Combined Therapy with Glycerol and 10% NaCl for Preventing Dialysis-Induced Hypotension

K.	Kazuyoshi	Okada
S.	Susumu	Takahashi
Y.	Yuji	Nagura
M.	Michinobu	Hatano

Second Department of Internal Medicine, Nihon University School of Medicine, Tokyo, Japan

Dr. K. Okada, Second Department of Internal Medicine, Nihon University School of Medicine, Tokyo 173 (Japan)

Dear Sir,

Dialysis-induced hypotension (DIH) is a troublesome problem when attempting to perform chronic stable hemodialysis. Although several factors have been proposed for its etiology and the interactions are complex [1], an osmolality fall has been suggested to represent one of the important mechanisms [2]. It has been reported that intravenous injection of 10% NaCl [3], intravenous infusion of mannitol [4], high-sodium dialysate [5], high-glucose dialysate [6], and dialysate modified by the addition of mannitol or glycerol [7] can prevent DIH, suggesting that both a continuous increase in serum osmolality and an intermittent increase in serum osmolality are effective in the prevention of DIH. We therefore attempted to combine continuous and intermittent increases of serum osmolality, expecting a better effect of DIH.

Two patients dialyzed for 4 h three times weekly were selected because of their frequent occurrence of DIH (baseline period). They were given continuous infusion of Glyceol® (Chugai Pharmaceutical Co., Japan) at a rate of 100 ml/h intravenously. Glyceol (500 ml) contains 150 g glycerol, 25 g fructose and 4.5 g NaCl. Subsequently, they received continuous infusion of Glyceol at a rate of 100 ml/h combined with intermittent injection of 20 ml of 10% NaCl at the start of dialysis and at 1, 2, and 3 h after the start of dialysis. In case 1, the frequency of DIH and body weights before and after dialysis were significantly decreased by the continuous infusion of Glyceol alone. When combined

therapy was employed, the body weights before and after dialysis were appreciably reduced as compared to those during the Glyceol only period. However, the systolic blood pressure before dialysis was significantly increased as compared to that in the baseline period. In case 2, the body weights before and after dialysis, and the weight gain between dialyses were significantly decreased by the continuous infusion of Glyceol alone. When combined therapy was employed, the frequency of DIH and body weight after dialysis were significantly reduced, and the body weight before dialysis and weight gain between dialyses were appreciably increased as compared to those during the Glyceol only period. In addition, the diastolic blood pressure before dialysis was significantly elevated as compared to that in the baseline period (table 1). Since combined therapy was effective in DIH, the predetermined net ultrafiltration could be performed, resulting in a decrease in cardio-thoracic ratio.

Although the present method can be easily employed with a definitive effectiveness for the prevention of DIH, caution related to an increase in blood pressure before dialysis and weight gain between dialyses is required. If the dose of either Glyceol or 10% NaCl is increased further, or the injection interval of the 10% NaCl is shortened, stronger effect would be expected.

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0028-2766/92/

0602-0238\$2.75/0

Table 1. Changes in frequency of dialysis-induced hypotension, body weight, weight gain between dialyses, and blood pressure before dialysis in each period

Frequency of dialysis-induced hypotension, %

Body weight, kg

before dialysis

Weight gain between dialyses, kg

systolic

Blood pressure before dialysis, mm Hg

diastolic

Case 1 Baseline Glyceol Glyceol+10%NaCl

ω-

63.1 ± 0.2 61.2 ± 0.2 59.0 ± 0.2

3.1 ± 0.2 3.0 ± 0.2 2.8 ± 0.1

171 ± 3 176 ± 3 181 ± 3

90 ± 2 88 ± 2 91 ± 2

Case 2

Baseline 13 62

Glyceol 11 36

Glyceol+10% NaCl 16 6^

52.0 ± 0.3 50.6 ± 0.2 51.4 ± 0.2

49.1 ± 0.1 48.4 ± 0.2 48.0 ± 0.1

2.9 ± 0.3

± 0.2

± 0.2

ω»

162 ± 5

± 3

± 5

79 ± 2 84 ± 2 86 ± 2

All values are expressed as the mean ± standard error. *p < 0.05, **p < 0.01, ***p < 0.001.

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