

CELL PROCESSING CENTER: PRODUCTION AND CLINICAL APPLICATIONS

Isabel Aline Fernandes Ferreira¹; Alexsandra Nunes Pinheiro¹; Marília Silveira Maia¹; Sâmya Waleska Gomes Nunes¹; Natércia Maria Moura Bruno¹; Viviane Aguiar Ferreira Gomes¹; Vanessa Fernandes Paiva¹; Weide Barbosa de Mendonça¹; Luciana Maria de Barros Carlos¹; Luany Elvira Mesquita Carvalho¹; Karine Sampaio Nunes Barroso¹; Fernando Barroso Duarte¹

1. Institutional affiliation: 1. Centro de Hematologia e Hemoterapia do Estado do Ceará

INTRODUCTION:

The Cell Processing Center (CPC) is responsible for processing and cryopreserving hematopoietic progenitor cells (HPC) from 5 transplant centers in the state, four of which are private and one public. As of December 2022, the cryopreservation technique based on cell concentration was adopted. We currently use a concentration of 300,000 cells/mm³. This change was implemented based on scientific evidence showing that cryopreservation by cellularity significantly reduces the risk of complications during infusion, especially neurological events. In addition, this method contributes to less cell loss after the thawing process, ensuring greater viability and efficacy of cryopreserved CPH. AIM: To present and analyze the production of a Cell Processing Center (CPC), with emphasis on the safe and efficient handling of cells for therapeutic use.

MATERIALS AND METHODS:

A retrospective analysis was carried out of the laboratory records of patients seen by the CPC between January 2023 and April 2025. The study included autologous patients undergoing cell mobilization with the aim of collection by apheresis and subsequent cryopreservation for use in hematopoietic progenitor cell transplantation (HPCT). The following clinical parameters were collected and analyzed: Number of apheresis performed per patient; Age; Diagnosis; Number of cryopreserved bags; Cell viability after processing and grafting of patients transplanted in the period analyzed.

RESULTS:

A total of 258 autologous patients from 5 transplant centers were treated during the period under evaluation, 144 (55.8%) from the public network and 114 (44.2%) from the private network. 306 CPH bags were collected and 799 bags of up to 100 mL were cryopreserved (an average of 3 bags per patient). 48 patients underwent two apheresis procedures. The average age of the patients was 52, ranging from 19 to 76. The main indications for autologous BMT were Multiple Myeloma (60.4%), Hodgkin's Lymphoma (19%), Non-Hodgkin's Lymphoma (16.3%) and others (4.3%). The average post-processing cell viability was 98.5%. Of the transplants carried out during the period, the average neutrophil engraftment time was 10 days, ranging from D+7 to D+17.

CONCLUSION:

The data presented demonstrates the effectiveness of the CPH cryopreservation service in caring for 258 autologous patients from different transplant centers. There was a predominance of indications related to Multiple Myeloma, followed by Lymphomas. The average post-processing cell viability was 98.5%, demonstrating the quality of the processed material. The average time for neutrophil grafting was (10 days). These results reinforce the importance of standardizing processes, guaranteeing safety and efficacy in TCPH.

KEYWORDS: Hematopoietic Progenitor Cells (HPC); hematopoietic progenitor cell transplantation HPTC; Cryopreservation by cellularity