The Effects of Intravenous Vitamin C Administration on hs-CRP and Tumor Necrosis Factor-α Levels in Haemodialysis Patients

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Abstract:
Background: It has been proved that pre-inflammatory factors increase mortality and morbidity of cardio-vascular diseases especially in hemodialysis patients. There is a great evidence for the increase of pre-inflammatory factors and vitamin C deficiency in dialysis patients. Limited data, however, are available regarding the effects of vitamin C supplementation on reduction of inflammatory markers in such patients.

Objectives: The aim of this study is to determine the changes of hs-CRP and Tumor Necrosis Factor-α (TNF-α) levels after administration of vitamin C in End Stage Renal Disease patients (ESRD) on Hemodialysis

Methods and Materials: In this clinical trial, vitamin C was administered intravenously (IV), (500 mg two times per week) for 2 months in 41 chronic hemodialysis patients and the hs-CRP and TNF-α levels of these patients were compared with a control group with no vitamin C as treatment. Besides hs-CRP and TNF-α, detailed laboratory results were evaluated before and after the study. The statistical analysis was performed using SPSS version 16 at the end of the study.

Results: The hs-CRP and TNF-α levels reduced significantly in hemodialysis patients after vitamin C supplementation (hs-CRP decreased from 7.27±3.70 to 6.60±3.75, P< 0.001 and TNF-α decreased from 25.61±12.28 to 22.82±22.83, P= 0.006), whereas the levels of these pro-inflammatory factors increased in hemodialysis patients without vitamin C supplementation (hs-CRP increased from 7.13±3.56 to 7.73±3.83, P= 0.049 and TNF-α increased from 21.32±5.64 to
23.63±15.59, P= 0.353). Vitamin C supplementation also reduced ESR level and increased Hb level significantly but it had no influence on lipid profile. 

**Conclusion:** According to the findings of this study, it seems that vitamin C administration can reduce hs-CRP and TNF-α level in hemodialysis patients and as a result prevent atherosclerosis. It can be concluded that administration of vitamin C supplementation is beneficial in hemodialysis patients.

**Key words:** hemodialysis, hs-CRP, TNF-α, Vitamin C