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Intravenous L- Carnitine in HD patients and some of its benefits: A single-center Observation

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Letter to the Editor

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Dear Editor

L-carnitine is an essential cofactor in fatty acid and energy metabolism and has become of interest in end-stage renal disease and dialysis patients. Chronic kidney disease (CKD) patients could be predisposed to carnitine deficiency due to many factors including protein-restricted diet, decreased L-carnitine production because of impaired kidney function, and increased carnitine loss during dialysis, however, serum carnitine concentrations tend to decrease more at longer dialysis duration [1,2]. Ahmad, 2001, added that Hemodialysis (HD) patients often have low serum concentrations of free L-carnitine and decreased skeletal muscle stores [3]. Abnormal carnitine metabolism in dialysis patients could be associated with some clinical problems. Studies have shown that L-carnitine supplementation in HD patients improves several complications seen in dialysis patients, including limitation of exercise capacity, increased intradialytic hypotension, and muscle symptoms [3,4]. L-Carnitine has been used as adjuvant therapy in HD for many years. However, there is controversy whether L-carnitine supplementation

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is beneficial [5]. L- Carnitine has been used inconsistently with an argument in many HD Units and was generally free of serious side effects.

We recorded the effect of intravenous L-carnitine in HD patients complaining of muscle fatigue and weakness. This is a clinical and laboratory observation at Arar general hospital in Kingdom Saudi Arabia (KSA) and included eleven patients on maintenance HD. The observation performed for more than 30 months starting from November 2017 until Feb 2020. All patients had been complaining of muscle fatigue and weakness manifestations. Additionally, they cannot get out from the sitting position easily or with aid. The patients started to receive management in the form of intravenous injection of L-carnitine ampoule (1000 mg) post HD session three times/week for eighteen months up to two years. At the start of the year 2020, Because of the unavailability of the drug (L-carnitine), all patients stopped its use obligatory. All patients' reviews were evaluated by two treating physicians (Megahed A F and Hles G M). They prescribed the management and followed the patients' complaints before, during the use of L-carnitine, and after the obligatory stoppage of the drug. Observations of the two treating physicians were recorded. After the collection of the data, they were analyzed using the statistical package of social science (SPSS, IBM) software version 24. Categorical data were expressed as numbers and percentages. Scale data were expressed as means ± SD and medians.

The current observation included eleven HD patients of mean age of 56.91(6.964) years. Males constituted five (45%) of the total sample. The mean dialysis duration was 59.82(54.175) months. Tables 1 shows the baseline demographic and clinical and laboratory data of the included sample.

The eleven patients included in the observation received L-carnitine ampoule each HD session and all of them had improved as regards their complaints of muscle fatigue and weakness either totally or partially. Seven of them improved totally, can get up from bed without aid and walk and descend stairs without aid, while the remaining improved partially. One patient shifted to another HD unit and lost follow-up. After discontinuation of the drug; the ten patients started to complain again about muscle fatigue and weakness as before the start of management except for one patient who deteriorated furthermore. Four of the observed patients were complaining of intradialytic hypotension which disappeared with the use of L- carnitine ampoule and recurred again after the stop of L- carnitine.

Table 1.

Demographic data of the observed patients				
		n	%	
Gender	Female /Male	6/5	54.5/45.5	
Country	KSA	8	72.0	
	Non-Saudi	3	28.0	
Smoking	Non-smoker	9	81.8	
	Smoker	1	9.1	
	Ex-smoker	1	9.1	
Diabetes mellitus	Yes	7/11	63.6	
HTN	Yes	11/11	100.0	
Ischemic heart disease	Yes	3/11	27.3	
Serology	Negative	7	63.6	
	Positive HCV-Ab	3	27.3	
	Positive HBsAg	1	9.1	
Clinical and laboratory data of the observed patients				
	n	Mean	Std. Deviation	Median
Age	11	56.91	6.964	58.00
Duration of HD (in months)	11	59.82	54.175	46.00
Body Weight	11	75.39	17.463	70.00
Average UF	11	2.95	1.340	3.25
Diastolic blood pressure	11	83.45	7.313	80.00
Systolic blood pressure	11	155.82	15.132	160.00

Possible Aetiology of CKD	DM	1	9.1	
	HTN	9	81.8	
	DM & HTN	1	9.1	
WBC Pre study	10	7.07	1.539	6.93
Hemoglobin Pre study	10	10.39	1.292	10.20
Platelet Pre study	10	250.80	148.037	213.50
Glucose Pre study (mg/dl)	10	217.01	105.911	207.54
Blood. Urea Pre study (mg/dl)	10	130.59	32.734	126.90
Creatinine Pre study (mg/dl)	10	8.67	3.383	7.96
Uric acid Pre study (mg/dl)	9	5.59	1.414	5.87
Albumin Pre study..	10	3.27	0.429	3.41
ALT Pre study	9	22.22	15.458	17.00
AST Pre study	6	41.33	63.933	11.00
GGT Pre study	10	73.99	111.054	34.00
Cholesterol Pre study (mg/dl)	9	148.87	32.258	146.68
Triglyceride Pre study (mg/dl)	10	137.71	127.508	84.08
Calcium Pre study (mg/dl)	9	8.64	0.864	8.84
Phosphorus Pre study (mg/dl)	9	4.76	1.363	4.46
Serum Sodium Pre study(ml eq/L)	9	135.00	2.828	135.00
Serum potassium Pre study(ml eq/L)	9	5.04	0.976	4.80
Transferrin. Saturation(%)	10	24.047	13.3217	18.64

In the current observation, the use of intravenous L –carnitine post HD sessions is associated with subjective improvement in muscle function, this is supported by many studies that considered L-carnitine is very essential in HD patients. Routine administration of L-carnitine to all dialysis patients is still not recommended; however, a trial of L-carnitine administration can be useful in symptomatic patients with certain clinical features. These include intradialytic muscle cramps and hypotension, asthenia, and muscle weakness [3,4]. Significant benefits of L-carnitine supplementation in patients with better serum albumin advocate that this therapy should not be restricted to patients with the worst nutritional and overall status [6]. Iwasaki and his associates, 2020 reported that baseline carnitine concentrations were low among Japanese dialysis patients, especially among patients who received dialysis for more than four years [7]. However, L-carnitine administrations may help reduce muscle spasms in selected patients.

CONCLUSION

The intravenous L-carnitine ampoule of 1000 mg post HD three times/week could be useful in symptomatic HD patients with certain clinical features including intra-dialytic hypotension and muscle weakness or fatigue. Large prospective observational studies are warranted to validate these findings.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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