Role of intradialytic oral nutrition therapy in Indian patients

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Abstract
Malnutrition is common in patients with chronic renal failure (CRF), and its prevalence before the initiation of dialysis is poorly characterized in these patients in developing countries. There is a paucity of data on the quantification of malnutrition and inflammation in undialyzed patients of CRF from India. Besides the medical condition like anorexia, nausea, vomiting, uraemia etc there are some vegetarian diet pattern and religious factors which abstinence the patients from consuming high biological value protein. This enhances the gap between daily nutrition requirement and fulfilment of the same. Here the oral nutritional supplement appears to be a sustainable effort toward addressing malnutrition in maintenance haemodialysis patients.

Keywords: CRF, Dialysis, Malnutrition, Oral nutrition supplements, Albumin.

Introduction
Malnutrition is a frequent complication which affects quality of life and is associated with increased risk of mortality and morbidity in maintenance haemodialysis patients.[1,2]

Decreased nutritional intake may be a function of uraemia itself, leading to anorexia that may also be associated with disorders in taste, fatigue, and nausea and/or vomiting.[11,12]

It is recommended to screen the nutritional status of the patient before dialysis so that the quality of treatment can be improved. The various methods used for assessment of nutritional status are time consuming and complex. Subjective global assessment (SGA) scores, determined by medical history on seven items and clinical findings on four items, is a well-validated tool for screening for malnutrition.[4-6]

Albumin has also maintained a prominent role as a practical marker with a very strong association with morbidity and mortality in haemodialysis patients.[3] Serum albumin is a valid and clinically useful measure of protein-energy nutritional status in MHD patients. Hypoalbuminemia is highly predictive of future mortality risk and measurement of serum albumin is inexpensive, easy to perform and widely available.

Indian Scenario

In India there is a high prevalence of protein energy malnutrition in patients with end stage renal disease (ESRD) and the calorie and protein intake of Indian patients with ESRD is poor. There is a paucity of data regarding the prevalence and clinical consequences of protein-energy malnutrition (PEM) in the chronic renal failure, maintenance dialysis, and renal transplant population in developing countries. Malnutrition, which is reported to be present in 42% to 77% of the end-stage renal disease population in developing countries is strongly associated with morbidity and mortality.

Malnutrition in Indian patients is often severe and multifactori al. Reasons include late initiation of PD protein restriction in the pre dialysis period recurrent infections, co morbidity, and dietary factors. Patients almost invariably fall short of recommended dietary intakes.[7]

Many religious practices in developing countries promote abstinence from meat, fish, and eggs. Both a vegetarian dietary pattern which is being adopted by an increasing number of people, and ingestion of inadequate protein and calories in the diet to arrest the progression of chronic renal failure, may lead to malnutrition. The attendant complications of PEM, malaise, wasting, anaemia, and decreased immunity may predispose these patients to infections. This is commonly seen in both the maintenance haemodialysis and peritoneal dialysis population and may decrease their surviv al.

Vegetarianism is very common in India that means the patients do not get animal source protein in their diet. Dietary habits are also complex with many patients being pure vegetarians, some who occasionally partake of meat in the diet and some who are regular non vegetarians. This makes nutritional assessment and management difficult. Data on Indian patient's nutritional status is scant. A recent trial showed that malnutrition at initiation of PD was predictive of higher incidence of peritonitis.

Daily Nutritional Requirement

Indian PD patients are thought to consistently fail to achieve NKF-KDOQI recommended calorie and protein intake, which was confirmed in some Indian studies.[8]

The recommended dietary energy intake (DEI) for patients undergoing haemodialysis and peritoneal dialysis is 30–35 kcal/kg per day.[8,9,10] Suggested mean dietary protein intake (DPI) is 1.2 g/kg per day in patients on haemodialysis and 1.3 g/kg per day in patients on peritoneal dialysis.[8,9,10] Most patients on dialysis, however, have a lower DEI and DPI than the recommended intake.

Role of Oral Nutrition Supplements

Oral supplementation can provide an additional 7–10 kcal/kg per day of energy and 0.3-0.4 g/kg per day of protein, which makes it possible to meet the recommended targets of both DEI and DPI.[8]

Increasing protein and caloric intake coincident with the thrice-weekly haemodialysis treatments may facilitate achieving sufficient nutritional support to improve physiologic processes enough to delay death.[31]

Intradialytic oral nutritional supplements may help address the catabolic impact of the haemodialysis procedure.[13,14] In addition to direct losses of amino acids to the dialysate (which some estimates have equated to the loss of up to 15 g of protein each treatment).[15-17] hemodialysis has been shown to result in a net catabolic state that predisposes to protein breakdown due to activation of inflammatory mediators.[18-19]

Table1summarize some Indian studies which unveil the existence of malnutrition of the renal patients before and during RRT and Table 2 summarize some studies where authors have divulged the effect of intradialytic oral nutrition therapy on the nutritional status, albumin level and quality of life of the renal patients.

Literature of Review

A nutritional assessment conducted by Prasad et al. (2008).[7] concluded that 67.8% renal patients are mild to moderately malnourished where as 7% are severely malnourished at the time of initiation of dialysis.

In another study conducted by Prakash et al (2007).[20] on 203 Indian renal patients concluded that 66% patients are initially malnourished with low serum albumin level 3. 18mg/dl.

Prasad et al. (2007).[21] has showed a higher incidence of peritonitis in malnourished renal patients.

CKD specific oral nutrition supplements intervention for 3-6 months to haemodialysis patients had been showed a significant increase in albumin concentration by 2.2gm/l to 3.2gm/l.[24,25,26,28,29]

Table1. Prevalence of malnutrition in CKD patients in India.

Study	N/Location/ Dialysis Modality	Study Design and Duration	Evaluation modalities	Results
[7]Prasad et. al. (2008)	283/India/ PD	Follow up study	Nutritional assessment	67.8% mild to moderate malnourished, 7% severe malnourished at the initiation of dialysis.
[20]Prakash et. al. (2007)	203/India/CRF	2 yrs.	Nutritional and anthropometric assessment	65% alnourished, with low albumin level 3.18 mg/dl.
[21]Prasad et. al. (2007)	56/ India/ PD	----	Nutritional assessment and episodes of Peritonitis	Higher incidence of peritonitis in malnourished patients.
[22]Janardhan et. al. (2011)	60/ India/ HD	6 Month	Nutritional assessment	91% malnourished with low albumin level.
[23]Tapiawala et. al. (2006)	81/India/ ESRD	----	Nutritional and anthropometric assessment	48% with CRI, 50% on CAPD, 58% on HD are malnourished.

Table2. Effect of intradialytic oral nutritional interventions on the nutritional status and serum albumin levels of the dialysis patients.

Study	Intervention Modality	Study design and duration	Results and conclusions
[24]Eustace et al. (2000)	Essential Amino Acids (EAA) (3.6g with meals three-times daily) vs placebo.	for 3 months	Serum albumin concentration in HD patients (EAA vs placebo) increased by 2.2 g/l.

[25]Sharma et al. (2002)	CKD-specific ONS 500 kcal and 15g protein vs standard home-prepared ONS (500 kcal and 15 g protein) vs routine care	for 1 month	Significant increase in albumin concentration in the groups receiving CKD-specific ONS and home-prepared ONS vs routine care (39 g/l and 40 g/l vs 35 g/l, respectively).
[26]González-Espinoza et al. (2005)	Egg albumin-based ONS; open-label controlled trial with	6-month follow-up	Serum albumin levels increased from 26.4 g/l to 30.5 g/l in the study group vs 26.6 to 28.0 g/l in the control group.
[27]Moretti et al. (2009)	Standard ONS	for 1 year; crossover controlled trial	Serum albumin levels increased from 34.9 g/l to 35.2 g/l at 3 months in the group receiving ONS.
[23]8Beutler et al. (1997)	CKD-specific ONS vs usual diet	for 4 months	Albumin levels increased with ONS from 32.0 g/l to 33.2 g/l.
[29]Caglar et al. (2002)	In-center CKD-specific ONS thrice-weekly on hemodialysis (415 kcal and 16.6g protein per session)	for 6 months; observation and intervention	During intervention period, albumin levels increased from 33.3 g/l to 36.5 g/l.
[30]Kalantar-Zadeh et al. (2005)	In-center (dialysis clinic) with low albumin concentration ≤38 g/l CKD-specific ONS thrice-weekly on HD	for 4 weeks	Pre-trial serum albumin levels (34.5±.1 g/l) increased to 36.8 ±.4 g/l between 18 and 26 days after the start of the intervention.

Discussion

We identified peer review articles published on the prevalence of malnutrition in renal patients and the effect of nutritional intervention on the health status of the Indian patients. Twelve articles were analysed for the systemic literature review.

Thus malnutrition is common in patients with CRF before the commencement of dialysis, so an emphasis should be placed on the regular assessment of nutritional status of CRF patients to avoid the adverse events during dialysis.

Poor nutrition in dialysis patients is associated with increased morbidity and mortality in the form of delayed wound healing, malaise, fatigue, increased susceptibility to infection and poor rehabilitation. Nutritional needs are enhanced in presence of stresses like infection or surgery to limit excessive tissue catabolism and therefore, these are the situations, which demand intensive nutrition therapy.

The studies evaluated showed 60% patients of renal disease are already malnourished before undergoing to dialysis in India. After a nutritional intervention for at least 3 months an average serum albumin level is increased by 2.2 gm/l- 3.5gm/l.

Conclusion

It has been concluded that the oral nutritional supplement appears to be a sustainable effort toward addressing malnutrition in maintenance haemodialysis patients. These may subsides the gap between the daily energy requirement and energy consumption by the patients.

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