Multiple Organ Failure Associated with Dimethylsulfoxide and Hydroxyethyl Starch in Autologous Blood Stem Cell Transplantation

G.	Gakusen ⁿ	Nishihara ^a
T.	Takanobu	Sakemi ^a
Y.	Yuji ⁱ	Ikeda ^a
N.	Naoki	Baba ^a
Y.	Yoshinori	Shimamoto ^b

Division of ^aNephrology and ^bHematology, Department of Internal Medicine, Saga Medical School, Saga, Japan

Gakusen Nishihara, Division of Nephrology, Department of Internal Medicine, Saga Medical School, Nabeshima, Saga 849 (Japan)

Dear Sir,

Autologous blood stem cell transplantation (ABSCT) is reported to have less contamination by tumor cells [1] and more rapid recovery of marrow function than autologous bone marrow transplantation [2]. Life-threatening complication associated with the infusion of bone marrow grafts or peripheral blood stem cells (PBSC) preserved with a mixture of dimethylsulfoxide (DMSO) and hydroxyethyl starch (HES) has not yet been documented. We describe the case of multiple organ failure (MOF) after the infusion of PBSC preserved with a mixture of DMSO and HES.

A 22-year-old male was admitted, complaining of pain in the lower right quadrant of the abdomen, where a tender tumor was palpable. He was diagnosed as having malignant lymphoma Burkitt type originating in the terminal ileum. High-dose ablative chemotherapy consisting of pirarubicin, rani-mustine, carboplatin and etoposide was performed. On day 9 of the chemotherapy, PBSC, which had been harvested via peripheral blood by means of apheresis and stored at -80°C with 5% DMSO and 6% HES (Kyokuto Pharma. Indust. Co., Tokyo, Japan), were rapidly thawed in a 37°C water-bath and infused through a central venous catheter for 60 min. The infused volume was 759 ml containing 38.0 g of DMSO (0.70 g/kg) and 45.5 g of HES (0.84 g/kg).

An hour and a half after completion of the infusion the patient developed pulmonary edema and was in respiratory failure with arterial blood gas showing pH 6.86, PO₂ 48 mm Hg, PCO₂ 99 mm Hg, HCO₃ 16.6

mmol/l and with blood pressure 120/70 mm Hg, pulse rate 170/min. He was shocked with marked hypotension and required mechanical ventilation. Three days later he became independent of both mechanical ventilation and inotropic support. However, the investigations showed anemia, nonoliguric renal deterioration and liver dysfunction: hemoglobin 7.7 g/dl, hematocrit 21.7%, white cell count 100/μl, platelets 1.2 × 10⁴/μl, blood urea nitrogen 77.9 mg/dl, creatinine 6.3 mg/dl, serum bilirubin 3.9 mg/dl, aspartate aminotransferase 3,573 IU/l, α-lanine aminotransferase 2,219 IU/l, lactic de-hydrogenase 20,340 IU/l and prolonged pro-

§ 4,000

E

3/4 3,000

2

| 2,000 -

| 1,000

5

||||,|||||

10 Days after ABSCT

20

References

Langlands K, Craig JO, Parker AC, Anthony RS: Molecular determination of tumor contamination in peripheral blood stem harvests. *Exp Hematol* 1990; 18:680. Kessinger A, Armitage JO: The evolving role of autologous peripheral stem cell transplantation following high-dose therapy for malignancies. *Blood* 1991;77:211-213. Davis JM, Rowley SD, Braine HG, Piantadosi S, Santos GW: Clinical toxicity of cryopre-served bone marrow graft infusion. *Blood* 1990;75:781-786.

Smith DM, Weisenburger DD, Bierman P, Kessinger A, Vaughan WP, Armitage JO: Acute renal failure associated with autologous bone marrow transplantation. *Bone Marrow Transplant* 1987;2:195-201. David NA: The pharmacology of dimethyl sulf-oxide 6544. *Rev Pharmacol* 1972;12:353-374. Yellowless P, Greenfield C, McIntyre N: Dime-thylsuphoxide-induced toxicity. *Lancet* 1980;i: 1004-1006.

MOF Associated with DMSO and HES in ABSCT

Nephron 1996;72:356-357

357