenteral nutrition may prove lifesaving in the management of a starving critically ill patient by improving their biochemical parameters like serum albumin and total leucocyte counts and also decreasing incidence of surgical complications, reducing the durations of stay in the hospitals and improving surgical outcome and decreasing postsurgical morbidity and mortality (Dudrick *et al*., 1968). Adequate parenteral nutrition to these metabolically stressed patients attenuates the nitrogen losses in catabolic states and forms important adjuvant to surgical care of these patients. In spite of

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these eminent benefits, selection of patients who require perioperative parenteral nutrition is difficult.

MATERIALS AND METHODS

The present randomized controlled study was conducted on hundred patients, fifty patients as study group and fifty patients as control group, admitted for major surgical interventions in the department of general surgery over a period of one year. Parenteral nutritional support preoperative, postoperative or combined was given to all patients in the study group. No such parenteral nutritional support was received by patients in the control group. In all patients admitted for the study, a detailed history was taken besides complete nutritional assessment was made within 24 hours of admission. The measurements included anthropometrics, weight, height and body mass index was calculated. For the selection patients, the eligibility criteria included weight loss more than 10% over ideal or usual body weight, body mass index <18.8 for males and <18.4 for females, Triceps skin fold thickness <10 mm in males and <13 mm in females, mid arm circumference < 25 cm in males and <23 cm in females. Biochemical criteria included total serum proteins < 6.5 gm/dl, serum albumin <3.5 gm /dl and lymphocyte count <1500/ cmm of blood. Serum protein and albumin level were determined by chromatography and lymphocyte count from total white blood cell count. Parenteral nutritional support preoperative, postoperative or combined, technically and medically feasible was given to patients included in the study group. Patients included in the control group received no parenteral nutritional support except daily fluid requirement, blood transfusion, vitamin K which ever was found necessary during perioperative period. Patients received adequate nutritional support > 35Kcal / day, proteins >1.5 gm/ kg / day preoperatively and was continued post operatively till the patient was on full oral diet. The non –protein caloric support was adjusted to the degree of stress and ranged from1.7 kcal/kg/day to 2.5 kcal/kg/day times the basal energy expenditure. Protein infusion ranged from1.5 grams /kg/day according to the individual patient requirement and degree of stress although very low serum albumin was replaced by albumin infusion on gram to gram basis. The nitrogen to calorie ratio of 1;150 to 1; 200 was required throughout the study. Parenteral nutritional energy fomula energy composition included carbohydrates 50-60%, Proteins 15-20% and fats 20-30%. In addition patients in the study group also received multivitamin injections, Vitamin K and blood transfusion depending upon the requirement of the patient. All the solutions were started at the rate of 1-2 ml / minute for 15-30 minutes and then the rate of infusion was enhanced to constant rate of 3-4 ml/minute for rest of the solutions administrated For each patient, basal energy expenditure was determined using formula from Harris-Benidict Standard.

For males: 66.47 + 13.75 (weight) + 5.0 (height) - 6.76 (age) Kcal/da

For females: 65.51 + 9.56 (weight) + 1.85 (height) - 4.68 (age) Kcal /day.

Patients received adequate nutritional support >35 Kcal/day, Proteins >1.5 gm/kg/day preoperatively and was continued post operatively till the patient was on full oral diet. The non-protein caloric support was adjusted to the degree of stress and ranged. At the end of the study comparison between the two groups of patients was done.

Statistical analysis: Patient variables analyzed included Weight, Total protein and Lymphocyte count. Standard paired‘t’ test was used to test the significance of difference between preoperative versus postoperative nutritional and laboratory parameters in study group and in the control group. Standard unpaired ‘t’ test, was used to test the significance of difference between the postoperative nutritional and laboratory parameters in the study and in the control group.

RESULTS

The present study was conducted on 100 patients who were admitted for various major surgical procedures and divided into two groups of 50 each. One group served as control group which received no parenteral nutritional support except normal fluid requirement and blood transfusion whichever was necessary. The study group was put on parenteral nutrition. The base line demographic characteristics of the two groups were compared in terms of age, sex, nutritional status and laboratory parameters including total serum protein, albumin and lymphocyte count with no statistically significant difference at base line (P>0.0) There were no complications related directly to parenteral nutritional support and no electrolyte or liver function abnormalities occurred. Infusion of solution was well tolerated. There was significant clinical improvement in the nutritional status of all patients in the study group. There was improved wound healing and maintenance of body weight in absence of peripheral edema or hypernatremia as compared to control group. In the study group the mean weight loss was 0.22kgs from the preoperative weight of 40.18 +_ 5.40 kgs to postoperative weight of 39.96+- 6.99 and the difference was not statistically significant (P>0.010).

Total protein increased by 0.69 gms per decileter from mean preoperative value of 5.35 +_ 0.70 to postoperative value of 6.04 +-0.63 and the difference was highly significant statistically (P>.001), albumin increased by 0.94 grams per decileter from its mean preoperative 2.69 +_0.45 grams /dl to its postoperative 3.63+- 0.59 grams/dl , the difference was statistically highly significant (P <0.001). Although the absolute lymphocyte count increased by 140 per cmm from preoperative value of 1363.86 +_ 640.04 per cmm to postoperative 1503+- 481 per cmm but the difference was not statistically significant. (P>0.05) In control group there was a mean weight loss of 2.24 kgs from preoperative weight of 41.04+_ 4.82 kgs to postoperative weight of 38.80 +_ 3.74 kgs and the difference was statistically significant (P< 0.001). The mean total protein decreased by 0.18grams/dl from preoperative value of 5.46+_0.65 grams /dl to postoperative value of 5.28+_0.72 grams /dl with insignificant difference between the two statistically (P>0.05). Albumin decreased by 0.26grams/dl from preoperative value of 2.74 grams /dl to post operative value of 2.48+_ 0.43 grams/dl (P<0.05). The absolute lymphocyte count decreased by 176/ cmm from preoperative value of1350.60+_ per cmm to post operative value of 1174+_ 305.92 per cmm and the difference was statistically significant (P<0.05)

DISCUSSION

Dudrick *et al* in 1968 developed intravenous hyperalimentation at the University of Pennsylvania. Subsequent improvement in nutrient solutions, equipment and techniques of administration has made parenteral nutritional support technically feasible and relatively safe in immunologically compromised patients.

Studley (1936), Rhoads and Alexander (1950) made some pioneering observations relating malnutrition with poor surgical outcome. They believed that surgical outcome of well-nourished patients is better than malnourished patients. Some post-operative complications may be related to prior malnutrition and malnourished patients could not cope up with post-operative complications, particularly infection as effectively as well nourished. Seltzer *et al*. (1982), Mughal and Muguid (1987) observed that preoperative weight loss of more than 4.5kg as a predictor of high mortality. Numerous earlier studies have documented the feasibility and safety of perioperative parenteral nutritional support as an adjunct to surgical treatment of diseases, head and neck (Law *et al*., 1973), esophagus (Conti *et al*., 1977), stomach and pancreatico-biliary system (Deitil 1978). They demonstrated improved nutritional status in total parenteral nutritional support treated patients and low morbidity and mortality as compared to controls. In the present study we observed significant subjective improvement in the parenteral nutritional support treated group as compared to control group. Although the patients in the study group did not gain weight but preoperative weight was maintained as compared to control group in which weight loss was statistically significant. Sandstrom *et al*. (1993), in a series of 300 patients treated with post-operative parenteral nutritional support for 14 days, with lipids as chief source of energy observed no difference in the mortality rate in these patients. Similar results were observed by Freund *et al*. (1979).

Summary and conclusion

In our study we found that laboratory parameters improved in the study group significantly as compared to the control group in which there was significant decrease in serum proteins, serum albumin and lymphocyte count from their respective perioperative values. A significant subjective improvement was observed in the parenteral nutritional support treated group as compared to control group. Although the patients in the study group did not gain weight but preoperative weight was maintained as compared to control group in which weight loss was statistically significant. Laboratory parameters improved in the study group significantly ($P>0.001$) as compared to the control group in which there was a significant decrease in the total serum proteins, serum albumin and lymphocyte count from their respective preoperative values. The administration of essential and nonessential amino acids was associated with increase in serum albumin concentration in the study group. Thus from the present study we conclude that perioperative parenteral nutrition in malnourished surgical patients improves serum albumin and total lymphocyte counts. It also helps in maintaining body weight in contrast to control group.

REFERENCES

Conti, S., West, J.P. and Fitzpatrick, H.F. 1977. Mortality and morbidity after esophagectomy for cancer of esophagus and cardia. *Am J Surg.,* 43:92-6.

Deitel, M., Vasic, V. and Alexander, M.A. 1978. Specialized nutritional support in cancer patients. Is it worthwhile? *Cancer*, 41:2359-63.

Dudrick, S.J., Wilmore, D.W., Vars, H.M. and Rhoads, J.E. 1968. Long term parenteral nutrition with growth, development and positive nitrogen balance. *Surgery,* 64:134-42.

Freund, H., Hoover, H.C., Atamian, S. and Fischer, J.E. 1979. Infusion of branched chain aminoacids in post-operative patients. *Ann Surg.,* 18-23.

Mughal, M.M. and Meguid, M.M. 1987. The effect of nutritional status on morbidity after elective surgery for benign gastrointestinal disease. *JPEN J Parenter Enteral Nutr.* 11:140-3.

Neumann, C.G., Lawler, G.J. Jr, Stiehm, E.R., Swendseid, M.E., Newton, C., Herbert, J., *et al*. 1975. Immunological response in malnourished children. *Am J Clin Nutr.* 28:89-104.

Rhoads, J.E. and Alexander, C.E. 1955. Nutritional problems in surgical patients. *Ann NY Acad Sci.* 63:268-75.

Sandstorm, R., Drott, C., Hyltander, A., Arfvidsson, B., Scherstén, T., Wickström, I., *et al*. 1993. The effects of post-operative intravenous feeding (TPN) on outcome following major surgery evaluated in a randomized study. Ann Surg. 1993; 217:185-95.

Seltze, M.H., Slocum, B.A., Catalde-Betcher, E.L., Fileti, C. and Gerson, N. 1982. Instant assessment: Absolute weight loss and surgical mortality. *JPEN J Parenter Enteral Nutr.* 69:147-50.

Studly, H.O. 1936. Percentage of weight loss: a basic indicator of surgical risk in patients with chronic peptic ulcer. *JAMA*. 106:458-60.

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