

EFFECT OF A DIALYSIS SESSION ON PLASMA BRANCHED CHAIN AMINO ACIDS IN HEMODIALYSIS PATIENTS

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Background

- Hemodialysis (HD) procedure have been shown to increase protein catabolism and is concerned with the loss of aminoacids into the dialysis fluid, suggesting that the dialysis procedure is catabolic.
- Catabolic factors in hemodialysis
 - blood-membrane interactions
 - dialysate aminoacid and protein losses
 - acidosis
 - inflammation

- One third and three fourths of maintenance HD patients show signs, symptoms, or laboratory evidence of malnutrition.
- Plasma levels of BCAAs are particularly important as they comprise about one third of skeletal muscle in the human body, and play an important role in protein and neurotransmitter synthesis.

Objective

- The objective of this study is to assess the effect of a single dialysis session on plasma branched chain amino acids in patients on maintenance hemodialysis .
- To evaluate the percentage losses of all the three branched chain aminoacids at the end of hemodialysis procedure .

Design

- Fifteen patients with chronic renal failure undergoing hemodialysis were included in the study.
- Blood samples were collected from the arterial end of the dialyser for aminoacid analysis.

- Serum aminoacids by Reverse phase high pressure liquid chromatography.
(HPLC), in which aminoacids are derivatized with O-Pthalaldehyde.(OPA)
- Plasma urea and creatinine were quantitatively measured on Beckman Synchron CX9 fully automated analyzer using commercial kits.

- Plasma bicarbonate concentrations could be measured in only five of our study patients.

Statistical analysis

- Mann Whitney U test was employed and all values obtained were expressed as Mean (\pm SEM), and were corrected for plasma creatinine levels. A p value of < 0.05 was considered to be statistically significant.
- Statistical analysis was performed using Microsoft excel spread sheet and SPSS for windows- version 11.5.

Results & Discussion

- A significant decrease in plasma concentration of Valine and Isoleucine were observed at the end of hemodialysis compared to the pre HD levels ($p < 0.05$).
- However, the decrease in plasma concentration of Leucine during the post HD period was found to be statistically insignificant ($p = 0.078$).

- Since amino acids are lost into the dialysate, the data was corrected for loss into dialysate by creatinine i.e. the values were divided by creatinine (PreHD/Cre & PostHD/Cre).
- After correction the decrease in plasma concentrations of Valine and Isoleucine were still found to be statistically significant.

Table 1: Plasma BCAA concentrations before & after hemodialysis

Amino acids $\mu\text{mol/L}$	PRE HD Mean \pm SEM	POST HD Mean \pm SEM	P value	P* value
Valine	229.94 \pm 23.50	166.81 \pm 12.25	0.027	0.050
leucine	137.27 \pm 19.58	128.73 \pm 16.16	0.078	0.917
isoleucine	102.14 \pm 12.37	78.45 \pm 33.30	0.018	0.023

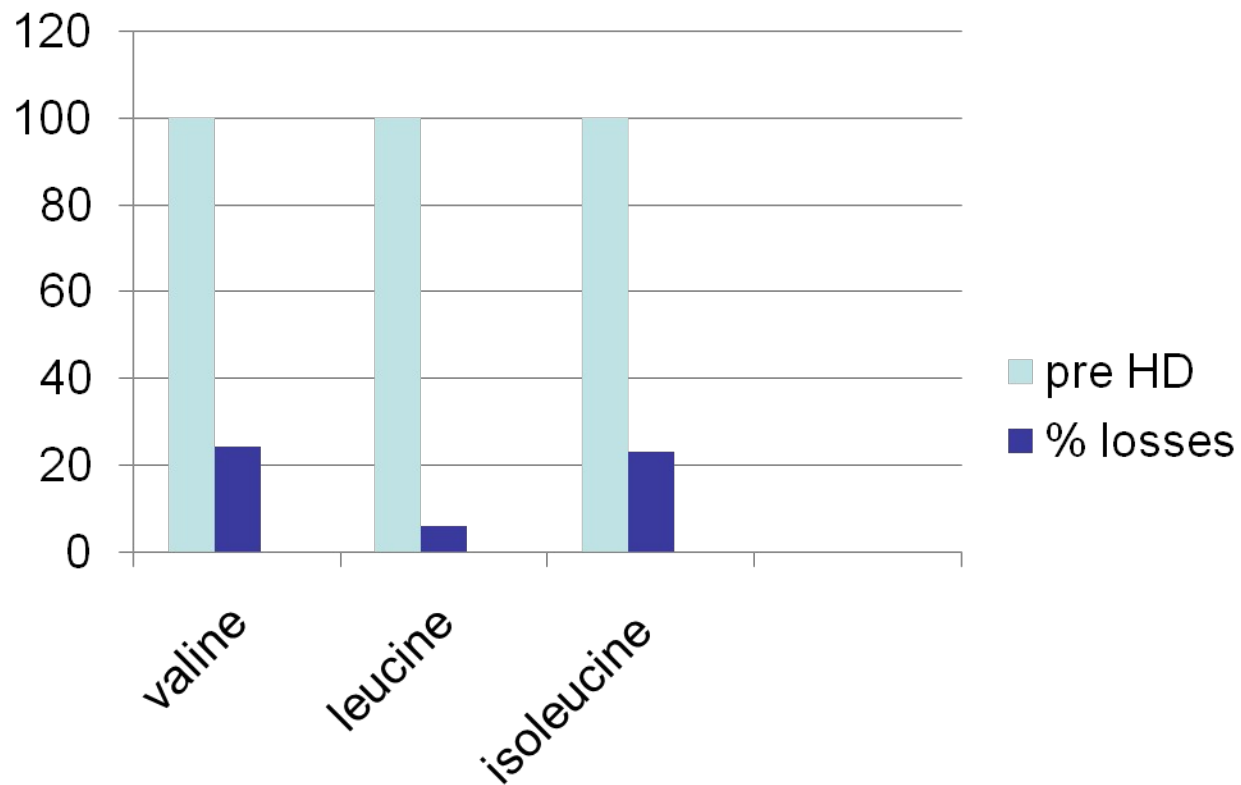
(P* value = value obtained after correcting the data for plasma creatinine concentrations)

- The percentage losses after the completion of HD were -24.45 , -23.19 , and -6.22% respectively for valine, isoleucine, and leucine.
- Plasma bicarbonate levels could be estimated in just five of our study patients which were found to be 23.92 ± 0.91 m mol/L.

- **TABLE 2:** PERCENTAGE CHANGE IN PLASMA CONCENTRATION BRANCHED CHAIN AMINO ACIDS, TAKING THE PRE HD VALUES AS 100%

BCAA	% CHANGE
Valine	-24.45
Leucine	-6.22
Isoleucine	- 23.19

- Graphical representation of plasma BCAA pattern



Hypothesis

- BCAA Oxidation
- Protein degradation
- Dialysate AA losses
- Reduced protein synthesis

Conclusion

- A significant decrease in plasma concentrations of Valine and Isoleucine along with **insignificant (p=0.078) Leucine** levels were observed at the end of hemodialysis.
- The percentage losses after the completion of HD were -24.45 , -23.19 , and -6.22% respectively for valine, isoleucine, and **leucine**.



- The muscle and whole body proteolysis could happen.
- Points to need for supplementation with BCAA or BCKA during HD.

I thank my PhD guide, for giving me this
OPPORTUNITY



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thank you, **all** to do
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