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PROFILE AND COMPLICATIONS OF PATIENTS AFTER BONE MARROW TRANSPLANTATION IN A SPECIALIZED SERVICE

PERFIL E COMPLICAÇÕES DE PACIENTES APÓS TRANSPLANTE DE MEDULA ÓSSEA EM SERVIÇO ESPECIALIZADO

PERFIL Y COMPLICACIONES DE PACIENTES DESPUÉS DE TRASPLANTE DE MÉDULA ÓSEA EN UN SERVICIO ESPECIALIZADO

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ABSTRACT

Objective: to identify the profile and complications of patients after bone marrow transplantation in a specialized service. **Method:** descriptive, retrospective, research with a quantitative approach, involving 103 patients who underwent hematopoietic stem cell transplantation, within the period from 2008 to 2010, by means of nursing care records and spreadsheets, with approval by the Research Ethics Committee of the School of Medicine of São José do Rio Preto (FAMERP), under the Protocol 3,389/2010. Statistical tests with a significance level of 0.05 were performed. **Results:** most patients were male, aged between 40 and 60 years, married, working in the field of general services, coming from cities in São Paulo and Mato Grosso, Brazil, and provided with care by the Brazilian National Health System (SUS). **Conclusion:** this study may support health professionals who work in this field. **Descriptors:** Profile; Patient; Diagnosis; Bone Marrow Transplantation.

RESUMO

Objetivo: identificar o perfil e as complicações de pacientes após transplante de medula óssea em serviço especializado. **Método:** pesquisa descritiva, retrospectiva, com abordagem quantitativa, envolvendo 103 pacientes submetidos a transplante de células-tronco hematopoéticas, no período de 2008 a 2010, por meio de prontuários e planilhas de enfermagem, com aprovação do Comitê de Ética em Pesquisa da Faculdade de Medicina de São José do Rio Preto (Famerp), sob o Protocolo n. 3.389/2010. Foram realizados testes estatísticos com o nível de significância de 0,05. **Resultados:** a maioria dos pacientes era do sexo masculino, com idade entre 40 e 60 anos, casada, trabalhava na área de serviços gerais, era procedente de cidades de São Paulo e Mato Grosso e era atendida pelo Sistema Único de Saúde (SUS). **Conclusão:** este estudo pode subsidiar os profissionais da saúde que atuam nessa área. **Descritores:** Perfil; Paciente; Diagnóstico; Transplante de Medula Óssea.

RESUMEN

Objetivo: identificar el perfil y las complicaciones de pacientes después de un trasplante de médula ósea en un servicio especializado. **Método:** investigación descriptiva, retrospectiva, con abordaje cuantitativo, con participación de 103 pacientes que se sometieron a trasplante de células madre hematopoyéticas, en el período de 2008 a 2010, por medio de prontuarios de atención de enfermería y hojas de cálculo, con aprobación del Comité de Ética en Investigación de la Facultad de Medicina de São José do Rio Preto (Famerp), bajo el Protocolo 3.389/2010. Se realizaron pruebas estadísticas con un nivel de significación de 0,05. **Resultados:** la mayoría de los pacientes eran varones, con edades entre 40 y 60 años, casada, trabajaba en el área de los servicios generales, procedente de ciudades de São Paulo y Mato Grosso, Brasil, y era asistida por el Sistema Nacional de Salud de Brasil (SUS). **Conclusión:** este estudio puede proveer subsidios a los profesionales de la salud que actúan en esta área. **Descriptores:** Perfil; Paciente; Diagnóstico; Trasplante de Médula Ósea.

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INTRODUCTION

The hematopoietic stem cell transplantation (HSCT), although constituting a treatment with high curative potential, poses high risks and high morbidity and mortality rates. It can reconstruct the hematopoietic and immune systems, in a variety of malignant or non-malignant diseases, susceptible to cure by chemotherapy associated or not with radiotherapy.¹ It consists in replacing a bone marrow affected by disease by normal cells, in order to reconstitute it, so that normal blood cells are produced again.²

Regarded as one of the greatest advances in modern medicine, bone marrow transplantation (BMT) is a treatment for diseases that affect blood cells, such as acute leukemia; chronic myelogenous leukemia; chronic myelomonocytic leukemia; lymphomas; severe anemias; congenital anemias; hemoglobinopathies; congenital immunodeficiencies; multiple myeloma; hypocellular myelodysplastic syndrome; severe combined immunodeficiency; osteopetrosis; primary myelofibrosis in evolutionary phase; myelodysplastic syndrome in transformation; and thalassemia.²

In autologous BMT, peripheral stem cells are taken from the patient her/himself, stored, and reinfused after a conditioning regimen (chemotherapy). In allogeneic BMT, bone marrow is removed from a donor previously selected through histocompatibility tests, usually identified among relatives (akin) or in bone marrow banks (not akin). In syngeneic BMT, the donor is an identical twin brother. And in transplantation with umbilical cord, frozen cells are used.³

Transplantations have some common phases, described as: pre-BMT (preparation for transplantation); conditioning regimen; bone marrow aspiration, processing, and infusion; engraftment; hospital discharge; and outpatient follow-up.⁴ This is a lengthy process, with high complexity and high cost, consisting of several steps with a particular dynamics, requiring selective strategy, distinct logistics, appropriate hospital infrastructure, and a qualified multidisciplinary team.⁵

Patients undergoing transplantation must remain hospitalized for long periods under specialized care and isolation, and they are susceptible to a variety of complications deriving from the procedure, different for each person, with most occurrences within the first 4 months after transplantation. The

complications may be acute, when occurring since the onset of conditioning regimen, i.e. from the 10th (as identified in the nursing care record) treatment day to the 100th post-transplantation day, and the chronic complications occur after the 100th day.^{5,6}

Most patients undergoing BMT who survive the immediate postoperative period and do not experience a relapse of their primary disease within 1 or 2 years enjoys a productive and active life. However, some of them have chronic and late complications, related to the primary disease, the conditioning regimen applied with or without radiotherapy, the type of transplantation, the acute complications, age, gender, and the drugs used for treating infections and graft disease against the host.³

The BMT unit requires care in isolation, it has an specialized nursing team, aware of the difficulties experienced by patients, who are vulnerable and greatly affected regarding their quality of life, requiring emotional support and care from the multiprofessional team, especially the nurse. Although there is information on the prevalence of nursing diagnoses related to hematological disorders, there is a lack of information about this area, justified by the fact that this is still a recent specialty in Brazil.⁶

This study aims to identify the profile and complications of patients after bone marrow transplantation in a specialized service. We notice that there are many difficulties, thus, it is expected that the results point out pathways and help professionals working in this area.

METHOD

This is a descriptive, retrospective, study with a quantitative approach, involving 103 patients who underwent HSCT, within the period from January 2008 to August 2010 at the BMT unit in a general, teaching, hospital, in the northwest of the state of São Paulo, Brazil. The BMT unit consists in 7 beds, 2 of them in unique isolation system, and 1 room equipped with cooled air and High Efficiency Particulate Air (HEPA) filter.

The BMT service started operating in 1998, accredited by *Portaria* of the Brazilian Department of Health Care (SAS) 678, enacted on November 16, 1999. Since its inauguration, the unit under study has conducted more than 300 HSCTs, the autologous and allogeneic types. The hospital has a supportive diagnostic service (tomography, resonance, endoscopy, anatomopathological laboratory, etc.), providing patients with treatment

through the Brazilian National Health System (SUS) and other agreements, both from the region and other states, as well as being interconnected to the hemotherapy service of São José do Rio Preto, São Paulo, Brazil.

Data were collected from nursing care records and by means of nursing care spreadsheets where there are relevant conducts regarding transplantation, from diagnostic tests to post-procedure assessments. The following variables were used to characterize the subjects: gender, age, profession, marital status, type of agreement, birthplace, and period when the procedure was performed. Medical diagnosis, time and type of transplantation, donor, complications, and evolution at the time of hospital discharge were also identified.

The study was approved by the Research Ethics Committee of the School of Medicine of São José do Rio Preto (FAMERP), under the Protocol 3,389/2010. Data were grouped into a spreadsheet of the software *Microsoft Excel* and, subsequently, displayed in tables. Percentages were used with an approach by the statistical association test (chi-square) and univariate comparison tests, all of them at a significance level of 0.05, *t* test for independent samples, and Mann-Whitney test, as well as analysis of variance and Kruskal-Wallis test.

The Kruskal-Wallis and Mann-Whitney tests were used due to the high dispersion of data, i.e. high standard deviation and presence of outliers influencing the average value of distribution, making it negative for statistical analysis itself. These tests are non-parametric, i.e. they use the median as a measure for decision, as it is not influenced by outliers and dispersion.

RESULTS

As for the profile of the 103 patients, 65 (63.11%) were men, aged between 40 and 60 years. Regarding the marital status, 53 (51.46%) were married. Concerning the professions pursued, 57 (55.34%) worked in the field of general services (e.g. driver,

mechanic, teacher, mason, farmer), 18 (17.48%) were students, 10 (9.71%) undertake household chores, 7 (6.80%) work in the commercial field, 5 (4.85%) work in the health field, 4 (3.88%) were children, and 2 (1.94%) did not pursue any paid activity.

Regarding the birthplace, 52 (50.49%) were from the state of São Paulo, 27 (26.21%) from Mato Grosso, 14 (13.59%) from Espírito Santo, 7 (6.80%) from Minas Gerais, 1 (0.97%) from Maranhão, 1 (0.97%) from Mato Grosso do Sul, and 1 (0.97%) from Rio Grande do Sul. Most of them were provided with care through SUS, 98 (95.15%). The month of July had 21 (20.39%) procedures, the highest incidence of HSCT, followed by 13 (12.62%) in April, 12 (11.65%) in May, 11 (10.68%) in September, 9 (8.74%) in August and November, 8 (7.77%) in January, and 20 (19.42%) in the remaining months of the year.

In terms of diagnosis, it was found that 15 (14.56%) had leukemia, 33 (32.04%) Hodgkin's lymphoma, 22 (21.36%) had non-Hodgkin's lymphoma, 26 (25.24%) had multiple myeloma, and 7 (6.80%) had tumors in general. Autologous transplantation was observed in 88 (85.44%) patients. Out of the 15 (14.56%) who underwent allogeneic transplantation, 9 (8.74%) had a sister as donor, 5 (4.85%) had a brother, and 1 (0.97%) had a child.

Among post-transplantation complications, 84 (81.55%) had problems such as constipation, diarrhea, urinary tract infection, respiratory infection, graft disease against the host, and 19 (18.45%) had no complication. It was found that 74 (71.84%) patients survived to transplantation and were discharged from hospital.

Table 1. Medical diagnosis in relation to donor. São José do Rio Preto, 2013.

Diagnosis*	Donor		Total
	No	Yes	
Leukemia	2 (2.47%)	13 (86.67%)	15 (15.63%)
Hodgkin's lymphoma	33 (40.74%)	0 (0.00%)	33 (34.38%)
Non-Hodgkin's lymphoma	22 (27.16%)	0 (0.00%)	22 (22.92%)
Multiple myeloma	24 (29.63%)	2 (13.33%)	26 (27.08%)
Total	81 (84.38%)	15 (15.63%)	96 (100%)
P value	< 0.001		

*Patients with a diagnosis of tumor were excluded from the analysis due to lack of sample representativeness.

Table 2. Medical diagnosis in relation to patient's situation after transplantation. São José do Rio Preto, 2013.

Diagnosis*	Situation		Total
	Death	Alive	
Leukemia	7 (25.93%)	8 (11.59%)	15 (15.63%)
Hodgkin's lymphoma	3 (11.11%)	30 (43.48%)	33 (34.38%)
Non-Hodgkin's lymphoma	9 (33.33%)	13 (18.84%)	22 (22.92%)
Multiple myeloma	8 (29.63%)	18 (26.09%)	26 (27.08%)
Total	27 (28.13%)	69 (71.88%)	96 (100%)
P value	0.010		

*Patients with a diagnosis of tumor were excluded from the analysis due to lack of sample representativeness.

Table 3. Occurrence of complications in relation to patient's situation after transplantation. São José do Rio Preto, 2013.

Complications	Situation		Total
	Death	Alive	
No	0 (0.00%)	19 (25.68%)	19 (18.45%)
Yes	29 (100%)	55 (74.32%)	84 (81.55%)
Total	29 (28.16%)	74 (71.84%)	103 (100%)
P value	< 0.001		

Table 4. Medical diagnosis, type of transplantation, donor, complication, and current situation regarding patient's age. São José do Rio Preto, 2013.

Variables	Occurrence	N	$\bar{x} \pm s$	Md	Min	Max	P value
Diagnosis*	Leukemia	15	40.47 ± 17.34b	44.00	13.00	60.00	< 0.001
	H lymphoma	33	28.27 ± 12.63c	25.00	9.00	57.00	
	NH lymphoma	22	39.41 ± 15.51b	43.00	8.00	61.00	
	Myeloma	26	56.00 ± 11.98a	59.00	20.00	69.00	
	Tumor	7	19.57 ± 12.22c	19.00	4.00	37.00	
Type of TX**	Allogeneic	15	39.53 ± 17.78	42.00	13.00	61.00	0.871
	Autologous	88	38.72 ± 18.07	40.50	4.00	69.00	
Donor**	No	88	38.72 ± 18.07	40.50	4.00	69.00	0.871
	Yes	15	39.53 ± 17.78	42.00	13.00	61.00	
Complication**	No	19	28.16 ± 15.49	23.00	8.00	56.00	0.003
	Yes	84	41.25 ± 17.65	44.50	4.00	69.00	
Situation**	Death	29	42.97 ± 17.95	52.00	4.00	68.00	0.149
	Alive	74	37.22 ± 17.80	38.00	6.00	69.00	

P value related to analysis of variance. Different letters in the same column differ statistically by Tukey test at 5% significance. ** P value regarding t test for independent samples.

Table 5. Medical diagnosis, type of transplantation, donor, complication, and current situation in relation to patient's time of transplantation. São José do Rio Preto, 2013.

Variables	Occurrence	N	$\bar{x} \pm s$	Md	Min	Max	P value
Diagnosis*	Leukemia	15	295.4 ± 298.5	127.0	10.0	806.0	0.534
	H lymphoma	33	386.9 ± 290.7	377.0	21.0	1189	
	NH lymphoma	22	285.3 ± 346.1	160.0	13.0	1474	
	Myeloma	26	342.9 ± 252.3	338.0	17.0	719.0	
	Tumor	7	264.4 ± 184.2	335.0	25.0	518.0	
Type of TX**	Allogeneic	15	315.1 ± 304.4	127.0	10.00	806.0	0.844
	Autologous	88	335.4 ± 286.9	325.5	13.00	1474	
Donor**	No	88	335.4 ± 286.9	325.5	13.00	1474	0.844
	Yes	15	315.1 ± 304.4	127.0	10.00	806.0	
Complication**	No	19	345.2 ± 257.8	335.0	68.0	806.0	0.467
	Yes	84	329.6 ± 295.9	258.5	10.0	1474	
Situation**	Death	29	136.0 ± 275.0	46.0	10.0	1474	< 0.001
	Alive	74	409.4 ± 256.1	408.5	35.0	1189	

P value refers to Kruskal-Wallis test. ** P value related to Mann-Whitney test.

It was shown that most patients with a donor had leukemia and those without donor had Hodgkin's lymphoma, the highest percentage of patients who died had non-Hodgkin's lymphoma and those who survived had Hodgkin's lymphoma. The association between complications and patients' situation showed that 84 had post-transplantation complications and 29 died.

There were significant differences between patients' age when analyzed according to diagnosis ($p < 0.001$). Multiple myeloma, leukemia, and non-Hodgkin's lymphoma were more frequent among older people, when compared to Hodgkin's lymphoma and tumors, which had lower average age. There was significance between the time of transplantation, when compared to the situation after procedure. Those who died had lower average time of transplantation than those who survived.

DISCUSSION

As for the profile, most patients were from the states of São Paulo, Mato Grosso, Mato Grosso do Sul, Espírito Santo, Minas Gerais, and Rio Grande do Sul, corroborating studies that point out the southern and southeastern regions as having higher rates of mortality due to cancer, demonstrating the need to educate health professionals to work in this area.⁷

In this study, most patients with a donor had leukemia and those without donor had Hodgkin's lymphoma, the highest percentage of those who died had non-Hodgkin's lymphoma and those who survived had Hodgkin's lymphoma. The need for chemotherapy affects the bone marrow and predisposes to severe infection; the complications in transplant patients manifested in various ways. Usually, they have long-term catheter, such as Hickman, Broviac, or Groschong, in order to facilitate the administration of chemotherapy, antibiotics, blood products, fluids, and other supportive therapies.⁸

With an impaired immune system, the chance of developing bacteremia and fungemia is great, leading the patient to septic shock, multiple organ failure, and death, mainly affecting the respiratory, gastrointestinal, and renal systems, with high morbidity and mortality.⁸ Recovery of the immune system occurs gradually within the period from 12 to 18 months. *Varicella zoster* virus infections are common within the first year after transplantation and prolonged use of Acyclovir reduces the risk of reactivation.⁶

P. carinii infections are more frequent within the first 6 months, but they may occur later among patients using corticosteroids. Sinusitis is frequent, especially among those patients with reduced levels of immunoglobulins and mucosal hypertrophy associated with the use of cyclosporine and tacrolimus. Pneumonia, acute respiratory failure, cough with phlegm, urinary tract infection (UTI), vomiting, diarrhea, and constipation are the main complaints and complications reported by transplant patients.⁶

Despite therapeutic advances in relation to post-transplantation immunosuppression, graft disease against the host (GDAH) remains, after infectious processes, as the most frequent complication of allogeneic BMT, increasing the morbidity and mortality rates, with a huge impact on patients' survival and the target organs as the liver, epithelial cells of the intestine and skin. As our entire immune response comes from the bone marrow and in transplantation the patient receives a new immune system, the white blood cells from donor recognize as foreign the host's body and starts fighting against it, characterizing GDAH, classified as acute when it emerges around the 20th day after allogeneic BMT, with exanthema, jaundice, abdominal pain, and diarrhea.^{8,9}

Increasingly, BMT has established itself as a significant therapeutic option for various pathologies. The ways of coping with disease interfere positively or negatively with advances and rehabilitation. The diagnosis of leukemia, myeloma, or tumors leads the individual to relate treatment to death, regardless of how high the technology involved is and how good the treatment outcomes are. The coping styles are associated with the highest levels of negative affection (e.g. depression and anxiety) and the individuals prefer withdrawing, even from their own family.¹⁰⁻¹²

The need for special care procedures due to low immunity (immunosuppressed) entails intense changes in the social roles of a transplant patient, either in family, work, and society. A lengthy hospital stay and extreme dependence on the hospital staff, physical side effects related to treatment, associated with a series of psychological and physical stressors, including isolation, fluctuation of clinical status and, as a consequence, the possibility of death, allows relapse among a large portion of transplant patients. Younger patients were more resigned regarding a negative diagnosis than older patients. Specific factors related to gender rather act

on the social domain, and women need greater support and contact than men.¹³

Nursing needs to deepen its knowledge about these patients from the standpoint of their needs, capabilities, limitations, and difficulties, in order to help them to go through this experience as active elements in the process and not just as spectators of actions taken by health professionals.¹⁴⁻¹⁷ The production of services and education of professionals specialized in the various areas of knowledge is increasingly required. Nurses seek specialization courses in hematology, which has gained prominence and scientific/academic significance in recent years, because it involves a number of diseases that are becoming more frequent.

Understanding the process that involves the patient that undergoes HSCT is required for the professional's qualification and continuous updating, especially in nursing, since there are few studies on transplantation in the area. Apprehending the dynamics of specialized units improves clinical reasoning and seeks greater harmony between all phases of nursing care systematization.¹⁸

Oncological patients experience varying degrees of pain and anxiety, with changes at the physical, emotional, affective and professional levels that generate stress both for her/him and for her/his family, something which further complicates the treatment she/he is undergoing.¹⁹ Therefore, it is worth knowing the profile and major complications after bone marrow transplantation, especially in relation to the emotional support they need.

The specialized care provided by the health team to the oncological patients includes comprehensive, targeted, and individualized actions, through prevention and/or reduction of adverse effects arising from the systemic action of chemotherapy agents, influencing coping and confidence during treatment.²⁰ The nurse working in the HSCT sector uses technologies, knowledge, and technical skills and she/he has autonomy to provide complex nursing care procedures, besides managing the use of materials and equipment needed.¹⁶ Ensuring a humanized treatment is a challenge for professionals dealing with care for transplant patients, with a holistic approach, and there is a need for further researches in this area.

Although it has not affected the results, one of the limitations in conducting this retrospective study was the difficulty in data collection, due to the absence of a computerized system in the unit under study,

patients' nursing care records and files with incomplete or missing information.

CONCLUSION

Younger patients diagnosed with Hodgkin's lymphoma who underwent autologous transplantation had fewer complications and better prognosis when compared to the others. Therefore, identifying the profile, diagnosis, complications, and current situation in relation to time after transplantation may provide means for the nursing professionals who work in this area, which still shows to lack researches conducted by and for nurses.

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