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Analysis of Amino Acid Composition and Dietary-Induced Changes in Patients with Chronic Kidney Disease

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Objectives : Although protein restriction is often recommended for patients with chronic kidney disease (CKD), there is a lack of research on the amino acid composition in CKD patients and the changes in amino acid levels following the currently recommended diet. Therefore, this study aimed to investigate the basic amino acid composition in CKD patients and the changes in amino acids resulting from dietary modifications.

Methods : This study was a prospective randomized trial involving 52 participants. Of these, 26 patients were provided with a CKD-specific meal, while the remaining 26 patients received dietary education only. Baseline amino acid levels and changes after 56 days of dietary intervention were measured and compared.

Results : Among the 52 participants, 45 CKD patients completed the study. When comparing essential and non-essential amino acids, deficiencies were observed in essential amino acids, including histidine (56%), tryptophan (43.3%), isoleucine (8.3%), and lysine (3.3%). Deficiencies in non-essential amino acids were noted in tyrosine (13.3%), taurine (8.3%), and serine (6.7%). After 56 days of dietary intervention, the group receiving the CKD-specific meal showed an increase in all essential amino acids, except for tryptophan, compared to the education-only group. Similarly, all non-essential amino acids, except for tyrosine, showed an increase. Glutamine and serine exhibited statistically significant changes (Table 1).

Conclusions : Our study showed that the protein-restricted CKD-specific meal, designed according to CKD guidelines, is more effective than dietary education alone in preventing amino acid deficiencies and promoting their increase. Further discussion is needed regarding the characteristics of each amino acid, and the relevance of CKD-specific diets and their efficacy.

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	Education-only group	CKD-specific meal group	P-value
Essential amino acids			
Leucine	-10.81±30.24	2.55±29.61	0.141
Isoleucine	-12.28±24.33	-5.30±17.59	0.279
Valine	-2.15±43.51	15.76±48.45	0.198
Lysine	4.13±41.09	17.96±54.45	0.343
Treonine	7.13±25.59	8.28±35.96	0.902
Tryptophan	0.72±10.41	-2.90±14.84	0.350
Histidine	1.74±7.64	9.92±10.51	0.059
Non-essential amino acids			
Alanine	9.93±103.42	55.21±133.49	0.212
Glutamic acid	-1.17±26.72	0.51±27.64	0.836
Glutamine	34.48±60.12	80.24±65.46	0.019
Serine	2.42±21.54	19.34±23.10	0.015
Tyrosine	2.15±10.46	1.09±14.04	0.774
Taurin	-4.38±40.74	9.73±21.76	0.157