

Autologous cord blood transplantation in neuroblastoma

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To the Editor,

High-risk neuroblastoma is the most common indication for autologous hematopoietic stem cell (HSC) transplantation in children, and peripheral blood stem cells (PBSC) are now the most common source of HSCs.¹ On the other hand, available data about autologous cord blood (CB) transplantation for childhood malignancies is very limited.¹⁻³ To this point, only three cases of autologous CB transplantation for stage IV neuroblastoma have been reported.^{1,2,4} We herein present a case of stage IV neuroblastoma wherein transplantation with autologous CB took place.

A 43-month-old male presented with an abdominal mass. A complete blood count showed a WBC count of 5700/mm³, hemoglobin 9.3 g/dl and a thrombocyte count of 436000/mm³. He had an elevated urinary vanillylmandelic acid level of 90 mg/day, serum lactate dehydrogenase level of 801 IU/L and neuron-specific enolase level of 70 ng/ml. Magnetic resonance imaging revealed a tumor 10x7x12 cm in diameter arising from the left adrenal gland. I-123 MIBG scintigraphy demonstrated multiple bony involvement. A Tru-cut biopsy from the left retroperitoneal mass was performed, and the pathological examination revealed a diagnosis of neuroblastoma. At the same time, bilateral involvement of the bone marrow was shown by bone marrow biopsy. A diagnosis of stage IV neuroblastoma was made, and the patient began chemotherapy, as suggested by the national protocol of the Turkish Pediatric Oncology Group.⁵ After 8 cycles of chemotherapy, the residual tumor, which had regressed 25% according to the diagnosis, was almost totally resected. According to the protocol, he received two additional cycles of chemotherapy after the operation. Subsequently, the residual tumor was detected around the abdominal aorta; in addition, minimal frontal bone and left humeral involvement was found with magnetic resonance imaging and I-123

MIBG scintigraphy. ICE chemotherapy was started and PBSCs collected after the first ICE chemotherapy cycle. But the CD34⁺ stem cell count was not adequate for autologous PBSC transplantation. After the third cycle of ICE chemotherapy, he received radiotherapy to the area of the remaining tumor in the abdomen. At that time we learned that his CB had been collected and stored at a private CB bank. We decided to use CB and PBSC together for autologous transplantation. The conditioning regimen consisted of carboplatin, etoposide and melphalan. A total of 1 x 10⁵/kg CD34⁺ stem cells derived from CB and 2.97 x 10⁶/kg CD34⁺ stem cells derived from PBSC were infused. We achieved neutrophil and platelet engraftment at 14 and 35 days, respectively. No major transplant-related complications were observed. 13-cis retinoic acid treatment was given for 6 months. The patient remains alive and disease-free 18 months after transplantation.

Neuroblastoma is the most common extracranial solid tumor in children. Despite the development of new treatment options, the prognosis of high-risk neuroblastoma patients remains poor. The intensification of consolidation therapy with autologous HSC rescue after myeloablative chemotherapy has contributed to improved outcomes when compared to those of traditional chemotherapy.^{2,4}

Intensive induction regimens are currently used before PBSC collection, and the time needed to harvest sufficient autologous PBSCs is longer. The procedures and the time needed for leukapheresis are uncomfortable, especially for young children. Subcutaneous administration of G-CSF is painful, and the risk of using central lines may be higher in children.³ Sometimes the PBSC count is insufficient for transplantation. In addition, the risk of tumor contamination is lower in CB. For all these reasons, if autologous CB is available, it may be a first option as a source of HSCs; or at least, CB and PBSC could be used together to

reach a sufficient CD34⁺ count for autologous transplantation in children.

Key words: neuroblastoma, cord blood, autologous transplantation.

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