

# Hematopoietic stems cell transplantation and cell therapy: added value in the treatment of hematopoietic patients

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## Abstract

Hematopoietic stem cell transplantation has become a curative and disease-free survival option compared with other therapeutic modalities in specific congenital or tumor pathologies. At the beginning of 2006, the project for the creation of the Hematopoietic Stem Cell Transplant Unit of the Hospital de SOLCA – Guayaquil was designed. In June 2006, the Bone Marrow Transplant Unit (BMTU) began to win the first transplants, one autologous and the other allogeneic. Since then, 375 hematopoietic progenitor transplants have been performed, of which 166 have been allogeneic, 147 with hematopoietic progenitors obtained from peripheral blood or bone marrow itself, 19 with cells obtained from umbilical cord blood, and 209 with autologous transplants. An expansion project has been designed that includes an infrastructure with 20 rooms for hospitalization and a larger area for cell manipulation with complementary equipment, which will make it possible to increase the service of Portfolio, namely, the option of haploidentical allogeneic transplantation and specific adoptive T-cell immunotherapy procedures.

## Keywords:

**MESH:** Bone marrow transplantation; Bone marrow neoplasms; Cord blood stem cell transplantation.

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Hematopoietic stem cell transplantation has become an option routinely used in large oncology centers worldwide, which offers a greater chance of cure and disease-free survival than those achieved with other therapeutic modalities in specific congenital or tumor pathologies.

This procedure consists of administering a cytotoxic treatment with high doses of chemotherapy and radiotherapy to eradicate neoplasia or abnormal hematopoiesis that has the lethal side effect of destroying the bone marrow. Hematopoietic and immunological activity recovery is achieved by supplying previously extracted pluripotent hematopoietic progenitor cells obtained from a compatible donor (allogeneic transplant) or the patient (autologous transplant).

Understanding the principles of transplantation, as well as the knowledge of its risks and benefits, has given this technique a significant boost in the last two decades. Its indications are currently well-defined.

At the beginning of 2006, the project for the creation of the Hematopoietic Stem Cell Transplant Unit of the Hospital de SOLCA – Guayaquil was designed. The justification for this project was obtained after carrying out a situational study, which analyzed the mortality rate,

overall survival, and progression-free rate in patients with oncohematological diseases diagnosed and treated at the Hospital de SOLCA - Guayaquil.

This analysis showed high five-year mortality rates in diseases with an indication for this procedure, led by acute leukemias and closely followed by myelomas, lymphomas, and other less frequent pathologies since the treatment schemes until then did not include hematopoietic progenitor transplantation within their therapeutic options.

In June 2006, the Bone Marrow Transplant Unit (UTMO) began the first transplants, one autologous and the other allogeneic. Since then, 375 hematopoietic progenitor transplants have been performed, of which 166 have been allogeneic, 147 with hematopoietic progenitors obtained from peripheral blood or bone marrow itself, 19 with cells obtained from umbilical cord blood, and 209 with autologous transplants [1, 2].

The infrastructure has been increasing over time, going from two rooms with adequate isolation for transplantation and three conventional rooms for the mobilization of hematopoietic progenitors to eight rooms for this purpose at the end of 2008, complying with all the requirements demanded by the National Institute for Donation and Transplantation of Organs, Tissues, and Cells (INDOT), maintaining reaccreditations by this Organization every two years. This is how UTMO has been leading the offer of this transplant modality for the last 17 years, becoming the reference center for hematopoietic stem cell transplantation nationwide.

The increase in infrastructure and continuous equipment has gone hand in hand with the scientific advances obtained by the medical team that works in the unit. Thanks to this, at the end of 2007, UTMO was recognized as a reliable center by the National Marrow Donor Program (NMDP). In January 2021, it was considered by the Center for International Research on Blood and Marrow Transplants (CIBMTR) within Latin American Transplant Centers with significant results, including them in their statistical records, with the possibility that our patients can enroll in international studies.

The results show overall and disease-free survival rates comparable to those of international centers in the different transplant modalities, which have been presented at the annual EBMT (European Bone Marrow Transplantation) Congress in February 2019 and at the American Society for Transplantation and Cellular Therapy (ASTCT) in February 2021.

However, as a consequence of scientific advances in this aspect worldwide, the need to grow has become imperative, for which an expansion project has been designed that includes an infrastructure with 20 rooms for hospitalization and an area for cell manipulation plus wide with complementary equipment, which will allow increasing the portfolio of services, namely, the option of haploidentical allogeneic transplantation and specific adoptive immunotherapy procedures with T cells; the infusion of T-lymphocytes from the donor in case of signs of post-transplant relapse; and the elimination of alloreactive T lymphocytes using harmful lymphocyte selection procedures for the management of graft versus host disease (GVHD), considered one of the most complex complications of allotransplantation.

All this will allow us to continue offering a better life expectancy to patients with pathologies that indicate this therapeutic procedure.

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## Abbreviations

**NMDP:** National Marrow Donor Program.

**EBMT:** European Bone Marrow Transplantation.

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Bella Maldonado: Conceptualization, formal analysis, research, project management, original draft writing.

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**Consent for publication**

It is not required when images, resonances, or tomographic studies of specific patients are not published.

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**Conflicts of interest**

The author declares that they have no conflicts of competence or interest.

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