EVALUATION OF NUTRITION IN ADULTS ON CAPD BY BIOELECTRICAL IMPEDENCE ANALYSIS (BIA) AND ANTHROPOMETRY AND THE IMPACT OF INTERVENTION ON THEIR NUTRITION.

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Background

Protein energy wasting (PEW) are highly prevalent in CAPD patients and is a strong risk factor for morbidity and mortality in these patients. High index of suspicion and vigilant monitoring for early diagnosis and multipronged approach in the management of malnutrition led to the good outcome. The Evaluation of PEW in continuous ambulatory peritoneal dialysis (CAPD) patients in especially using BIA and the impact of intervention has not been studied in much detail in Indian population.

Aim of the study

- Evaluation of Protein energy wasting in adults on CAPD by Clinical, Anthropometry, Biochemical and Bio impedance analysis method.
- Impact of Intervention on patients with malnutrition.

Methods

63 CAPD patients (M = 28, F = 35) were assessed for their nutritional status and inflammation after minimum 3 months of CAPD initiation.

Nutritional status was assessed by dietary diary, Anthropometry, Subjective global assessment, multi-frequency BIA and serum albumin, S.pre - albumin, S.transferrin, S.cholesterol. Inflammation was assessed by hs - CRP > 3mg/l and IL-6 > 2 pg/ml.

Based on different method, diagnosis of malnutrition was made. Appropriate nutritional intervention, as per K-DOQI guidelines was given to those patients satisfying the study criteria. Various methods of intervention are Dietary counseling, treatment of inflammation, Adequacy of dialysis, Correction of acidosis and other methods (Anabolic steroids, Psychiatric counseling, and Appetite stimulant. Gastrointestinal motility drugs, Phosphate binders were with held.) Subsequent nutritional status and impact of intervention of patient was assessed at the end of 1st and 6 th month.

Results

- The mean values of calorie, protein / Kg/ day, S.protein, S.Albumin, S.Pre-albumin, S.Transferrin and S.Cholesterol were 25.4 Kcal, 0.81 gm ,5.9 gm/dl, 3.0 gm/dl ,21.11 mg/dl , 130.6 mg/dl and 155.9 mg/dl respectively.

Parameters	Baseline Mean ± S.D	I st month Mean ± S.D	6 th month Mean ± S.D	P value
Total Calorie Intake Kcal /Day	1478.4±209.0	1583.4±201.3	1633.4±212.1	0.0001
Calorie Intake Kcal/ Kg/Day	25.4±4.6	26.4±3.7	26.6±3.81	0.001
Total Protein Intake Gm /Day	47.9±12.0	54.1±11.2	56.1±12.3	0.001
Protein Intake Gm/ Kg/Day	0.81±0.2	0.86±0.16	0.86±0.15	0.001
Carbohydrate Intake Kcal/Day	879.1±156.9	922.1±164.9	952±126.9	.06
Fat Intake Kcal / Day	357.1±58.4	323.1±68.4	301.1±61.4	0.23
Weight(Kg)	59.4±11.1	60.8±10.3	62.95±10.	<0.001
Height(Meter)	1.6±0.1	1.6±0.1	1.6±0.1	-----
Body Mass Index Kg/m^2	23.7±5.0	23.7±5.0	23.7±5.0	<0.001
Mid Arm Circumference (Cm)	26.3±4.5	26.8±4.5	27.3±4.5	<0.001
Tricipital Skinfold Thickness (Cm)	1.624±0.4	1.68±0.4	1.724±0.4	<0.001
Mid Arm Muscle Circumference	24.6±4.5	24.8±4.7	25.5±4.5	<0.001
Corrected Mid Arm Muscle Area	45.7±19.7	47.2±19.7	48.2±19.7	0.03
Hemoglobin(gm/dl)	10.37±1.5	10.63±1.54	11.3±1.47	<0.001
S.Phosphorus(mg/dl)	4.75±1.1	4.78±0.88	4.99±0.75	<0.001
S. Potassium(mg/dl)	4.6±1.1	4.7±1.3	4.8±1.6	0.42
S.Albumin (gm/dl)	2.6±0.5	2.8±0.5	3.18±0.7	<0.0001
S. Pre- albumin (mg/dl)	21.11±7.70	22.11±8.7	25.1±9.7	<0.0001
S.Transferrin (mg/dl)	130.6±39.70	144.6±39.70	160.5±59.70	<0.001
S. Hco3 (mmol)	19.54±2.8	20.54±2.3	21.4±2.4	<0.001
S.Cholesterol (mg/dl)	141.4±38.9	148.6±33.2	153.3±36.7	<0.001
Lean Tissue Index kg/m^2	9.6±2.4	9.8±2.4	11±2.4	<0.001
Fat Tissue Index kg/m^2	10.2±4.6	9.2±3.2	8.5±2.8	0.35
Phase Angle	3.619±0.7	3.99±0.5	4.55±0.4	<0.001
HSCRP (mg/L)	8.8±7.6	5.46±3.2	3.4±2.1	<0.001
IL-6 (PG/ML)	8.4±12.2	4.6±4.2	1.56±2.2	<0.001

TABLE shows various Nutritional, Anthropometry, Inflammatory and Biochemical parameters of CAPD patients in the study population at baseline, I st month and end of 6 th month.

- The prevalence of malnutrition was high as 80% . By SGA – 82%, by S.Albumin – 79.4%, lean tissue index - 76%. The prevalence of inflammation is as high as 70% .

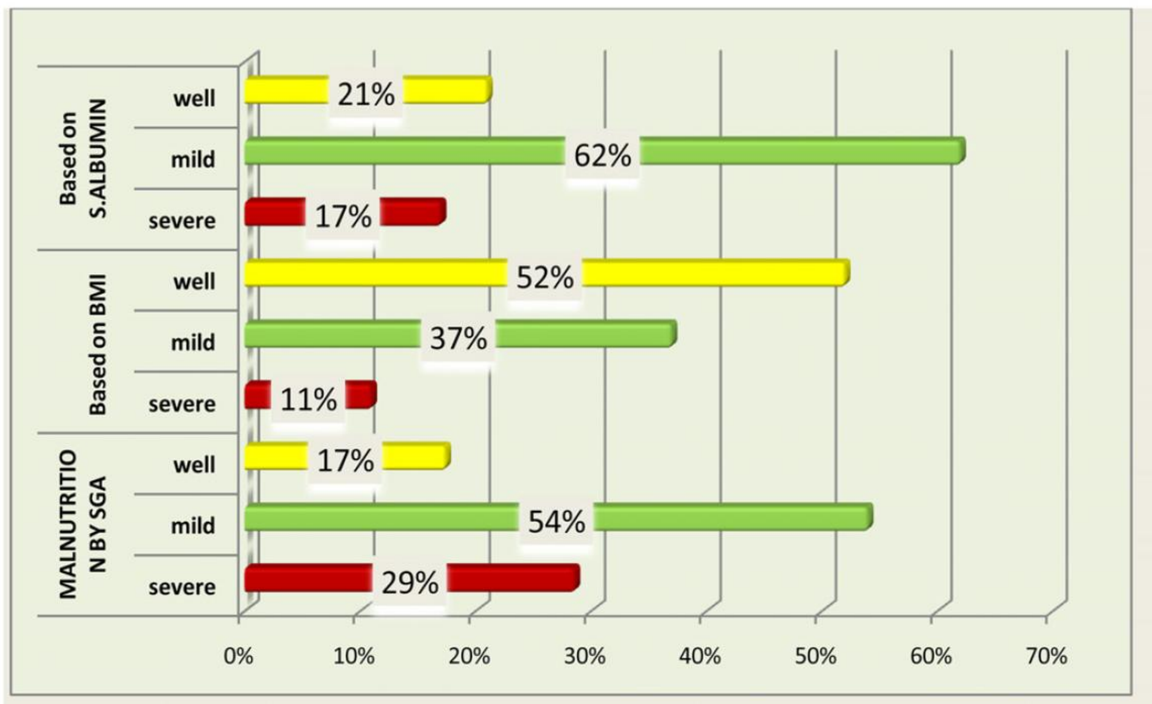

Figure Shows Prevalence of PEW based on various methods:

- No of well nourished CAPD patients increased from 17.5% to 52.4%, 20.6% to 58.7%, and 23.9 % to 65.1%.by grading of malnutrition assessed by SGA, Albumin Severity and LTI respectively after intervention.

Methods of intervention	Indicators	Base line	After intervention.
Intensive Dietary counseling	High biological protein intake more than 50% of protein intake	50.7 %(32/63)	90.4 %(57/63)
Anti-inflammatory drugs and treatment of infection	hsCRP > 3 mg/dl	70 %(44/63)	46%(29/63)
	IL-6 <2 pg/ml	72.5 %(45/63)	43 %(27/63)
Soda bi carbonate tablets	Serum. HCO3 levels > 22 mmol/L	35 %(22/63)	68.3%(43/63)
Increased frequency, tonicity, and volume of dialysis.	Adequacy of dialysis (KT/v)	49.2 %(31/63)	78.2 %(49/63)

	SGA			S.ALBUMIN		
Grades of malnutrition	Baseline	I st month	6 th month	Baseline	I st month	6 th month
Normal	17.5%	27%	52.4%	6.3%	9.5%	27%
Mild-	54 %	61.9%	44.4%	76.1%	81%	66.7%
Severe	28.6 %	11.1%	3.2%	17.4%	9.5%	6.3%
Total	100	100	100	100	100	100

Impact of intervention on grades of malnutrition assessed by SGA and Albumin severity.

- LTI correlates significantly with Kcal / kg /day food intake, mid arm circumference, mid arm muscle circumference and pre-albumin.
- FTI correlates significantly with BMI, MAC, TST, MAMC, c MAMA, S.Albumin and S.cholesterol.
- Phase angle co - relates with S. albumin, S.HCO3, S.Cholesterol, BMI, MAC, TST, MAMC, c MAMA and Kt/V.
- Kcal intake/ kg/day, protein intake/day and phase angle were independent predictors of PEW.

Conclusions

- The prevalence of malnutrition was high as 80% based on different methods.
- BIA is highly sensitive.
- Around 35 - 40% of CAPD patients became well nourished from PEW, statistically significant improvement in the nutritional status after intervention.
- Dietary management is an integral part.

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