LETTER TO THE EDITOR

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Fatty Precipitation in Donor Bone Marrow Caused by Overnight Cold Preservation in a Refrigerator

Verici Kemik İliğinde Buzdolabında Bir Gecelik Soğuk Muhafazanın Neden Olduğu Yağ Çökelmesi

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To the Editor,

Japan experiences many typhoons every year. In the period from summer to autumn, when the risk of typhoons is particularly high in Japan, the risk of delays in bone marrow aspirate transportation increases because public transportation is canceled when typhoons arrive. No domestic or national guidelines have been established regarding the storage of bone marrow aspirate material after collection and the storage conditions are determined by the policies of each transplant facility. However, considering cell viability, the physicians at many stem cell transplantation centers consider it desirable to store bone marrow aspirates at 4 °C if they are to be preserved overnight or longer [1]. Although the standard practice is thus usually bone marrow aspirate storage at 4 °C, we experienced an exceptional case of solidified bone marrow aspirate after 24 h of storage at 4 °C.

In this case, bone marrow aspirate material was collected from a 45-year-old man in another institute on 23 August 2024 and was to be transported to our institute for a 65-year-old female recipient. Transportation of the bone marrow aspirate was scheduled to occur on the same day as the collection but was canceled due to an approaching typhoon. It was subsequently transported by a commercial transporter (Nippon Express, Japan) on 24 August 2024, the next day after collection, after having been stored overnight at 4 °C at the collection center. The amount of bone marrow aspirate collected was 1200 mL and the total absolute number of all nucleated cells (ANC) was 2.29×10^{10} (3.08×10^{8}/kg body weight).

On the day of transportation, 24 August 2024, the bone marrow aspirate material arrived at our institute at 12:00 PM (noon). The ANC had decreased to 1.26×10^{10} (1.70×10^{8}/kg body weight) at the time of arrival to our institute, constituting a 55% reduction. Removal of erythrocytes and plasma was to be performed because of major incompatibility between the donor's blood type (AB+) and the patient's blood type (B+). However, the lipid component in the bone marrow aspirate had solidified (Figure 1), making it highly viscous. This made it impossible to inject the bone marrow aspirate into the apheresis bag. The lipid component required time to dissolve, and then the bone marrow aspirate was safely infused with an ANC recovery value of 75.9% and a mononuclear cell recovery value of 69.1% based on post-processing evaluations. We determined cell viability to be 97.1% using the 7-amino-actinomycin D staining assay. The triglyceride concentration in the bone marrow aspirate was 304 mg/dL, which was higher than that of the peripheral blood

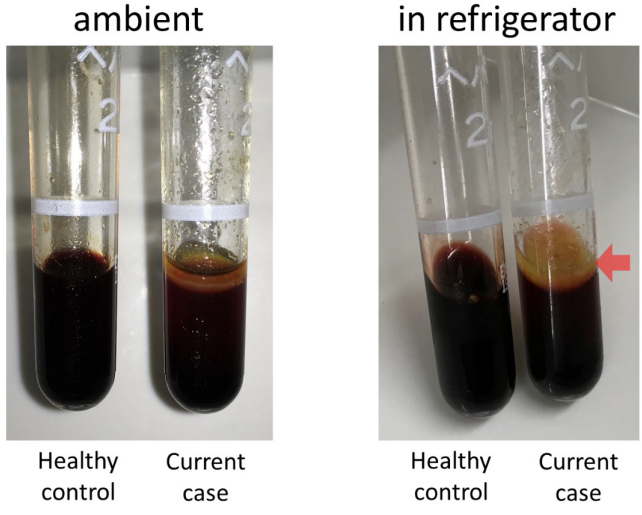

Figure 1. The donor's solidified bone marrow aspirate material. The left panel shows that the bone marrow aspirate material from the donor and that of a healthy control were both liquefied at room temperature. The right panel shows that the lipid component of the donor's bone marrow aspirate material solidified (red arrow) during overnight preservation in a refrigerator. The bone marrow aspirate material from the healthy control was not solidified.

(201 mg/dL). The recipient was engrafted with neutrophils on day 21 and with both erythrocytes and platelets on day 30.

If the delivery of bone marrow aspirate material is unusually delayed for reasons such as weather or natural disasters, storage at room temperature may be desirable in cases where the bone marrow aspirate contains a significant amount of fat. Nevertheless, it should be emphasized that this is an exceptional case and that standard practice generally supports storage at 4 °C.

Keywords: Stem cell transplantation, Bone marrow transplantation, Donor

Anahtar Sözcükler: Kök hücre nakli, Kemik iliği nakli, Verici

Ethics

Informed Consent: Written informed consent was obtained from the patient for publication of this study.

Footnotes

Authorship Contributions

Surgical and Medical Practices: O.I., T.K.; Concept: O.I.; Design: O.I., T.K. M.U.; Data Collection or Processing: O.I., T.K.; Analysis or Interpretation: O.I., T.K. M.U.; Literature Search: O.I., T.K.; Writing: O.I., T.K.

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Reference

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