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Delayed cytokine effects of 4 days of intravenous G-CSF infusion for mobilization of peripheral blood stem cells: Possible role for neuroregeneration

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Statement of the Problem: Granulocyte colony-stimulating factor (G-CSF) has been widely used to mobilize peripheral blood stem cells (PBSC). In addition, it also has been tried to reveal the regenerative potential in various neurodegenerative diseases. We investigated the short-term and delayed effects of infused G-CSF for PBSC mobilization on the various cytokine secretions in cerebral palsy (CP) children. Methodology & Theoretical Orientation: G-CSF (10µg/kg/dose) was administered subcutaneously for 4 days to the children with CP. In first group, blood levels of G-CSF, interleukin (IL)-6, IL-10, insulin-like growth factor (IGF-1), vascular endothelial growth factor (VEGF), and brain derived neurotrophic factor (BDNF) as well as mobilized total nucleated cell (TNC)/CD34⁺ cell counts in peripheral blood (PB) were compared between levels just before (D+0) and 1 day after 4 days of G-CSF injections (D+5). In second group, cytokine levels were compared between D+0 and 1 month after 4 days of G-CSF injection (D+30). Cytokine levels were measured by enzyme-linked immunosorbent assay. Findings: Baseline levels of G-CSF were significantly increased (p=0.000) and IGF-1 decreased (p=0.011) at D+5 after 4 days of G-CSF compared to control group. In contrast, other cytokine levels including IL-6, IL-10, VEGF, and BDNF did not show any significant changes between before and after G-CSF administration. CD34⁺ cell counts (p=0.000) as well as TNC counts (p=0.000) in PB were significantly increased from D+0 to D+5 in children who received G-CSF compared to placebo group. Regarding delayed effect of G-CSF, G-CSF levels were significantly increased from baseline to D+30 (p=0.000), along with the increase IL-10 (p=0.035) and VEGF levels (p=0.011) and the decrease of IGF-1 levels (p=0.014). Conclusion & Significance: G-CSF which administered to mobilize PBSCs could induce the delayed effects on the levels of G-CSF itself as well as of other cytokines which could affect on the neuroregenerative potential.

Biography

Lee is a professor of department of pediatrics, Hanyang University Medical Center. He earned his degree of M.D. and PhD at Hanyang University College of Medicine. He got postgraduate researcher course in the field of pediatric hematology and stem cell transplantation at the UCLA Medical Center. His major fields are pediatric hematology, hematopoietic stem cell transplantation, and stem cell biology including stem cell homing. He performed the first successful cord blood transplantation (CBT) for child with relapsed acute leukemia at 1998 in Korea. Since then, he established infrastructures of CBT regarding banking guidelines for CB as well as clinical guideline for CBT. Furthermore, he performed the pioneering works for legislation for CB act in Korea. Recently, he has tried the application of mononuclear cells of CB and mobilized peripheral blood stem cells as cell therapeutics for refractory neurologic diseases.

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