Comparative Study of Combined Intravenous Iron with Vitamin C versus only Intravenous Iron in Hemodialysis Patients with Functional Iron Deficiency Anemia

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Background: Erythropoietin & iron supplement are the armamentarium of anemia in hemodialysis patients. But some patients might not respond to these treatments despite of adequate iron. Functional iron deficiency anemia is the condition of adequate iron storage but with insufficient iron mobilization. This condition is characterized by normal to high ferritin level but low transferrin saturation. Previous studies have shown that intravenous vitamin c combined with iron in hemodialysis patients could raise the hemoglobin levels and decrease the erythropoietin dose requirement. There have not yet been any clinical studies to compare the vitamin c supplement with iron to iron supplement alone in treatment of functional iron deficiency anemia.

Objective: The primary objective was to compare the effect of anemic treatment between using intravenous iron alone and combining with intravenous vitamin C in hemodialysis.

Method: This study was the randomized controlled trial conducted in a university hospital. Hemodialysis patients with functional iron deficiency anemia between September 2016 and September 2017 were enrolled. They were randomized into the control, receiving intravenous iron only, and the experiment, receiving combined intravenous vitamin c and iron. The red cell and iron indices were examined before and following the therapy at the 5th week and 10th week, then compared the results in both groups.

Results: Twenty-nine hemodialysis patients with functional anemia were included, with 14 in the control group and 15 in the experimental group. Hemoglobin levels rose from 9.33 % to 12.03 % (p-value = 0.35) in the control group and from 9.21 % to 10.62 % (p-value = 0.08) in the experimental group. The mean corpuscular volumes rose from 83.4 fl to 86.4 fl (P-value = 0.31) and rose from 82.67 fl to 85.89 fl (P-value = 0.01) in the control and the experimental group, respectively. The transferrin saturation was increased to 36 % (p-value = 0.001) and 29 % (p-value = 0.03) in the control group and the experimental group, respectively. There were no statistical differences between each group.

Conclusion: The combined intravenous vitamin C and intravenous iron supplement yield no more beneficial effect than the intravenous iron only in treatment of functional iron deficiency anemia in hemodialysis patients.

Keywords: Functional anemia, Vitamin C, Intravenous iron, Hemodialysis