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Research Article

A CROSS-SECTIONAL STUDY ON PATIENTS WITH ENTERAL NUTRITION

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ABSTRACT

Objective: Unintended weight loss is common with the hospitalized patients which is supported by the enteral nutrition develops the patient's condition of malnourished along with their quality in life to some extent. This study was conducted to evaluate the impact of clinical parameters in both malnourished and normal patients under enteral nutrition feeding.

Method: This study was conducted among 29 patients (divided into 2 groups as Normal BMI and low BMI) admitted in the Intensive Care Unit of a corporate super speciality hospital, Coimbatore, Tamilnadu and indicated for the enteral feeding, laboratory parameters such as Hemoglobin, blood sugar, Serum sodium, Serum potassium were monitored during baseline and at the end of enteral feeding.

Results: Patients were monitored closely for any alterations in their laboratory parameters, general characters Significant changes in the laboratory parameters were monitored in both groups which showed clinically significant changes in patients with low BMI than the patients with normal BMI.

Conclusion: Enteral nutrition can significantly increases the hemoglobin, serum sodium and serum potassium levels in malnourished patients.

Keywords: Enteral nutrition, Malnutrition, Body mass index, Hemoglobin.

INTRODUCTION

Malnutrition is a causal factor in 1% to 15% of ambulatory outpatients, 25% to 60% of institutionalized patients, 35% to 65% of hospitalized elderly patients and in 29% of new admissions to long-term care geriatric hospitals. Malnutrition is associated with higher co-morbidity, secondary to reduced function and impaired immunity leading to pneumonia, sepsis, exacerbation of cognitive and mood disorders, reduction in quality of life, delayed wound healing, pressure sore development, and finally death [1]. In critically ill patients, there is interference with storage and mobilization of nutrients because of organ dysfunction. In addition, fasting can compromise the gut function, gut barrier, mesenteric blood flow, immune function, protein synthesis, wound healing, liver function and renal functions [2]. Enteral feeding is being preferred now-a-days because of the ease of administration, decreased cost, decreased risk of infection, no need for central venous access and improved gastrointestinal function [3]. The major advantage of enteral nutrition is the decreased infection rate in critically ill patients [4, 5]. It maintains integrity of gastrointestinal mucosal structure and function [6]. Clinical pharmacists have made a significant impact on the health care system by identifying drug related problems and improving the patient care. Since medicines are likely to remain a core element in health care and there will be need for pharmaceutical care and proper drug information for the public and other health professionals becomes sine qua non. Pharmacists in western country recently have been concerned about the decline in the number of pharmacists seeking board certification or recertification as specialists in nutrition support and changes in the job responsibilities as nutritional support pharmacists. These factors have resulted in a need to evaluate the system of nutrition support by pharmacist. Drug related problems in clinical nutrition patients can successfully be evaluated by pharmacists to positive outcome by avoiding adverse events [7].

This study was carried out in order to monitor the patients administered with enteral nutrition and their outcomes in the clinical parameters with the nutritional therapy which is the key factor in this study. The primary purpose of this study was to examine whether enteral nutrition is an effective tool in improving nutritional status in study patients, and its correlation with nutritional parameters.

MATERIAL AND METHODS

Any patient with intact gastrointestinal tract is a candidate for receiving enteral nutrition. Intestinal obstruction and intestinal fistulas are the only contraindications for enteral feeding. In contrast to the usual belief, presence of bowel sounds is not a prerequisite for starting enteral feeds. A prospective observational study conducted at the intensive care unit (ICU) of a private corporate super speciality hospital, Coimbatore, Tamilnadu. The study was carried out for a time period of four months from January 2012 to April 2012.The study population of either sex included a total of 29 patients who received enteral nutrition along with their medications. The data was collected from various sources such as patient's case reports, treatment charts, and laboratory reports. The assessments included demographic data: age, gender, height, weight, diagnosis and treatment. Also duration of enteral nutrition and reason for admission was assessed. The total study patients were divided into two groups according to their body mass index (BMI). Statistical analysis was performed using SPSS 10.1 for Windows (SPSS Inc, Chicago IL).Laboratory data are presented as mean ± SD. All data were analyzed by Kolmogorov-Smirnov test. Since all values were greater than 0.05 (5% level), normality assumption was not met. So non parametric test Mann-Whitney U-test was used for unequal sample size and Wilcoxon Matched pairs test were used for further analysis. Pearson's correlation was performed in analysis for correlation between BMI and hemoglobin, random blood sugar, serum sodium and serum potassium.

RESULTS

Among the study population (n=29) male patients were comparatively high (n=23) than the female patients (n=6), there were patients of all age group from 21 to 80. Patients with body mass index (BMI) of 21 was considered as a marker of malnutrition, the average baseline weight of the study group was 61±8.75 kg ($p<0.0001$) and the mean height was 165.90±7.71 cm ($p<0.05$) (Table. 1), by using the weight and height patient's individual BMI was calculated and the study population was divided into two groups. Patients with BMI ≤ 21 Kg/m^2 were considered as malnourished patients and the normal patient group was categorized with the patients having BMI>21 Kg/ m^2.

Further, causality for admission to the hospital was observed among the study group which revealed that the predominant reason for the admission was because of the neurological problems followed by the cardiovascular complications as the second predominant reason for the admission among the study group followed by the endocrinological problems (Table. 1).

Table 1: Showing General Characteristics of study Patient

General Characteristics (N=29)	
Gender	
Male n (%)	23 (79.3)
Female n (%)	6 (20.7)
Age (Mean±SD) years	50.5±15.3
Weight (Mean±SD) kg	61±8.57
Height (Mean±SD) cm	165.90±7.71
BMI	
≤21 (%)	8 (27.6)
≥22 (%)	21 (72.4)
Reason for Admission	
Digestive (%)	1 (3.4)
Neurological (%)	13 (44.8)
Cardiovascular (%)	7 (24.1)
Nephrological (%)	3 (10.3)
Endocrinological (%)	5 (17.2)
Duration of Enteral Nutrition (Mean±SD) days	8.28±5.83

All patients were treated with numerous classes of drugs along with the enteral nutrition, an average number of drug per patient was 11.34±2.58 (Table. 1), the lowest number of drug being 6 and 13 being the maximum number of drug prescribed. The average duration for the treatment with enteral nutrition among the study patient was calculated which showed the 8.28±5.83 days (Table. 1) comprising 3 days as the minimum and a maximal duration of 23 days.

During the treatment with enteral nutrition, laboratory values of hemoglobin, blood sugar (random), serum sodium, serum potassium were monitored on admission (considered as baseline) and at the end of enteral nutrition (Table. 2). All the patients were started early enteral nutrition with the tube followed by oral administration.

In malnourished patients (BMI<21) the average baseline level of hemoglobin was 12±1.8 gm/dL which was declined to 10.24±1.3gm/dL at the end of the enteral therapy (p<0.01), the lowest hemoglobin content was found in a malnourished female patient (9gm/dL) and the highest being 14.5 gm/dL. But in the normal patients (BMI>21) the average hemoglobin level during baseline was 12.2±1.54 gm/dL which declined to 11.02±1.24 gm/dL at the end of the study (p<0.0001) (Table. 2).

Nearly 17.2% of the study group having endocrinological problem were diabetic, on baseline the random blood glucose levels of this particular group was very high when compared to the other group. The maximum glucose level being 544 mg/dL was found among the study population. The average sugar level at baseline was 154.17±81.24 mg/dL which reduced to 135.10±36.14 mg/dL at the end of enteral nutrition (Table. 2).

Table 2: Showing Laboratory values of Malnourished and Normal patient during Baseline and at end of Enteral Nutrition

Laboratory Value	Unit	Patients with Malnutrition BMI ≤21			Normal Patients BMI ≥22		
		Baseline	End of EN	P Value	Baseline	End of EN	p Value
Hemoglobin (Mean±SD)	g/dL	12±1.8	10.24±1.3	0.0078*	12.2±1.54	11.02±1.24	<0.0001
Blood Sugar (Mean±SD)	mg/dL	193.5±146.7	134.5±32.7	0.141†	139.2±29.2	135.33±38.13	0.322†
Serum Na (Mean±SD)	mEq/L	139.63±3.7	134.13±4.9	0.020*	134.9±5.3	129.5±5.2	<0.0001
Serum K (Mean±SD)	mEq/L	3.73±0.24	4.26±0.23	0.014*	3.74±0.97	4.19±0.39	0.004*

§ Wilcoxon Matched pairs test*P<0.05, † NS

The mean serum sodium on admission among the study group was 136.21±5.31 mEq/L and at the end of enteral nutrition it was 130.79±5.43 mEq/L. In the study population a total of 10 patients were reported with hyponatremia and 2 of them were identified as hypernatremic. In malnourished patients serum sodium during baseline was 139.63±3.7 mEq/L which decreased at the end of enteral nutrition as 134.13±4.9 mEq/L (p<0.05). At the end of enteral nutrition 22 (75.86%) patients had less than 135 mEq/L of serum sodium, in normal patient group the serum sodium during baseline was 134.9±5.3 mEq/L which reduced to 129.5±5.2 mEq/L (p<0.0001), but no case of hyponatremia was reported. Average serum potassium level was 3.74±0.83 mEq/L at baseline and at the end of the enteral nutrition it was 4.21±0.35 mEq/L, about 10 patients were hypokalemic on admission and a single patient was reported with hypokalemia during the study period. In the group of malnourished patients serum potassium levels were found increased (p<0.05) at the end of enteral nutrition comparing with the baseline, in the normal group the levels of serum potassium increased (p<0.01) at the end of enteral nutrition (Table. 2).

Pearson's correlation was used to analyze the correlation of BMI with hemoglobin, random blood sugar, serum sodium and serum potassium which showed the positive association between BMI and hemoglobin during baseline and at the end of enteral nutrition (Table. 3).

Table 3: Showing Correlation between Body Mass Index and Clinical Parameters

Parameters	Baseline		End of Enteral Nutrition	
	R	P	r	P
Hemoglobin	0.1453	0.4521	0.3563	0.0578
Blood sugar	−0.3221	0.0884	−0.040	0.8362
Serum Na	−0.3560	0.0581	−0.2490	0.1927
Serum K	0.0343	0.8595	−0.0295	0.8792

Further, linear regression performed between BMI and hemoglobin to determine the influence of one on another which showed the definitive influence of BMI on hemoglobin (Figure. 1).

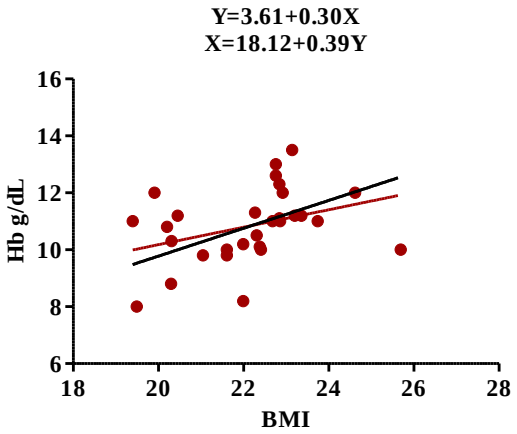

Fig. 1: Regression of Hemoglobin versus Body Mass Index

DISCUSSION

Malnutrition is a major problem among the long-term care facilities where about 30% of the patients hospitalized are undernourished. On treating patients on long term care basis it is in need to monitor the nutritional care, as the nutritional neglect also having medico-legal consequences in Western countries. Being fourfold less expensive in cost than total parenteral nutrition (TPN) it is wide in administration to the patients, so as the screening methods also should be effective in. From our study we found that the female

patients were comparatively higher than male to be malnourished which confirms the statement of Le Land KA & Subramanian V [8]. The major reason for admission in hospital and enteral nutrition administration is neurological problems caused by road traffic accidents, which is previously studied by Madan VS [9].

Results showed that there was a trend of positive association between BMI and Hemoglobin during baseline and end of enteral nutrition (r= 0.1453, 0.3563 and P= 0.4521, 0.0578) though the duration of stay for the patients were less for the follow-up to be done and the sample size being small and is insignificant statistically. BMI has definite influence though statistically insignificant on hemoglobin rather hemoglobin on BMI (Figure. 1). This trend is in line with the Strong and consistent association between BMI and hemoglobin which have been established in several studies across different population [10].

Small sample size had been making generalizability difficult as our present study could yield more effect if done in a large population size**.**

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AUTHOR'S CONTRIBUTION

Both authors contributed the idea of research, design of study, data analysis and manuscript preparation.

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