

Nursing care in autologous hematopoietic progenitor transplantation

Cuidados de enfermagem nos transplantes autólogos de células estaminais hematopoiéticas

Actuación de enfermería en el trasplante autólogo de progenitores hematopoyéticos

Alison Paulina Cedeño Toapanta

<https://orcid.org/0009-0004-3636-9106>

Graduate Researcher, Faculty of Health Sciences. Technical University of Ambato, Ecuador
acedeno4488@uta.edu.ec (correspondence)

Luis Felipe Chileno Camacho

<https://orcid.org/0000-0002-6415-9593>

University Professor, Faculty of Health Sciences. Technical University of Ambato, Ecuador
lf.chileno@uta.edu.ec

ABSTRACT

Background: Autologous hematopoietic progenitor transplantation (auto-HPT) is a treatment for hematologic diseases that involves infusion of the patient's hematopoietic stem cells. It requires prior myeloablative conditioning and specialized care. The procedure, potential complications, and nursing care at different stages were described. **Methods:** Systematic review using the PRISMA approach, with inclusion and exclusion criteria. The search was performed in multiple databases in English, Spanish, and Portuguese, between 2019 and 2023. Twenty full articles that met the criteria were analyzed. **Results:** The most commonly used source of hematopoietic progenitors at present is peripheral blood. Before infusion, the patient receives conditioning with high-dose chemotherapy. The main complication is infections; overall survival at 5 years is 68-80%. Nursing care in auto-HPCT is indispensable in all its stages because it performs preventive care, patient education, nutritional and emotional support, management of complications, and subsequent reintegration. **Conclusion:** Specialized and timely nursing care, based on the available evidence, allows improving the results and reducing the complications associated with auto-HPT, impacting the survival and quality of life of these patients.

Keywords: Autologous transplant; hematopoietic progenitor cells; oncology nursing; chemotherapy.

RESUMO

Contexto: O transplante autólogo de progenitores hematopoiéticos (TPAH) é um tratamento para doenças hematológicas que envolve a infusão de células estaminais hematopoiéticas do próprio doente. Requer um condicionamento mieloablativo prévio e cuidados especializados. São descritos o procedimento, as possíveis complicações e os cuidados de enfermagem nas diferentes fases. **Métodos:** Revisão sistemática utilizando a abordagem PRISMA, com critérios de inclusão e exclusão. A busca foi realizada em múltiplas bases de dados em inglês, espanhol e português, entre 2019 e 2023. Foram analisados 20 artigos completos que atenderam aos critérios. **Resultados:** A fonte de progenitores hematopoiéticos mais utilizada atualmente é o sangue periférico. Antes da infusão, o paciente é condicionado com quimioterapia em altas doses. A principal complicação são as infecções; a sobrevivência global aos 5 anos é de 68-80%. Os cuidados de enfermagem no auto-TCTH são essenciais em todas as suas fases, uma vez que realizam cuidados preventivos, educação do doente, apoio nutricional e emocional, gestão de complicações e reintegração subsequente. **Conclusões:** Os cuidados de enfermagem especializados e atempados, baseados na evidência disponível, permitem melhorar os resultados e reduzir as complicações associadas ao auto-HPCT, com impacto na sobrevivência e qualidade de vida destes pacientes.

Palavras-chave: Trasplante autólogo; células progenitoras hematopoyéticas; enfermagem oncológica; quimioterapia.

RESUMEN

Antecedentes: El trasplante autólogo de progenitores hematopoyéticos (TAPH) es un tratamiento de las enfermedades hematológicas que consiste en la infusión de células madre hematopoyéticas del propio paciente. Requiere un acondicionamiento mielo ablativo previo y cuidados especializados. Se describe el procedimiento, las posibles complicaciones y los cuidados de enfermería en las distintas fases. **Métodos:** Revisión sistemática utilizando el enfoque PRISMA, con criterios de inclusión y exclusión. La búsqueda se realizó en múltiples bases de datos en inglés, español y portugués, entre 2019 y 2023. Se analizaron 20 artículos completos que cumplieron los criterios. **Resultados:** La fuente de progenitores hematopoyéticos más utilizada en la actualidad es la sangre periférica. Previo a la infusión, el paciente recibe acondicionamiento con altas dosis de quimioterapia. La principal complicación son las infecciones; la supervivencia global a 5 años es del 68-80%. Los cuidados de enfermería en el auto-TCPH son imprescindibles en todas sus fases, ya que realiza cuidados preventivos, educación del paciente, soporte nutricional y emocional, manejo de las complicaciones y posterior inserción. **Conclusiones:** Los cuidados de enfermería especializados y oportunos, basados en la evidencia disponible, permiten mejorar los resultados y disminuir las complicaciones asociadas al auto-TPH, impactando en la sobrevivencia y calidad de vida de estos pacientes.

Palabras clave: Trasplante autólogo; células progenitoras hematopoiéticas; enfermagem oncológica; quimioterapia.

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ARTICLE INFORMATION

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Nursing care in auto-HPT is crucial across all stages for preventive measures, patient education, complication management, and reintegration, impacting patient survival and quality of life. The study portrays the state of the art of a little-explored topic in the global south, providing insights for its theoretical understanding and also being able to assist future policy initiatives or future scientific studies.

Originality/value:

The systematic review highlights the essential role of nursing care in auto-HPT, synthesizing evidence to improve patient outcomes and reduce complications, thus enhancing overall survival and quality of life.

INTRODUCTION

Haematological diseases have currently experienced a progressive rise in recent years, with a high mortality rate, which is why human beings have been forced to develop medical technology that allows them to meet the needs of patients, such as in the timely detection, diagnosis, treatment, and monitoring of these pathologies. This is why one of the treatments that has had a great nature in recent decades is Bone Marrow Transplantation (BMT) better known as hematopoietic progenitor cell transplantation (HSCT) since it has shown an increase in survival (Amaru et al., 2019).

Worldwide, the Worldwide Network for Blood and Marrow Transplantation (WBMT) mentions that around 70 million malignant and non-malignant diseases are routinely treated with HSCT, emphasizing that the treatment has made a positive contribution to society (Donation and transplants - PAHO/WHO | Pan American Health Organization, n.d.) (Pukkas, 2013). Because of this, studies carried out in Latin America report that the first transplant was performed more than 30 years ago, between 1979 and 1992 and was reported at the International Research Center for Blood and Marrow Transplantation, as well as more than 13000 transplants were performed in Argentina, Mexico and Brazil (Picchioni et al., 2021).

Now, in Ecuador, the Ministry of Public Health (MSP) mentions that it reached an agreement through the National Institute of Organ and Tissue Donation and Transplantation (INDOT), in which a commitment was signed with the Hackensack University Medical Center Hospital in the USA. It is important to mention that in Ecuador there are already 3 accredited establishments in TCPH that belong to the Society for the Fight Against Cancer – SOLCA and are located in Quito, Guayaquil and Cuenca (Program for bone marrow transplantation to be strengthened in Ecuador – Ministry of Public Health, n.d.).

Autologous hematopoietic stem cell transplantation (Auto-HSCT) is a treatment that serves to treat different serious hematological diseases, this procedure involves the collection of the patient's own hematopoietic stem cells, which must subsequently be infused, since it leads to the administration of high doses of chemotherapy and/or radiotherapy, allowing the restoration of bone marrow function and thus improving the patient's quality of life (Amaru et al., 2019). This treatment involves risks that endanger the patient's survival and quality of life as it is a highly complex therapy, that requires lifelong follow-up and care (Cazón, 2022). That is why, to be successful in the transplant, this will not only depend on the transplant specialist, but also multidisciplinary work. Moreover, a strategic approach at tangible and intangible levels is necessary to guarantee a satisfactory level of health care (Moreta & Flores Chiliguano, 2023).

It should be noted that the nursing staff plays an essential role within the multidisciplinary team as they intervene in all stages of the team, and are in direct contact from the beginning to the post-transplant follow-up. In this regard, Cazón (2022) argues that the nurse plays an irreplaceable role in the care of the physical, emotional, and spiritual needs of the patient, for this reason, they must know what the stages of the transplant are, its complications, and what will be the care and interventions that are carried out before, during and after the hematopoietic stem cell transplant.

Based on this, this research is of great importance, since for future generations Auto-TPH will be used more prevalently in the hospital setting. Therefore, this study aims to describe the nursing performance in autologous hematopoietic stem cell transplantation, based on the literature review, as well as to know the transplant procedure, its possible complications and, above all, to mention the nursing care and interventions that should be performed before, during and after hematopoietic stem cell transplantation.

METHODOLOGY

The present research is based on a systematic methodology, a research document was used under Systematic Review (R.S.). The method used for the collection and classification of data follows the PRISMA approach, ensuring the rigor of the information. This approach was implemented to describe nursing performance in the context of hematopoietic stem cell transplantation.

Inclusion criteria:

- Documents that include in the title the terms "autologous transplantation", "hematopoietic progenitors", "hematopoietic stem cells", and "transplant nursing".
- Articles found with the search equation "Autologous stem cell transplant nursing care" Open access articles to full articles.
- Language articles: English, Spanish, and Portuguese.

- Articles published from 2019 to 2023.

Exclusion criteria:

- Articles in languages without the option of translation.
- Articles without scientific basis.
- Documents not related to nursing performance in autologous transplants.
- Repeated studies.

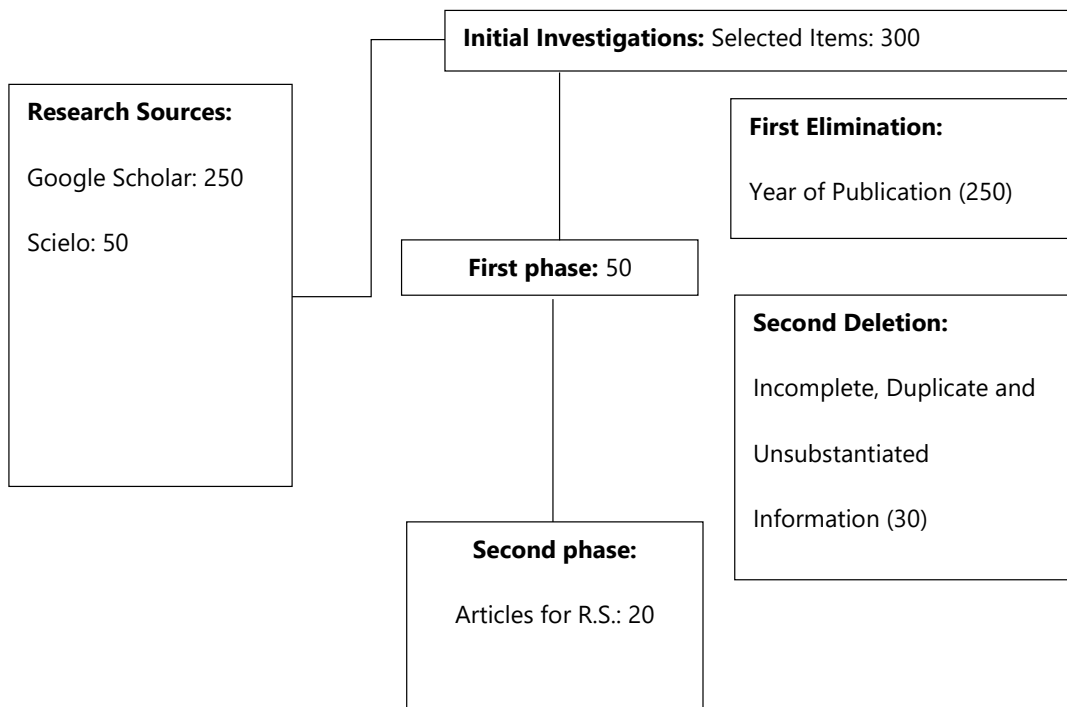
Search engines: Google Scholar, E-Book, Scopus, Science Citation Index, Web of Science, PubMed, SciELO.

Bibliographic research strategy: key terms: "autologous transplantation", "hematopoietic progenitors", "hematopoietic stem cells", "transplant nursing"; Language: English, Spanish, Portuguese; Boolean operators: AND, OR, NOT; Year of publication: last 5 years (2019 to 2023); main research sources: Google Scholar and Scielo.

RESULTS AND DISCUSSION

By using the search criteria, 300 articles from initial research were identified, based on the exclusion criteria it was determined to exclude 250 articles since they were outside the established period, followed by the second phase of selection with greater rigor, and 30 more articles were discarded due to incomplete information. Duplicates and unsubstantiated, obtaining 20 articles that meet all the criteria to proceed with the literature review.

Figure 1. Flowchart describing the search process, exclusion parameters, and total number of articles used for the analysis of results



Source: Article search process for R.S.

For the data extraction process, an organized approach was used by creating a table that includes various indicators to classify the reviewed articles. These indicators included: article title, author(s), and year of publication, study design, results, and URL/DOI. This detailed classification of the articles made it possible to group, compare and then write the systematic review article. The structuring of the information in this way facilitated the coherent synthesis of the results and contributed to the orderly presentation of the systematic review.

Table 1. Main literature retrieved

Article title	Author(s) and year of publication	Study design	Main results
Autologous hematopoietic stem cell transplantation in lymphoproliferative diseases: report of 5 cases.	Amaru Ariel et al (2019).	Retrospective review.	The mean age of transplantation was 49 (39-64) years. Neutrophil and platelet engraftment occurred in a time of 10.5 (9-13) and 9 (2-13) days respectively. Differences were observed between neutrophil grafting in patients according to the stage of the disease and the number of previous cycles of chemotherapy. On the other hand, for neutrophil grafting, we found differences between the dose of CD34+ and the time from diagnosis to transplantation. In conclusion, patients with PLE who presented an initial stage had a faster neutrophil engraftment after TAPESP, while a high dose of CD34+ cells helped to rapidly engage neutrophils. No serious infections were observed in patients during recovery (Amaru et al., 2019).
Care plan for the care of the patient undergoing an autologous bone marrow transplant.	Alejandro Navarro Herrero. 2022.	Bibliographic review.	The work began with the search and subsequent analysis of information, derived from different sources, about bone marrow transplantation, both aspects related to the disease that precedes it and those related to the role of nursing and patient care (Herrero, n.d.).
Adult Patient Education in Hematopoietic Progenitor Cell Transplantation.	Adriana Emilia Cazón. 2022.	Bibliographic review.	From the analysis of the different articles, the importance of the nurse in the Bone Marrow Transplant process at all times is observed, accompanying the patient and providing him with the necessary information to achieve his participation in the entire care process and his treatment. Quality care requires an educational intervention that allows patients to cope with the disease in such a way that they adopt strategies and behavioral training to alleviate their anxiety, achieve coping with the situation, and adherence to care during their hospitalization (Cazón, 2022).
Results of autologous hematopoietic stem cell transplantation in patients with multiple myeloma.	Wilfredo Roque García et al (2022).	Descriptive, longitudinal, ambispective study.	The mean age was 53.9±5.6 years, with a predominance of females. The most frequent complications were infectious diseases and mucositis. Overall survival at one year was 100% and 80% at five years. Progression-free survival at one year was 83% and 73% at five years (García, n.d.).
Nursing training: self-care in patients undergoing hematopoietic stem cell transplantation in a specialized oncology institution.	Melanie Amelia Salas Huamán et al (2023).	Quantitative, descriptive study.	The results show that 100% of patients have adequate self-care. In relation to the dimensions: knowledge 94.4%, skills 87% presented high levels respectively. It is concluded that continuing nursing education maintains solvency in self-care in the patient's daily life (Huamán et al., 2023).
Nursing care for patients undergoing hematopoietic stem cell transplantation.	Marina Izu et al (2021).	Scope review.	The articles were analyzed from a critical and detailed reading, extracting the most relevant factors. The sample consisted of 18 studies, which met the inclusion criteria proposed in this review. As for the year of publication, two were published in 2019, four in 2018, three in 2017, two in 2016, two in 2015, two in 2014, one in 2013, one in 2012 and one in 2011. Eight were published in international journals, and ten national. The nursing care that emerged from the review was classified according to the phase of transplantation: conditioning, stem cell thawing and infusion, and with the nursing and specialized care process, which encompasses infection prevention, venous catheter care, central disease, mucositis and grafting versus host diseases (Izu & Silvino, n.d.).
Nursing care for autologous hematopoietic stem cell transplantation in patients with multiple myeloma.	Tatiana Monteiro da Paixão, et al (2007).	Scope review.	The articles were analyzed from a critical and detailed reading, extracting the most relevant factors about nursing care for patients with multiple myeloma undergoing autologous stem cell transplantation. - Hematopoietic stem. The sample consisted of 10 studies that met the inclusion criteria proposed in this review. As for the year of publication, one was published in 2000, three in 2007, one in 2010, one in 2011, one published in 2014, one in 2017, one in 2019, and one in 2021. Six were published in national journals and four in international journals (Paixão et al., 2022).
Psychosocial impact of protective isolation in hematopoietic stem cell transplant recipients.	Andrea Martínez Serrano. 2023.	Bibliographic review.	Studies show that the experience of protective isolation leads to changes at the emotional level, as well as in the person's relationship with himself and his environment. The presence of personal, clinical factors related to confinement and nursing practice influence the perception of these experiences (Serrano, n.d.).
Hematopoietic autologous transplantation: a reality in the apheresis unit at the Virgen de la Victoria University Hospital Complex.	Brincones Rodríguez, Antonio Manuel. 2023.	Study design.	During 2022, 38 CPH extraction procedures were performed, compared to 22 procedures performed during 2021, which led to an increase in CPH collection activity of 72.7% (Rodríguez, 2023).
Nursing care in bone marrow transplantation.	Lucía Rodríguez Fernández. 2019.	Documentary bibliographic review.	To carry out this work, the reading of multiple articles, research, publications, etc. has been carried out. That the foundations of this work have been laid. The criteria of the authors consulted enriched and supported the purpose of the study. The descriptors used as keywords were obtained from DeCS (Descriptors in health sciences), using the following words to collect information: Care, bone marrow, hematopoietic progenitors, nursing, transplantation... The Boolean operators that were handled were "or" and "and" in databases such as Pubmed, Scielo, dialnet or cochrane, and in electronic journals such as Elsevier, as well as websites related to the subject (Rodríguez Fernández & NPunto, 2019).
Literature review on hematopoietic stem cell transplantation, options to improve assimilation, and their impact on patient survival.	Lambis Loaiza, Laura Alejandra. 2019.	Literature review.	This review demonstrates the importance of stem cell transplantation and its impact on the population, because in many cases it may be the only option for patient survival. Although the regimens to which patients are subjected can be toxic, survival rates have increased despite the details that the patient may go through after the procedure, however, for this purpose there has been an evolution in terms of the selection of the donor and the studies that are carried out on both the donor and the recipient to have a better compatibility and thus have a successful transplant Without so many complications. It is important to continue conducting research to try to reduce the complications associated with these procedures (Lambis Loaiza, 2019).
Autologous hematopoietic stem cell transplantation in monoclonal gammopathies: first results from the "Hermanos Ameijeiras" Hospital.	Calixto Hernández Cruz et al (2019).	Retrospective study.	The average age was 53.5 years; the majority had diagnosis of MM (85.7%) and all of them were diagnosed in stage III of Durie-Salmon; as CR 64.2% received HD-mel, at 200 mg/m ² . The recovery of neutrophil and platelet counts occurred on average at 11.4 and 12 days respectively. Transplant related mortality (TRM) at day +30 was 7.1%. The probability of OS at 2 years was higher than 90% and at 5 years of 68%
Quality in nursing care on progenitor stem cell transplants.	Natalia Padrón de León. 2019.	Systematic review.	A detailed analysis was carried out of the most commonly used transplants today and the management of both the care that should be offered to the patient and his or her family and the knowledge that nurses should have to deal with cancer patients. Reaching the conclusion that oncology nursing should focus on the quality and safety of patients who are subsidiary to these procedures, as this will ensure continuity and achieve a correct prevention of possible adverse effects of the transplant (de León, n.d.).
Health Education of Hematopoietic Stem Cell Transplantation.	Yessica Acosta Araña, (2019).	Experimental review.	A detailed analysis was carried out of the most commonly used transplants today and the management of both the care that should be offered to the patient and his or her family and the knowledge that nurses should have to deal with cancer patients. Reaching the conclusion that oncology nursing should focus on the quality and safety of patients who are subsidiary to these procedures, as this will ensure continuity and achieve a correct prevention of possible adverse effects of the transplant (de León, n.d.).
Hematopoietic stem cells. Implications and challenges of transplantation in today's medicine.	Annie Jesús Fajardo Quesada et al. (2022).	Bibliographic review.	Based on the study carried out, it can be said that hematopoietic stem cell transplantation is revolutionizing the way in which current medicine faces different diseases, however, it has become a challenge to find safe and effective procedures for its realization; this does not prevent classical transplantation methods from being used with satisfactory results (Aj et al., n.d.).
Hematopoietic stem cell transplantation: treatment of malignancies.	María Auxiliadora Cedeño Cevallos, et al (2019).	Bibliographic review.	Hematopoietic cell transplantation is the infusion of progenitor cells or "Stem Cells" with the aim of restoring bone marrow and immune function in patients with a variety of hematologic malignancies (leukemia, lymphoma, myeloma), acquired non-malignant diseases of the bone marrow (bone marrow aplasia), genetic diseases associated with abnormal hematopoiesis or impaired bone marrow function (thalassemias, sickle cell disease, severe combined immunodeficiency) (Cevallos et al., 2020).
Infectious processes in hematopoietic progenitor cell transplantation.	Carolina García Castillo et al (2020).	Retrospective study.	A total of 156 patients were included. Documented infectious processes accounted for 37.1% (n = 58), with no differences in frequency by age group; Infections were higher in patients who received bone marrow and umbilical cord blood as a source of cells compared to peripheral blood. The type of myeloablative conditioning was associated with the manifestation of the infectious process. A total of 25 causative agents were identified; 81% of the cases were caused by bacteria. Infectious processes occurred in the pre-graft stage in up to 72.4% (n = 42)(García-Castillo et al., 2021).
Autologous Stem Cell Transplantation in Multiple Myeloma: Post-Transplant Outcomes from the Taiwan Blood and Marrow Transplant Registry.	Tzu-Chuan Huang, et al (2019).	Retrospective study.	The mean age of the participants was 54.8 years and there were more men than women (57.6% vs. 42.4%). The majority of patients were diagnosed with IgG type myeloma (52.4%), followed by IgA type (23.2%) and light chain (21.4%). Patients with Durie Salmon staging system (DSS) III disease accounted for 61.9% of the study cohort, while 23.7% had stage II and 14.4% had stage I disease. The median progression-free survival (PFS) and overall survival (OS) after ASCT was 46.5 months and 70.4 months, respectively. DSS III was a poor prognostic factor affecting both PFS and OS with a duration of 35.9 months and 69.0 months, respectively, compared to the other two stages (p = 0.006 and p = 0.03, respectively). In addition, patients with a better response to treatment before ASCT had better PFS and OS compared to those who did not show a response (both p < 0.0001). The overall incidence of transplant-associated organ toxicities was low (Hassan et al., 2019).
Adherence to Nurse Guidelines for Home Care of Bone Marrow Transplantation from the Ecosystem Perspective.	Simone dos Santos Nunes et al (2020).	Descriptive, exploratory study.	From the data, the Orientations category emerged and gave rise to the subcategories: Interactive Relational Actions; and actions and behaviors that interfered with transplant success. Some users, due to an excess of information at the time of discharge, were unable to assimilate and execute the instructions received; others, during the hospitalization phase, learned to absorb them to receive care in the ecosystem space of the home after transplantation (Nunes et al., 2020).
The psychological suffering of hematopoietic stem cell transplant patients.	Isabelle Campos De Azevedo, et al (2019)	Cross-sectional study.	Forty-three of the 272 patients who underwent HSCT in the study period had one or more types of psychological distress. The age ranged from 14 to 67 years, with a mean age of 42.07 years, and 51.16% were women. Among patients who underwent HSCT and presented psychological disorders, 27.91% had multiple myeloma (MM) transplantation as the main diagnosis, 58.14% received autologous transplantation, and the most cited psychological suffering in the records was anxiety (62.79%)(Azevedo et al., 2019).

Source: own elaboration based in the retrieved literature

Autologous bone marrow transplantation (AMT) is a treatment that should be better known as Auto-HSCT hematopoietic stem cell transplantation, it is a therapeutic procedure that serves to treat different hematological diseases this consists of the intravenous infusion of hematopoietic progenitor cells from the same patient (Izu & Silvino, n.d.). However, (Amaru et al., 2019b; Cevallos et al., 2020) point out that for this procedure the patient must be in total remission, followed by this, he is subjected to an intensive treatment of cytotoxic drugs in high doses either chemotherapy and/or radiotherapy with the intention of eradicating a neoplasm, which have as a lethal side effect the destruction of the bone marrow, in order to be able to infuse new hematopoietic progenitor cells and repopulate the bone marrow and thus improve the patient's quality of life.

Based on this, he mentions (Rodríguez Fernández & NPunto, 2019) that not all patients are candidates for this treatment since there are multiple factors that must be met, among them this: the type and stage of the cancer or disease, the results of the physical examination and medical tests, the response obtained with previous treatments, the availability of a donor (the same patient), age, general health, and the existence of complications. For this reason, he states (Herrero, n.d.-a) that Auto-TPH differs on the basis of the source of extraction, which can be: umbilical cord, bone marrow and peripheral blood.

However, they mention (Aj et al., n.d. ; de León, n.d.-a) that the source of the umbilical cord is a source with a low volume of stem cells and that hematological recovery is much slower and more complicated, while in the bone marrow, (Lambis Loaiza, 2019) indicates that it is rich in hematopoietic progenitor cells, But the extraction causes a lot of pain to the patient, however studies show that the peripheral blood source is the only source to consider over time. However, (Herrero, n.d. ; Rodríguez, 2023) mention that under normal conditions there is a minimum amount of stem cells in the peripheral blood, for this reason, stimulation must be given prior to transplantation, through the daily administration of G-CSF (granulocyte colony-stimulating factor) through filgrastin or plerixafor (these drugs help stem cells leave the bone marrow and pass into the blood so that it is possible to extract it.

After achieving this increase in cells, the patient undergoes a process called apheresis, a technique by which hematopoietic progenitor cells are collected from peripheral blood, this consists of , connect the patient through a central catheter to a machine, which extracts the peripheral blood and circulates it through a separator, which separates the stem cells by centrifugation, depositing them in a bag and returns the rest of the blood components to the patient. This procedure lasts 3 or 4 hours.

As a result of this, it is important to mention that, in order to know when the patient should undergo apheresis, a test called CD34+ must be performed (this is an antigen found on the surface of a very early blood cell that is important in the formation of the bone marrow) this detects the birth of new stem cells (Molina, 2022; CD34 Test & Nicklaus Children's Hospital, n.d.)

Therefore, according to the medical diagnosis, in some patients the process of cryopreservation or preservation occurs and in others not, this process consists of storing the collected stem cells in bags that are gradually frozen in liquid nitrogen until they reach a temperature of -196°C according to (de León, n.d.) until the patient returns to the conditioning phase. Regarding this phase, he mentions (Azevedo et al., 2019; Serrano, n.d.) which is the most difficult stage that the patient will go through since it will suffer an impact on psychosocial well-being related to the restrictions that this process has, one of the most important is that the patient is admitted under a protective isolation of long duration with the main purpose of protecting their vulnerability to contracting infections.

Now, once the patient enters this phase based on their disease and according to the medical diagnosis, the patient must undergo chemotherapy in high doses to kill any tumor cell and thus reach the day of the infusion or also known as day "0" in this stage the infusion of the stem cells is proceeded. through a central venous catheter, in a time of approximately 15 to 60 minutes depending on (García-Castillo et al., 2021; Hassan et al., 2019; Herrero, n.d.-a)

It should be noted that during this phase the patient may present serious symptoms that are generated by the high toxicity of chemotherapy, causing possible: infections, mucositis, nausea and vomiting, diarrhea or constipation, anal fissure, fatigue, muscle weakness, fever, alteration in the perception of flavors, anemia, increased olfactory sensitivity, dehydration or water overload. septic shock, hypovolemic shock, renal alteration, alopecia, depression, among others as described (Araña, n.d.; Rodríguez Fernández & Punto, 2018; Serrano, n.d.). This is where the nursing staff plays a fundamental role as they will be in direct contact with the patient. According to them (Cazón, 2022; Herrero, n.d.-a) that nursing care in the transplant patient will be before, during, and after transplantation.

Nursing care before transplantation

The first nurse/patient contact is of vital importance since the nursing staff must educate the patient to avoid stress and improve the possibility of a positive response to treatment. That is why, it should begin with a personal interview preferably or if it is not possible to do it by telephone, in this interview the nurse must provide clear and concise information

such as the rules and conditions that the service has, what objects can enter the room, make it understood that she cannot receive visitors and whether or not it is allowed to have a companion, inform that the hospital stay will be extensive and that you can bring with you teaching materials, this will help improve your stay (Cazón, 2022).

Based on the above, all information provided must be provided in paper and/or electronic format. It should be noted that, in this interview, the nursing staff must show empathy, trust, transmit tranquility, listen actively and respond to questions and needs that the patient and family have, and above all that the patient has confidence and security in their treatment (Cazón, 2022).

Likewise, fertility should be mentioned since it is a very important aspect that the Guide on Blood and Bone Marrow Stem Cell Transplants points out, since the transplant causes 80% of infertility, this information is usually done by the doctor, but the nurse is under the obligation to educate the patient and indicate that after the transplant life will be normal, especially in young patients (it will be left to the patient, free choice) must preserve the female (eggs) or male (spermatozoa) reproductive organs, since high doses of chemo and/or radiotherapy affect these cells.

Once the interview is carried out, before hospitalization, the health personnel must have already prepared a room, it must be suitable for the extensive hospitalization of the patient, their room must be individual and with a private bathroom, sealed from the outside with a previous anteroom where the medicines and supplies of each patient will be kept, they must have air filters and always the doors must remain closed and alcohol gel devices available. they must be kept clean and tidy and cleaning carried out 2 times a day, flowers or plants cannot enter, much less contamination entities (Cazón, 2022; Nunes et al., 2020)

With regard to the distraction of the patient, it is essential to try to keep them entertained. At the SOLCA Quito Hospital, it is allowed to bring objects that entertain the patient such as laptop, cell phone, video game console, books, didactic board games, among others, (prior to disinfection) ("Bone marrow transplant", n.d.). As mentioned (Azevedo et al., 2019) that the suffering involved in the transplant is very detrimental to the patient's mental health since they are far from home and their social environment, which is why nursing staff must have strategies to help improve their hospital stay.

Nursing care during the transplant

Once the attending physician indicates the time of admission to the room, the patient must already come with everything indicated above.

As far as their clothing is concerned, it is very important to know what the patient's preference is, the pajamas should be comfortable and if possible made of cotton with buttons on the front so that there is ease in the management of the central venous access, or if this is not possible, a hospital gown will be provided. Now, the change of clothes should be daily for both the patient and the sheets, in the same way the patient should bathe every day and the nurse should cover the catheter so that it does not get wet and indicate that he should let the shower water run for at least 2 minutes, after showering he should dry himself gently with a towel provided by the health staff and check his body and see if he is wet. There are petechiae, bruises, lesions, redness or inflammation so you should immediately inform the nurse or doctor, you should also moisturize your skin with a scentless cream and with the neutral pH preferably that is rich in vitamin A, take care of the skin folds and keep ...

On the other hand, hand washing is a fundamental technique that is applied in the transplant room, according to the Pan American Health Organization (PAHO), which is one of the most promoted habits in the world and that it helps prevent diseases and safeguard life (Hand hygiene saves lives - PAHO/WHO | Pan American Health Organization, n.d.). For this reason, it indicates (Cazón, 2022) that hand washing should be done at least 4 times a day, preferably with 2% chlorhexidine soap applying the 11 steps including step 0, which is why they point out (García-Castillo et al., 2021; Paixão et al., 2022) that the hands act as an entity for the transmission of microorganisms, for this reason the patient should wash their hands every time touching any object and mandatory use when the hands are visibly dirty, before and after going to the bathroom, meals and every activity with health personnel to avoid infections.

Regarding oral hygiene, oral hygiene is a very important aspect to treat since the transplanted patient can generate serious mucus according to (Cazón, 2022) the mouth should be washed 4 times a day, after meals but (Izu & Silvino, n.d.; Paixão et al., 2022) mentions that it will be according to need and medical indication since nystatin, bicarbonate and lidocaine preparations should be made in order to treat or alleviate the adverse events of the high toxicity of chemotherapy. It also refers (Cazón, 2022) that the brush should be soft-bristled, keep the brush with the bristles up and in a dry place, if you have dentures you should brush with soap and water at least twice a day and store them at night in an empty container, you cannot use dental floss or chopsticks to avoid bleeding and injuries

On the other hand, it indicates (Izu & Silvino, n.d.) that central venous catheter care is fully performed by the nurse, it must be maintained, evaluated and aseptic cleaning performed daily since it is frequently used for the infusion of solutions necessary in its treatment and will be kept in a closed system.

Nursing staff is characterized by providing relief and well-being to the patient, which is why (Goyzueta, 2020) refers to pain as a factor that affects the physical, emotional and psychological state of the patient, nursing action is based on assessing pain based on a numerical scale EVA (0 to 10) where 0 is no pain and 10 is unbearable pain, The nurse is in charge of notifying the doctor and providing appropriate treatment.

On the other hand, food is very important to monitor, the nurse has the obligation to ask daily if she can eat or what food she wants (patients in this process have a daily menu where they choose their food and have a nutritionist during their hospital instance), but the nursing staff must assess the weight daily, nausea, vomiting, skin integrity, among others, and notifying the doctor (Cazón, 2022).

Regarding the emotional state of the patient, the nurse must be positive and not deceive the patient, encourage him and mention that he will soon leave the hospital stay, usually this type of patient has a daily psychologist, therefore he has medication to keep him calm and avoid anguish that affects his state of health (Serrano, n.d.). It is essential to mention that the nurse plays a fundamental role since she is with the patient at all times, she must have the necessary knowledge to treat any event that the patient presents and be prepared to act and provide the necessary care and avoid events that affect the transplant.

Post-transplant nursing care

Once the patient begins to generate new cells, through daily examination controls, a possible discharge is suspected, prior to this the nurse must have a list of indications by the doctor (Cazón, 2022).

In the first instance, all the patient's doubts must be answered, followed by this educate on: hand washing before/after eating or any activation carried out especially after going to the bathroom, must drink plenty of water (2 to 3 liters a day), stay at home for at least 8 days after discharge, Avoid draughts and sudden changes in temperature and return to work when the doctor tells you to. (Herrero, n.d.).

In the same way, visits from people who suffer from contagious infectious diseases such as: (flu, chickenpox, herpes, etc.) should be prevented and conglomerations should be avoided, however, based on oral cleaning, it should be done, after each meal and before going to bed, this should be with a soft-bristled brush and with a toothpaste for sensitive gums. With regard to physical activity, educate that you will feel more tired than normal but you should increase physical activity daily, start walking for 10 minutes and increase it for 5 minutes a day, you cannot perform contact and intensity exercises and do not expose yourself to the sun.

Based on the food, you will be given a menu with the diet that you can consume (nutritionist) family members must be educated to maintain strict hygiene measures in the handling of food and in the utensils for its preparation, preferably separate them from others, eat freshly cooked food, never preheated, spicy and not raw, if you do not have an appetite, consume small portions of 5 to 6 meals a day and moisturize your lips with neutral, odorless balm (Herrero, n.d.).

In the same way, you should educate yourself about skin care, shower daily with mild liquid soap with neutral pH, properly moisturize the skin and dry very well the folds and interdigital spaces of the hands, feet, genital and anal area (Herrero, n.d.).

Regarding sexual activity, it should be educated that you can sleep with your partner as long as you do not have any viral and/or bacterial infection, you will be able to have sexual intercourse once you reach them: more than 1000 neutrophils/mm³ and 40,000 platelets/mm³, if you do not have sexual desire you should inform the doctor since the transplant causes adverse effects such as (vaginal dryness or fatigue) the first step to follow is to use treatments external factors to help alleviate these physical factors, and talk to your partner even if it seems difficult. The absence of menstruation and the appearance of menopause symptoms are frequent.

PROHIBITIONS:

You should not carry out the cleaning and much less should you be when present when it is done, in the same way you should avoid having carpets and/or objects that accumulate dust.

Do not drink alcoholic beverages for the first 3 months, or for as long as your doctor tells you to.

Do not smoke and avoid smoking environments.

It is recommended not to have pets, but if you do, to have them outside the house and avoid touching them, not to have plants inside the house.

WARNING SIGNS:

It is important that the patient is clear about the warning signs so they will have to go immediately to the hospital: sustainable FEVER or greater than 38.5 ° C, difficulty breathing or coughing accompanied by blood, bruising or bleeding

(nasal, gums, anus or when urinating) constant diarrhea or vomiting, uncontrolled pain and it is key NOT to SELF-MEDICATE.

CONCLUSIONS

Autologous hematopoietic stem cell transplantation is a complex procedure that consists of several stages, from the collection of the patient's hematopoietic stem cells by apheresis, their cryopreservation, conditioning with chemotherapy, the infusion of the previously collected cells, and finally the subsequent follow-up. to evaluate spinal recovery. It is a treatment that allows high doses of chemotherapy to be administered for hematological diseases by being able to rescue the patient with their stem cells, to restore the bone marrow and the immune system, but HSCT is not free of complications, the main ones being mucositis, nausea and vomiting, infections, fever, anemia, kidney and liver problems, dehydration, multiple organ failure, and depression, among others. These side effects are due to the intense conditioning treatment and immunosuppression. Most occur in the post-transplant stage while the bone marrow and immune system are recovering. Timely management of these complications has a significant impact on outcomes and survival.

Because of this, nursing care plays a fundamental role in all stages of autologous transplantation. In the pre-transplant phase, they focus on educating the patient about the procedure, preventive measures, and potential complications, as well as psychological support, while during hospital admission they carry out strict controls for the prevention of infections, and monitoring the general condition, management of venous access, nutritional support, symptom control, and comfort. In the post-transplant stage, care continues with emphasis on early identification and treatment of any complications and the subsequent reintegration of the patient into daily life.

In conclusion, studies in hematopoietic stem cell transplantation deserve continued research to optimize procedures and care to obtain better clinical outcomes. Likewise, it is necessary to disseminate information to society to raise awareness about bone marrow donation and the importance of these treatments that constitute hope for many patients with potentially fatal diseases. Adequately training health personnel, especially nurses, is equally essential to guarantee safe and high-quality care for those who undergo an autologous transplant.

Main limitations of the study and future research

Although the systematic review provides valuable insight into nursing practice in autologous hematopoietic stem cell transplantation, several limitations must be acknowledged. First, the search relied on articles published in English, Spanish, or Portuguese between 2019 and 2023. Qualifying studies published after this period or in other languages were excluded, and may limit the breadth of the findings. In addition, the focus on selected databases and the exclusion of non-scientific papers may have introduced bias, including neglecting the service of clinician or patient perspectives price so. Furthermore, the scope of the study is limited to auto transplantation and nursing care in this setting, ignoring comparative insights into other types of stem cell transplantation or hematologic diseases and broader therapeutic aspects.

Table 3 Future research agenda proposal

Variable	Context	Methods	Approach
Patient Satisfaction	Within the context of autologous hematopoietic stem cell transplantation	Conduct patient surveys or interviews to gather feedback on various aspects of the transplantation process	Utilize quantitative scales or qualitative analysis to measure and interpret patient satisfaction scores, identifying patterns, and themes to inform targeted interventions.
Complication Rates	Complications are common in hematopoietic stem cell transplantation, impacting patient safety	Collect data on post-transplant complications through electronic health records or clinical databases	Analyze complication rates over time, stratifying by patient demographics, disease characteristics, and nursing interventions to identify risk factors and opportunities for prevention.
Nursing Workload	Nursing workload directly impacts the quality and safety of patient care during transplantation	Utilize time-motion studies or workload assessment tools to quantify nursing tasks and responsibilities	Explore correlations between nursing workload metrics and patient outcomes to optimize staffing levels, workflow processes, and resource allocation

Note. Own author elaboration

Future research on hematopoietic stem cell transplantation should prioritize longitudinal studies to assess long-term patient outcomes and complications. Furthermore, comparative studies are needed to assess how strategies transplantation and alternative therapies work well. Patient-centered research can provide valuable insights into psychosocial influences and preferences, thereby enhancing patient-centered care. In addition, insights into health economics and nurses' roles are needed to optimize resource management and improve patient outcomes in auto transplantation.

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