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Control of Dry Weight and Tube Feeding Improved the General Condition of a Hemodialysis Patient: Report of a Case

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ABSTRACT

Patients on long-term hemodialysis are at risk of developing malnutrition,and poor nutrient intake is an important factor in this. In the present case, we encountered a 55-year-old Japanese woman with end-stage renal failure and a past history of schizophrenia. Severe systemic edema was observed. Hemodialysis was started, but after one year she suddenly became unable to consume food orally, despite provision of a dietary plan by the nutrition support team (NST). Tube feeding was eventually implemented. Because the systemic edema did not improve, we decided to remove body fluid by intense hemodialysis. Hypotension was often observed during this hemodialysis, requiring dopamine. Over approximately 2 months, the patient's dry weight fell from 73 kg to 62 kg, the patient's activity improved and she became able to eat orally again, allowing tube feeding to be stopped. Although the reason for the sudden anorexia has not been clarified, tube feeding and dry weight control was successful in the treatment of this malnourished hemodialysis patient.

Key words: *Hemodialysis, Dry weight, Tube feeding, Nutrition support team*

Mortality and morbidity rates are high in patients on long-term hemodialysis therapy[8]. Malnutrition is associated with an increased risk for morbidity and mortality, so the monitoring of nutritional status in hemodialysis patients is very important[5]. Involvement of a nutritional support team(NST) has been helpful in the treatment of pressure ulcers, and a team approach has improved mineral and bone disorders in dialysis patients[1,4].

In the present case, a NST was helpful in the treatment of a malnourished hemodialysis patient with systemic edema.

CASE REPORT

A 55-year-old Japanese woman was admitted to our hospital in August 2008, because of chronic renal failure with systemic edema. Her past history included schizophrenia and congenital blindness. On examination, her height was 150 cm and her body weight was 75 kg, and she was bedridden because of symptoms of chronic renal failure. Hematological examination of the peripheral blood revealed the following: red blood cells, 310(400-520) × 10^4; hematocrit, 27 (36.0-48.0)%; hemoglobin, 9.3 (13.0-17.0) mg/dl; white blood cells, 5,200 (4,000-9,000). Biochemical analysis showed the following serum level: sodium, 132 (138-146) mmol/liter; potassium, 3.7 (3.6-4.9) mmol/liter; chloride, 101 (99-109) mmol/liter; total protein, 7.5 (6.7-8.3) mg/dl; albumin, 3.5 (3.9-4.9) mg/dl; total cholesterol, 163 (150-219) mg/dl; alkaline phosphatase, 283 (115-359) U/liter; cholinesterase, 243 (213-501) U/liter; lactate dehydrogenase, 214 (119-229) U/liter; total bilirubin, 0.3 (0.2-1.3) mg/dl; alanine aminotransferase, 5 (8-42) U/liter; aspartate aminotransferase, 9 (13-33) U/dl; blood urea nitrogen, 88.3 (8.0-20.0) mg/dl; and creatinine, 9.1 (0.6-1.2) mg/dl. Urinalysis was positive for protein (+) but negative for glucose. We could not detect heart failure in this patient using cardiac ultrasonography.

Hemodialysis was started immediately. The ini-

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tial dietary plan for this patient comprised: less than 6.0 g of sodium chloride and less than 60 g of protein per day, with an energy intake of 2,000 Kcal per day. In February, 2009, she suddenly became unable to eat food. Hormonal disturbance or uremia was not observed in this patient. We arranged a psychiatric consultation to see whether this anorexia might have been related to a psychiatric event, but this was determined not to be the case. The NST was helpful for treatment of this patient, and the nutritional status improved gradually after the introduction of tube feeding. The following nutritional plan was implemented: total energy, 1,520 Kcal; protein, 53.2 g; and water, 750 ml per day. We considered the 73 kg body weight excessive for this patient, so we decided to remove surplus body fluid by hemodialysis in May 2009. Changes in dry weight are shown in Fig. 1. During hemodialysis, hypotension was often observed, and this was treated with dopamine. From July 2009, the patient's activity improved, hypotension was not observed during hemodialysis, and appetite was also improved. She was able to transfer into a wheel-chair from the bed and to eat normally by mouth. Changes in serum protein are shown in Fig. 2, but serum albumin was not elevated during the hospital stay.

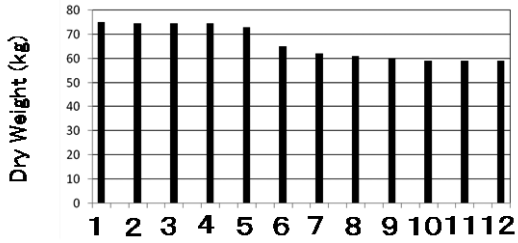

Fig. 1. Changes in dry weight at 2-monthly intervals.
Y-axis: Dry weight in kilograms (kg).
X-axis: 1: October, 2008; 2: December, 2008; 3: February, 2009; 4: April, 2009; 5: June, 2009; 6: August, 2009; 7: October, 2009; 8: December, 2009; 9: February, 2010; 10: April, 2010; 11: June, 2010; 12: August, 2010

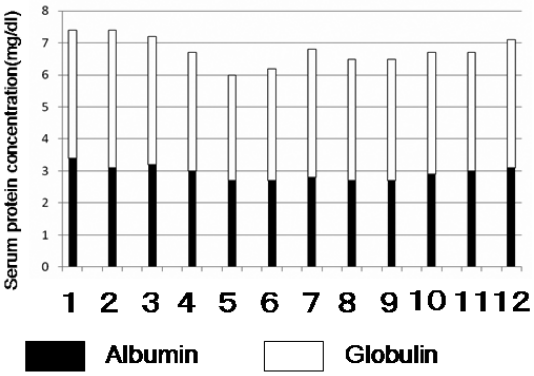

Fig. 2. Changes in serum protein concentrations at 2-monthly intervals.
Y-axis: serum protein concentration in mg/dl
X-axis: 1: October, 2008; 2: December, 2008; 3: February, 2009; 4: April, 2009; 5: June, 2009; 6: August, 2009; 7: October, 2009; 8: December, 2009; 9: February, 2010; 10: April, 2010; 11: June, 2010; 12: August, 2010

DISCUSSION

We have presented a case of a malnourished hemodialysis patient who was treated with tube feeding and removal of excessive body fluid by hemodialysis, with hypotension treated using dopamine.

Dry weight is defined as the lowest weight that the patient can tolerate without any intradialytic symptoms or hypotension at the termination of the treatment session[3]. In the present case, 73 kg was considered an excessive body weight for the patient's height (150 cm of height), so we tried to reduce the body weight by hemodialysis. During hemodialysis, hypotension was often observed, requiring dopamine treatment. Hypotension is a major complication during hemodialysis. Decreased plasma volume preservation is directly responsible for this phenomenon, and this is caused by fluid being removed from the intravascular space, delayed plasma refilling by ultrafiltration, and insufficient compensatory vasoconstriction[6]. Nette et al stated that norepinephrine infusion resulted in a direct and substantial decrease in relative blood volume in hemodialysis patients[6]. Dopamine, another vasopressor agent, provides stronger beta-adrenergic stimulation than norepinephrine and increases the heart rate to a greater degree[2]. In the present case, heart rate was not increased during hemodialysis (data not shown), but it is nevertheless advisable to use norepinephrine instead of dopamine in such patients to avoid tachycardia.

The prognosis of bedridden hemodialysis patients is relatively poor, particularly for younger patients[7]. It is important to improve activities of daily living, and the NST was helpful in the present case, not only in determining the energy content of meals but also in advising the best route of feeding.

In conclusion, we succeeded in improving the general status of a systemic edema and malnourished patient with chronic renal failure. Serum albumin was not fully elevated, but dry weight control was successful. The NST played an important role in the point of adequate energy intake in this case.

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REFERENCES

1. **Carver, M., Carder, J., Hartwell, L. and Arjomand, M.** 2008. Management of mineral and bone

disorders in patients on dialysis: a team approach to improving outcomes. Nephrol. Nurs. J. **35**: 265-270.

2. **De Backer, D., Biston, P., Devriendt, J., Madl, C., Chochrad, D., Aldecoa, C., Brasseur, A., Defrance, P., Gottignies, P. and Vincent, J.L.** 2010. Comparison of dopamine and norepinephrine in the treatment of shock. N. Engl. J. Med. **362**: 779-789.
3. **Hoenich., N.A. and Levin, N.W.** 2003. Can technology solve the clinical problem of 'dry weight'? Nephrol. Dial. Transplant. **18**: 647-650.
4. **Inui, S., Konishi, Y., Yasui, Y., Harada, T. and Itami, S.** 2010. Successful intervention for pressure ulcer by nutrition support team: a case report. Case Rep. Dermatol. **2**: 120-124.
5. **Kloppenburg, W.D., Stegeman, C.A., de Jong, P.E. and Huisman, R.M.** 1999. Relating protein intake to nutritional status in haemodialysis patients: how to normalize the protein equivalent of total nitrogen appearance (PNA)? Nephrol. Dial. Transplant. **14**: 2165-2172.
6. **Nette, R.W., Ie, E.H., Vletter, W.B., Krams, R., Weimar, W. and Zietse, R.** 2006. Norepinephrine-induced vasoconstriction results in decreased blood volume in dialysis patients. Nephrol. Dial. Transplant. **21**: 1305-1311.
7. **Sugaya, K., Hokama, A., Hayashi, E., Naka, H., Oda, M., Nishijima, S., Miyazato, M., Hokama, S. and Ogawa, Y.** 2007. Prognosis of bedridden patients with end-stage renal failure after hemodialysis. Clin. Exp. Nephrol. **2**: 147-150.
8. **United States Renal Data Service.** 1997. Excerpts from United States renal data system 1997 annual data report. Am. J. Kidney Dis. **30 (2 Suppl 1):** S1-213.