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Normoferritinemia가 있는 혈액투석 환자의 빈혈 치료에 대한 Vitamin C의 효과

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The Effect of Intravenous Ascorbic Acid in Hemodialysis Patients with Normoferritinemic Anemia

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Introduction: Hemodialysis (HD) patients with functional iron deficiency often develop resistance to recombinant human erythropoietin (rEPO). Recent studies suggest that intravenous ascorbic acid (IVAA) administration could override rEPO resistance in HD patients. This study was undertaken to test the effects of IVAA in HD patients with normoferritinemic functional iron deficiency accompanied with EPO-hyporesponsive anemia.

Methods: Fifty-eight HD patients with normoferritinemic (between 100 and 500 ug/liter) anemia were included and divided into the control (N=25) and IVAA (N=33) groups. IVAA patients received 500 mg of intravenous ascorbic acid with each dialysis session for 3 months and additional 4 months follow-up after the end of the therapy.

Result: Eight patients of IVAA group withdrew by the end of the study. Twenty patients has a response to IVAA with significantly increase in their hemoglobin (Hb >1.0 g/dL) and reduction of weekly rEPO dosage after three months later. Compared with non-responders (N=13), transferring saturation (TSAT) was significantly decreased in responders (N=20) (26±11 vs 35±14%, $p<0.05$) on baselines data. There was a significant rise in serum iron and TSAT (baseline vs 3 months, serum iron 57±22 vs 108±22 ug/dL, TSAT 26±11 vs 52±7%, $p<0.05$) and a fall in serum ferritin (377±146 vs 233±145 ng/mL, $p<0.05$) of responder group (N=20) but no significant changes in controls (N=20) and non-responder group (N=13) at three month later.

Conclusion: Intravenous ascorbic acid can be a potent and effective adjuvant therapy for hemodialysis patients with normoferrtinemic anemia. Ascorbic acid can reduce the dosage of EPO for anemia correction in hemodialysis patients.

Key Words: 빈혈, 비타민 C, 혈액투석환자
Anemia, Hemodialysis, Vitamin C