



NURSING CARE OF THE POTENTIAL DONOR OF ORGANS AFTER BRAIN DEATH: INTEGRATIVE REVIEW

CUIDADOS DE ENFERMAGEM AO POTENCIAL DOADOR DE ÓRGÃOS EM MORTE ENCEFÁLICA: REVISÃO INTEGRATIVA

CUIDADOS DE ENFERMERÍA CON EL POSIBLE DONANTE DE ÓRGANOS CON MUERTE ENCEFÁLICA: REVISIÓN INTEGRADORA

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ABSTRACT

Objectives: to characterize the scientific literature on the maintenance of the potential multiple organ donor after brain death and highlight relevant aspects to nursing. **Methods:** this is an integrative review of the literature guided by the formulation of the question: what knowledge has been produced about the maintenance of the potential organs and tissues donor?. For research refinement, the following inclusion criteria were set: publications in Portuguese, English and Spanish; available for free in full texts; published from January 2005 to December 2011; and approaching the theme proposed. For this purpose, the following descriptors were used: "Organ donors", "Brain death" and "Nursing"; obtained from LILACS, SCIELO, BDNF, ISI Knowledge and SCOPUS databases. A total of 15 publications were selected. Using a structured form was made the read of articles. The collected data was typed in the Microsoft Excel 2007 spreadsheets, analyzed through the descriptive statistics, presented in tables and organized into topics. **Results:** The search identified publications mostly of descriptive type, with qualitative method of data processing, published in the years 2009 and 2010. The results highlight the proper maintenance of the potential donor after brain death as the most promising way to reduce the shortage of organs, because it minimizes the effects of physiological changes and increases effective potential donors. **Conclusion:** The activities carried out by nursing in maintaining the potential donor of organs are considerably complex and require knowledge ranging from legislation to physiopathological changes resulting from brain death. **Descriptors:** organ donors; brain death; nursing.

RESUMO

Objetivos: caracterizar a produção científica sobre a manutenção do potencial doador de múltiplos órgãos em morte encefálica e destacar aspectos relevantes para enfermagem. **Métodos:** revisão integrativa da literatura guiada pela seguinte questão: qual conhecimento tem sido produzido sobre a manutenção do potencial doador de órgãos e tecidos? Para refinamento da pesquisa foram definidos como critérios de inclusão: publicações em português, inglês e espanhol; disponíveis gratuitamente em textos completos; publicadas no período janeiro de 2005 a dezembro de 2011; e que abordassem o tema proposto. Para tanto foram utilizados os seguintes descritores: "Doadores de órgãos", "Morte Encefálica" e "Enfermagem"; nas bases de dados: LILACS, SCIELO, BDNF, ISI Knowledge e SCOPUS, foram selecionadas no total 15 publicações. Utilizando um formulário estruturado foi realizada a leitura dos artigos. Os dados colhidos foram digitados em planilhas do Microsoft Excel 2007, analisados por meio da estatística descritiva, apresentados sob a forma de tabelas e estruturado em tópicos. **Resultados:** o rastreamento identificou publicações em sua maioria do tipo descritiva, com método qualitativo de tratamento de dados, publicadas nos anos de 2009 e 2010. Os resultados destacam a adequada manutenção do potencial doador em morte encefálica como o caminho mais promissor para reduzir a escassez de órgãos, pois, minimizados efeitos decorrentes das alterações fisiológicas e maximiza a efetivação dos potenciais doadores. **Conclusão:** as atividades desenvolvidas pela enfermagem na manutenção do potencial doador de órgãos são consideravelmente complexas e exigem conhecimentos que vão desde a legislação até as alterações fisiopatológicas decorrentes da morte encefálica. **Descritores:** doadores de órgãos; morte encefálica; enfermagem.

RESUMEN

Objetivos: caracterizar la producción científica sobre el mantenimiento del posible donante de órganos múltiples con muerte encefálica y destacar los aspectos relevantes para la enfermería. **Métodos:** se trata de una revisión integradora de la literatura guiado por la pregunta: qué conocimiento se ha producido sobre el mantenimiento de los órganos de los donantes potenciales y tejidos?. Fueron definidos los siguientes criterios de inclusión: publicaciones en portugués, inglés y español; disponibles gratuitamente con textos completos; publicadas de enero de 2005 a diciembre de 2011; que abordasen el tema propuesto. Fueron utilizados los siguientes descriptores: "Donantes de órganos", "Muerte encefálica" y "Enfermería"; en las bases de datos: LILACS, SCIELO, BDNF, ISI Knowledge y SCOPUS. Fueron seleccionadas en total 15 publicaciones. El uso de un formulario estructurado se realizó la lectura de los artículos. Los datos recogidos se introdujeron en Microsoft Excel 2007, analizados empleó estadística descriptiva, presentan en forma de tablas y organizados en temas. **Resultados:** la búsqueda identificó publicaciones en su mayoría de tipo descriptiva, con método cualitativo de tratamiento de datos, publicadas en los años 2009 y 2010. Los resultados destacan el adecuado mantenimiento del posible donante con muerte encefálica como el camino más prometedor para disminuir la escasez de órganos, pues reduce los efectos de las alteraciones fisiológicas y aumenta el número de posibles donantes. **Conclusión:** las actividades desarrolladas por la enfermería en el mantenimiento del posible donante de órganos son considerablemente complejas y exigen conocimientos que van desde la legislación hasta las alteraciones fisiopatológicas resultantes de muerte encefálica. **Descriptores:** donantes de órganos; muerte encefálica; enfermería.

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INTRODUCTION

The organ transplants consist of the substitution of an organ or tissue, hopelessly ill, that damages the life of an individual called receptor, by an organ or tissue of another healthy person called donor.^{1,2}

Nowadays, the transplant practice is considered a procedure which has well established therapeutic value with good results due to the upgrading of the surgery technique, improvement in the immunology area and the appearance of more efficient methods of organs conservation.³

However, as soon as the transplants were seen as a viable treatment, its biggest limiter turned out to be the organs shortage, something that generated a growing unbalance between the supply and demand of organs, although there are two types of donors: the living and the non living ones or the deceased.⁴

In Brazil, in 1991, the Federal Medicine Council regulated the diagnosis of brain death (BD) and defined it as an irreversible situation of the breathing and circulatory functions or irreversible cessation of all the brain function, including the brainstem and that the BD must be the consequence of an irreversible process and with known cause.⁵

The potential organs donor is the patient with the BD diagnosis in which the clinical contraindications had been discarded, for example, HIV virus, generalized infection and malignant neoplasm, which represent risks to the organ receptors.¹ In this case, it can be donated: heart, lung, liver, kidney, pancreas, intestine, corneas, skin and bones after a very thorough evaluation of its operation.⁴

It is estimated that from 1 to 4% of people who died in hospitals and from 10 to 15% from those who died in intensive care units are potential donors.⁶ In Brazil, a study about the lines for transplant in the Sistema Único de Saúde (SUS), showed that from each eight potential donors, only one is notified and just 20% of those ones became effective donors of multiple organs, something that represents a problem about the long waiting lines for a transplant in our country.⁷

The most promising way to minimize the suffering of those who are waiting for a transplant is optimize the potential donor through their advance identification and proper maintenance that makes it viable to keep the organs operating until the moment of the transplant. The maintenance of the potential donors constitutes the second

biggest cause of the non effectiveness of the organs donation in Brazil.⁸

The Nurse performance in the transplants area is regulated by the Resolution nº 292/2004 of the Nursing Federal Council (COFEN) that determines as the functions of this professional to plan, act, coordinate, supervise and evaluate the nursing procedures offered to the family and organs and tissues donors.⁹

OBJECTIVES

- To characterize the scientific production about the proper maintenance of the potential donor of multiple organs presenting brain death;
- To highlight the relevant aspects for the nursing professional about the proper maintenance of the potential donor of multiple organs presenting brain death.

METHODOLOGY

It is an integrative review of the literature, following these steps: setting of the review objectives and articles inclusion criteria; definition of information to be extracted from the researches; selection of articles; analysis of results; discussion about the findings and presentation of the review.

The main asked question for this review was: what knowledge has been produced, from the performed researches, about the maintenance of the potential organs and tissues donor?

The data collection was done in January 2012 in the SCIELO, Latin-American Literature of Health Science (LILACS), Nursing Database (BDenf), ISI Knowledge and Scopus databases.

For the proper refinement of the articles, it was defined a sample, obeying to the following inclusion criteria: publications in Portuguese, English and Spanish; available for free in complete text in the databases mentioned above; during the period from January 2005 to December 2011; articles which approached the theme of maintenance of the potential organs and tissues donor in any scope in individuals aging more than 18 years old.

The search of the publications was done through a crossing of the Descriptors in Health Science (DeCS): “doadores de órgãos/donadores de tecido/ tissue donors” X “Morte Encefálica/ Muerte cerebral/ Brain Death” X “Enfermagem/Enfermería/Nursing”.

With the computer search in the LILACS database, it was found and selected 04 articles. In the SCIELO database it was found

25 articles from which 20 were excluded afterwards because they did not approach the maintenance of the potential organs and tissues donor and because it did not have a methodological criterion.

In BDEnf database 04 publications were presented. After the abstracts evaluation and the complete articles reading, all of them followed the proposed criteria and were part of the final sample. In the ISI Knowledge database the search presented 01 article that was selected for the study. The search of the publications in the Scopus database found 13 articles from which 10 did not match with the objectives of this study and 03 were selected.

For the articles data collection, it was created a structured form based on the protocol of review of Polit, Beck and Hungler¹⁰, organizing the studies according to

the year of publication, type of used analysis and delimitation of the study.

After reading the articles, the data was typed in the Microsoft Excel 2007 spreadsheets, analyzed through the descriptive statistics and presented in tables. For didactic matters, the paper is structured according to the different pathophysiological changes due to the BD and the related nursing care.

RESULTS

The Table 01 shows how the publications involving the care towards the potential organs donor presenting brain death is characterized, according to the year of publication, the type of study and used method.

Table 01. Characterization of the studies about the maintenance of the potential organs donor presenting brain death.

Variable	DATABASE											
	LILACS		BDEFN		SCIELO		ISI Knowledge		SCOPUS		TOTAL	
	n	%	n	%	n	%	n	%	n	%	n	%
Year												
2005	1	6,67	0	0,00	0	0,00	0	0,00	0	0,00	1	6,67
2006	1	6,67	0	0,00	0	0,00	0	0,00	1	6,67	2	13,34
2007	1	6,67	0	0,00	2	13,32	0	0,00	1	6,67	4	26,65
2008	0	0,00	1	6,67	0	0,00	1	6,67	0	0,00	2	13,34
2009	1	6,67	0	0,00	1	6,67	0	0,00	1	6,67	3	20,00
2010	0	0,00	2	13,32	1	6,67	0	0,00	0	0,00	3	20,00
2011	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00
Type of study												
Descriptive	1	6,67	3	20,00	3	20,00	0	0,00	1	6,67	8	53,33
Theoretical review	3	20,00	1	6,67	1	6,67	1	6,67	0	0,00	6	40,00
Case study	0	0,00	0	0,00	1	6,67	0	0,00	0	0,00	1	6,67
Method												
Qualitative	4	26,65	2	13,34	1	6,67	1	6,67	1	6,67	9	60,00
Quantitative	0	0,00	1	6,67	3	20,00	0	0,00	2	13,34	6	40,00
Total	4	26,66	3	20,01	4	26,66	1	6,66	3	20,01	15	100,00

Source: From this research, 2011.

DISCUSSION

The brain death is a complex process that alters the physiology and the cellular biochemistry of all organic systems drastically. The clinical syndrome of the brain death produces sudden changes in the pressure levels, hypoxemia, hypothermia, coagulopathy, electrolytic and hormonal disorders.⁴

The changes due to brain death often lead to the dysfunction of multiple organs and systems, cardiovascular collapse and asystole in 60% of the cases, if they are not properly conducted.¹¹

• Maintenance of the Cardiovascular function

The intense liberation of the catecholamine during the autonomic discharge produces a big vasoconstriction, which leads to arterial hypertension, tachycardia and a

rise in the demand of the myocardium oxygen, something that can cause ischemia and myocardial necrosis, besides the cardiac arrhythmia.^{4,12}

During this stage, some authors point out that the nursing care must be directed to the administration of blockers of short action, always checking if the blood pressure is within the acceptable values.¹³ These values include systolic blood pressure above 90 mmHg, cardiac frequency around 100 bpm and central venous blood pressure (CVBP) between 8 and 10 mmHg.¹⁴ The nurse professional must follow the electrocardiogram and have the prepared material in case there is a cardiorespiratory arrest.¹³

Right after the autonomic discharge, there is a period of extreme vasodilatation, with severe blood hypotension, and this is the most serious pathophysiological change of BD. The vasodilatation produces a big rise of the

capacity of the vascular system producing hypovolemia.⁴

The hypovolemia correction needs central venous access for the infusion of a great volume of liquid and for the PVC measure.⁴ during the hypotension stage the nurse professional must be focused on the severe control of the PVC values and on the speed and the volume of the administered fluids, because the excess of liquid and its fast infusion can cause pulmonary edema, with a consequent damage to the donor's oxygenation.¹³

Besides the correct PVC measures, it must be taken into consideration other clinical signs, such as mucosa and dry skin signs. The diuresis control must be done each 6 hours according to the hydric balance and catheterization, being aware of the notifications in the cases of possible medical situations such as polyuria or oliguria.^{13,16}

If the catecholamine administration is necessary, the nurse professional must be careful in order to guarantee a good administration: guaranteeing the continuous infusion, controlling the permeability of the via and, in case of the use of an infusion syringe, it must be put in a way that it avoids severe changes in the syringe.^{13,14,17,18}

● Maintenance of the respiratory function

The lung is extremely susceptible to the events which follow the BD, because the left atrium blood pressure is so high due to the intense peripheral vasoconstriction that elevates the capillary hydrostatic pressure promoting a rupture of the capillary with interstitial edema and alveolar hemorrhage. These changes happen with the ventilation, infusion and hypoxemia unbalance.^{12,18}

All the possible donors demand mechanical ventilation. The objective is the maintenance of the arterial saturation of oxygen superior to 90% with partial arterial blood pressure superior to 60 mmHg.¹⁴

At this point, the activities of the nurse professional are focused on guaranteeing proper ventilation and oxygenation, controlling the respiratory parameters by pulse oximetry and arterial gasometry.^{13,15}

These activities include: tracheobronchial aspiration, to avoid the endotracheal tube movements and its disconnection with the respirator, to humidify the endotracheal tube each 24 hours, and to elevate the headboard 30° in order to avoid aspiration. Besides this, the nurse professional is responsible for a sterile tracheobronchial aspiration to avoid infections.¹³

● Temperature Maintenance

With the BD, there is a loss of the hypothalamic thermoregulatory center. As a result of it, a hypothermia state starts in the donor and it can generate the myocardial depression, the arrhythmias, the reduction of the oxygen transport, the rise of the hemoglobin affinity by the oxygen, the renal dysfunction, the pancreatitis and the coagulopathies.^{8,15}

At this point, the nursing care include: 37° C serum infusion, use of blankets and aluminum thermal blankets to avoid the heat loss (even it covers the head of donor), heating of the breathed gases and external heating using heat lamps in a distance of 0,5-1 m from the donor.¹³

● Maintenance of the Endocrine function

The progressive failure of the hypothalamic-pituitary axis evolves into a gradual and inexorable decline of the hormone concentrations, especially the antidiuretic one (ADH).^{5,18}

The Diabetes insipidus occurs in about 80% of these patients and it is characterized by great volumes of hyperosmolar diuresis, with secondary hypovolemia, hypernatremia and serum hyperosmolarity. And important cause of hypotension and tissue hypoperfusion, producing several electrolytic disorders besides the hypernatremia, which contributes towards the cardiac dysrhythmias development and myocardial depression.⁵

Severe decreases in the triiodothyronine levels (T3) are found right after the BD and have been implied in the reduction of the cardiac contractility, with phosphate depletion of high energy and a change from the aerobic to anaerobic metabolism. It contributes to the worse of the metabolic acidosis and the tissues perfusion of the organs of the donor.¹²

The insulin secretion is also damaged, something that can produce hyperglycemia. Together with it, there is the rise of the peripheral resistance to the insulin.¹² In these cases it is necessary to correct the hyperglycemia with a fast and continuous infusion of insulin in order to keep the glucose levels in the blood by around 150 Mg/dl.¹³

According to the same author, the nursing activities concerning the Diabetes insipidus and the hyperglycemia are based on the diuresis control, notifying the doctor is the urine elimination is superior to 200 ml/h. in case of vasopressin administration; the nurse professional must follow some possible

electrocardiographic changes as well as the glucose levels.^{13,18}

● Maintenance of the Liver and Coagulation functions

The brain tissue lesion releases the tissue thromboplastin and other substrates rich in plasminogen. These factors, added to the hemorrhage, transfusions, coagulation factors dilution, acidosis and hypothermia, support the development of disseminated intravascular coagulation.^{5,15}

The nursing team must be aware of any coagulation disorders. These changes can happen through minor signs, such as a change in the diuresis color (hematuria), gingival bleeding or persistent bleeding in vascular puncture areas.^{12,15}

Another author still points out that, in case it is prescribed, the nursing professionals are responsible for the plasma administration or platelet concentrate and must always check whether the Rh factor and the product identification match with the potential donor.¹³

● Corneas Maintenance

According to a study performed in Goiânia, the cornea is one of the most currently transplanted tissues, so, as the other types of care, the preservation of the cornea is fundamental.⁸

Concerning the corneas, the nursing actions include keeping the eyes of the potential donor closed, applying collyrium or lubricant solutions and, if necessary, using antibiotic.⁸

● Other Cares

It is still highly important that the nursing team attends the family of the potential donor in the most cordial and friendly way, answers to any questions they may ask, provides the necessary information and makes it easy for the family to visit the potential donor.^{13,15,16}

Besides this, the nursing team must provide conditions to the safe transportation of the potential donor to the operating room area, do the checklist of the conservation material and give it to the receiving team.^{13,18}

CONCLUSION

The activities developed by the nursing professionals in the maintenance of the potential organ donors presenting brain death (BD) are extremely complex and demand some knowledge that covers the legislation until the possible changes due to the BD status.

So, the importance of the nursing professionals is evident, especially those who act in urgency and emergency services or in intense therapy units, to be prepared to act in any of the stages of the donation process.

In this context, we highlight the importance of investing in researches in the transplants area and in the qualification of nurse professionals, focusing on the skills and competence development, so that they can effectively participate of the official notification of a potential donor, the clinical maintenance of this donor, the proper approach to the family in order to inform them about the brain death and the donation possibility.

The appropriate assistance to the potential donor aims to minimize the effects from the physiological changes which result from the BD and to maximize the effectiveness of the potential donors. Because of it, the care delivered to this individual must not be thought as a futile investment in a patient who has no chance to be clinically recovered, but as a unique treatment opportunity for many other severely ill patients.

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