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Prognostic factors in cord blood stem cell quality

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Abstract

Cord blood (CB) is a safe and rich source of hematopoietic stem cells (HSC) for oncohematology. The main indicators allowing the assessment of transplant feasibility is a number of nucleated (NC) and CD34+ cells.

A number of HSC is directly related to CB volume, depending on the processing technique and cryopreservation conditions. This study aims to isolate, identify, and quantify NC and CD34+ cells, as well as to evaluate cryopreservation on HSC viability and identify factors affecting HSC numbers in CB.

The average volume of collected CB was 71.48 ± 3.8 ml, NC number was $0.82 \pm 0.05 \times 10^9$, viability was $93.47 \pm 0.37\%$. CD34+ and NC numbers corresponded directly to cord blood volume, whereas CB volume is reflected in newborn weight. Cryoconservation has no effect on the number of viable HSC. Immunocytochemical analysis did not reveal any effects of cryoconservation on the number of viable CD34+; although, it might be necessary to apply more accurate methods of analysis. The maximum number of nuclear and CD34+ cells that can be isolated from cord blood volume is 70 ml from a newborn with a weight of 3500 g or more.

Keywords: cord blood, cryoconservation, viability, HSC