The role of nursing the patient with brain death in the ICU

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Abstract

This study is aimed at identifying the role of the nursing team in the care of patients with brain death in the Intensive Care Units (ICU), highlighting the essential conduct to maintain the potential donor, provide family care, and control all vital functions until the time of organ donation. This is a literature review with an exploratory objective, including articles from electronic journals and literary works. The study concludes that the intensivist team plays a very important role in maintaining the vital functions of the potential donor, being necessary that they have a strong understanding of all aspects of brain death, as well as scientific and ethical knowledge, because the viability of the organs or tissues to be donated depends directly on proper conservation.

Keywords: Brain death. Transplantation-Tissue and organ procurement. Nursing care-Living donors. Intensive care units.

Resumo

A enfermagem e o paciente em morte encefálica na UTI

Este estudo teve como objetivo identificar o papel da equipe de enfermagem nos cuidados prestados aos pacientes em morte encefálica nas unidades de terapia intensiva, apontando condutas indispensáveis à manutenção do potencial doador, assistência à família e controle de todas as funções vitais até o momento da doação de órgãos. Trata-se de revisão bibliográfica, com objetivo exploratório, incluindo artigos de periódicos eletrônicos e obras literárias. Conclui-se que a equipe intensivista desempenha papel de grande relevância na manutenção das funções vitais do potencial doador, sendo necessário embasamento a respeito de todos os aspectos da morte encefálica, conhecimento científico e ético, pois a viabilidade dos órgãos ou tecidos a serem doados depende diretamente de sua adequada conservação.

Palavras-chave: Morte encefálica. Transplante-Obtenção de tecidos e órgãos. Doadores vivos-Cuidados de enfermagem. Unidades de terapia intensiva.

Resumen

El papel de la enfermería y el paciente con muerte cerebral en la UTI

Ese estudio tuvo como objetivo identificar el papel del personal de enfermería en los cuidados prestados a los pacientes con muerte cerebral en Unidades de Terapia Intensiva (UTI), señalando las conductas indispensables para el mantenimiento del donante potencial, cuidado de la familia, y el control de todas las funciones vitales hasta el momento de la donación cuerpos. Se trata de una revisión bibliográfica con un objetivo exploratorio, incluyendo artículos de revistas electrónicas y obras literarias. Se llega a la conclusión de que el equipo intensivista juega un papel muy importante en el mantenimiento de las funciones vitales del donante potencial, siendo necesario tener como base el respeto en todos los aspectos de la muerte cerebral, teniendo en cuenta el conocimiento científico y ético, porque la viabilidad de los órganos o tejidos para ser donados depende directamente de su adecuada conservación.

Palabras clave: Muerte encefálica. Trasplante-Obtención de tejidos y órganos. Atención de enfermería-Donadores vivos. Unidades de cuidados intensivos.

Research articles

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Nursing and the patient with brain death at the ICU

Transplantation has become the best resource for patients with organ failure when other therapies are no longer effective. Transplantation is understood as the extraction or removal of organs, tissues or parts of the body of a living or nonliving donor, with therapeautic objectives [1].

The first transplant with a nonliving donor in Brazil happened in 1964, and it was a kidney transplant. Ever since, there have been improvements in this treatment in terms of intensive care, immunosuppressive drugs, adaptation of surgical techniques and the use of better developed solutions for better preservation [2]. Brazil is considered the second country in the number of transplants carried out every year, and more than 90% are executed by the Sistema Único de Saúde (Unified Health System) (SUS) [1]. Living donors may donate bone marrow, one of their kidneys, part of their liver and part of their lung. On the other hand, nonliving brain dead patients allow for the donation of heart, lungs, kidneys, corneas, liver, pancreas, bones, tendons, veins and intestine [1].

Brazilian law 10.211/2001 authorizes the family to allow or disallow for the donation process, even if the potential donor has made it clear, while living, that he or she desires to donate their organs. Given that situation, it is necessary for the nurse to orient the family and answer their questions regarding the donation and the procedures to be executed, and clarify which organs may be donated, and that this incurs in no costs – which are paid for by SUS – and allows for saving lives [3]. The donation of organs while living is legally allowed only for blood-related relatives to the fourth generation or spouses, or if the donor authorizes the receival of the organ by another person - except in the case of bone marrow, when this authorization is waived [1].

Serial factors interfere in the collection and donation of organs, among which are the omission of notice and identification of the patient, the care rendered to the patient, and complementary exams. In addition, little clarification to family members on the diagnosis of brain death, inadequate interviews and difficulties in communication with the team responsible for the donation process generate lack of knowledge and difficulties in the removal of the organs and their distribution. For this reason, about 30% to 40% of family members disagree with the practice of organ procurement [4].

In order for the transplant to be satisfactory certain exclusion criteria must be included, such as history of malignant tumors, active sepsis, tuberculosis, HIV infection, viral encephalitis (brain inflammation and infection), viral hepatitis, Guillain-Barré syndrome (an autoimmune disease which occurs when the body's immune system mistakenly attacks part of its own nervous system) and use of illegal intravenous drugs [5].

It is up to the professional nurse to initially carry out a family interview regarding the diagnosis of brain death. Equally, he or she must inform ethically, morally and legally on the process of procurement and distribution of organs and tissues to be donated, and educate in an objective manner, respecting the opinions of family members and their moment of loss and pain. In a state of shock, going through grief, suffering and despair, the family believes that the patient may still survive due to the preservation of their temperature, cardiac and respiratory functions [3]. In such painful circumstances, professionals must offer psychological support to the families.

This study aims at clarifying the theoretical relevance in a detailed context regarding the practice of organ donation in society, and get to know the role of the professional nurse in the process of organ procurement and donation, highlighting the indispensable care to the maintenance of the potential donor, assistance to the family and control of all vital functions until the time of donation.

Method

This study was outlined from a literature review with an exploratory goal, describing organ donation and the role of nursing in the case of brain dead patients in the ICU. For the inclusion in this research, publications had to approach the following themes: "nursing assistance in the organ donation process"; "knowledge about brain death"; "professional training"; and "care for brain dead patients in the ICU". On the other hand, publications which did not include the theme and those which did not agree with the referred descriptors or had no references were excluded. All the found sources were published between 2010 and 2015, making up a total of 30 scientific papers. Data collection consisted on the exploration of papers by electronic means and specialized websites such as *Scientific Electronic Library Online* (SciELO), the Hospital das Clínicas de São Paulo (Clinics Hospital of São Paulo), the Ministério da Saúde (Ministry of Health), the Conselho Federal

de Enfermagem (Brazilian Federal Nursing Council) (Cofen) and the Conselho Federal de Medicina (Brazilian Federal Medicine Council) (CFM). The data were analyzed according to the texts, themes and interpretations that came from them, comparing opinions in a broad way and sharing ideas, explanations and knowledge on each subtheme.

Brain death

Brain death (BD) is established as an irreversible condition of the respiratory and circulatory functions and cessation of all functions of the encephalus and brainstem, and some of the main causes include intracranial bleeding (45%), trauma (45%) and ischemic brain injury [5]. This condition is regulated by the Conselho Federal de Medicina (Federal Medicine Coucil) (CFM) by Resolution CFM 1.480/97, which determines two initial stages for the diagnosis of brain death: clinical and complementary exams. The clinical exam aims at asserting the absence of reflexes on the brainstem; it is carried out at time intervals according to the age of the potential donor: between 7 days and 2 incomplete months, the exams are repeated every 48 hours; from 2 months to 1 inomplete year, repeat every 24 hours; from 1 year to 2 incomplete years, repeat every 12 hours, and above the age of 2, repeat every 6 hours. It is important to point out that this exam should not be performed by professionals from the organ removal team, but by a medical neurologist [6].

Among the complementary exams one may mention cerebral angiography, electroencephalogram and CT scans, which should be carried out between the first and second clinical exams or after the second clinical exam of brain death. To conclude the diagnosis it is necessary to determine the absence of blood circulation in the encephalus, electrical inactivity and absence of metabolic activity [7].

The state of brain death is characterized by a complex process which leads to several detrimental complications to the potential donor. Therefore, it is extremely necessary for the nursing team to be trained in the investigation and detection of these possible complications, which include cardiac disfunction, arrhythmia, coagulopathy and cold-induced increase in diuresis. Giving thorough care to the patient is fundamental, especially temperature monitoring; it is indispensable to get the patient warm, since the lack of this care in emergency or intensive therapy situations may quickly result in hypothermia [8].

Nursing and the training in organ donation

To guarantee the effectiveness of organ donation it is important to have adequate maintenance, hemodynamic and physiologic preservation of the organs from the beginning to the end of the process. For that specialized materials and equipment are necessary, and so are trained professionals for identifying and controlling all changes in the patient's condition [9], and it is necessary to point out the importance of the preparedness of the team to act in case a speedy intervention is needed [8]. The problems frequently found in the process of organ donation, procurement and quality maintenance are the consequences of improper and ineffective preservation, generally due to the use of inadequate clinical therapy [5]. Special attention must be given by the team in the cases when it is necessary to identify the patients and make contact with their family members [8].

For some authors, one of the causes for the non attainment of organ donation is related to the lack of knowledge from the professional health team on the physiopathology and phisiology of brain death. This knowledge is considered to be a fundamental aspect for the assistance and care rendered to the potential donor, and it supports the clinical evaluation so that an early diagnosis of brain death can be elaborated recognizing the hemodynamic and physiologic changes. Therefore, for a good performance of the team it is important to carry out permanent education work aimed at training the professionals to understand the situation and detect any problems that may arise from it, aiming at planning and implementing the necessary care in an adequate way and evaluating treatment choices for the potential donor [9].

The performance and training of the nurse are different according to their degree of education, position and professional practice. In Brazil there are not many teaching institutions that train specialized professionals for giving care to patients in case of brain death and transplantation. It is important for the nurses to evaluate their actions and execution, and seek further knowledge about the donation process [10].

Nurses are the professionals who are commonly most involved with the emotions of the family members, because they convey the information of brain death and the possibility of donation. However, this research highlights the need for the training of this professional for explaining the diagnosis and questions regarding the transplant, thus preparing

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the family members, since communication and knowledge contribute to the increase of donations. Therefore it is extremely important that the nurse knows how to deal and relate with the family so that the organ procurement [11] process is successful .

The role of nurses in cases of brain dead patient in the ICU must be performed with dignity and respect, regardless of the procedure to be carried out. It is paramount that the nurses have scientific knowledge on physiopathology, since they have an extremely important role in controlling all hemodynamic and hydric data and monitoring the patients. These procedures are necessary for the donation to occur in a satisfactory way [12].

Nursing conduct

When the brain death process starts, changes occur in the organism. The initial care involves the evaluation of the drug prescriptions regarding the neurological condition; change in position to avoid pressure ulcers; and a 30 degree elevation of the head. In addition, the nursing patient must execute aspiration in order to fluidify pulmonary secretions ; periodic evaluation of accesses such as catheters; and measurement of vital signs at 24-hour periods [8]. It is also up to the intensivist nurse to evaluate all vital signs and write them down on the patient's medical record; to care for the cornea and always keep them moist; to clean the patient in order to avoid infection; to observe and write down the glycemic and blood coagulation values. An infusion pump is recommended when administering dopamine as per medical prescription [5].

The maintenance of the cornea of potential donors is accomplished with the occlusion of the eye area, application of water or ice, eye drops or lubricant, or using gauze dampened with 0.9% saline solution or distilled water every three hours to maintain the area clean and moist. These measures avoid complications such as inflammation of the cornea (keratitis), which may arise from a chronic problem and lead to visual deficit and complete loss of sight [13].

Generally, only 40% of the hearts are accepted for transplantation because some diseases make the donation unviable. Age is also an important factor, since it can also be a reason for contraindication; the age limit for male donors is 40, and for female donors 45. The maximum time during which an organ can be in ischemia, that is, without getting oxygen, is five hours [14]. In maintaining control of arterial hypotension, the nusrse must immediately replace the fluids and, if there are no changes, execute infusion with vasoactive drugs and observe the patient's response [13]. It must be emphasized that vasoactive drugs are administered through exclusive ways for central venous access. Volume replacement is accomplished by the large periferic acessways [13].

It is the job of the nurse to perform an electrocardiogram to detect the presence of cardiac changes such as arrhythmia, and in cases of cardiac arrest, execute along with the doctor basic and advanced maneuvers of cardiopulmonary resuscitation (compression and ventilation) [13]. It is important to point out the nursing conducts regarding pulmonary care, since it is a sensitive organ and vital for transplantation. Among the indispensable care, rigorous monitoring and oxygen supply to the tissues with saturation above 95% with a mecanic ventilator are noteworthy [8].

The treatment of a potential donor requires maintaining artificial mechanical ventilation and executing tracheal aspiration in order to keep the airways unobstructed. The team must be attentive to patients kept in ventilatory support, taking care upon moving the patient in order not to disconnect the ventilator or pinch the circuit, and keeping the artificial tracheas free from impurities which may damage the airways. The team must also pay attention to any alarms and make adjustments according to the programmed limit for each patient [13]. Likewise, maintaining adequate ventilation and oxygenation of the patient, controlling parameters of the mechanical ventilator and carrying out collection of material for blood gas dosing and for acid-basic balance are important care measures for maintaining the respiratory phisiology [15].

The core temperature in normal individuals varies between 36 °C and 37,5 C. Thermal imbalance occurs with brain death, because the hypothalamus, which is situated in the central nervous system, ceases to produce heat, resulting in progressive hypothermia that arises from the attempt to maintain a balance between the body and room temperatures. Extreme vasodilation cooperates to this state, with an influence from exogenous factors such as the infusion of large volumes of fluids [9].

Hypothermia provokes a series of damaging complications for the potential donor, among which vasoconstriction and myocardial depression, cardiac arrhythmia, coagulation disorders arising from pre-existing cardiac problems, hyperglycemia and ketosis, electrolitic disorders and deviations in the dissociation curve in the oxygenation of

hemoglobin. Due to the changes mentioned above, it is not recommended to measure body temperature through the mouth cavity, axilla or rectum, but rather through the pulmonary artery, esophagus, tympanic membrane or nasopharynx[8]. Warming the potential donor may be accomplished by infusion of liquids heated to the temperature of 37 °C to 38 °C, by intravenous administration, controlled with warmed blankets and nebulization[15].

Regarding the kidney function, it is necessary to maintain hydric control and evaluate diuresis, promoting the prevention of the endocrine disruption that derives from the rupture of the hypothalamo-hypophyseal axis which is characterized by the presence of diabetis[5]. Kidneys are the most utilized organs for transplantation, with more than 90% of available organs removed for donation. Polycystic kidneys or those with structural involvement should not be totally excluded, because the determining factor for their use is the macroscopic aspect. Donation can be done by patients from ages 5 to 55, and the time limit for using the organ for transplantation is 36 hours[14].

Disorders are common in brain dead patients. Among these are electrolitic disorders which include reduction in sodium, calcium, phosphate and magnesium levels, which need immediate replenishment. The increase in blood glucose normally derives from a deficiency in volume replacement; however, it is also associated with changes in the hormones involved in homeostasis, in addition to adrenal insufficiency[16]. Hyperkalemia and hypomagnesaemia are metabolical disorders which are common in the diagnosis of brain death and are factors that lead to cardiac arrhythmia. For the prevention of this condition, nursing care is necessary for monitoring and controlling the hydroelectrolytic balance[8].

Nursing professionals must also pay attention to possible changes related to diuresis, such as coloring and presence of blood, or haemorrhage in peripheral vascular locations. Likewise, they must constantly supervise the patients under the use of sodium nitroprusside, performing rigorous dripping control and blood pressure monitoring, either invasive or not[15].

The calory and energy intake has a fundamental role in supplying hemodynamic balance to the potential donor, and the lack of this care may lead to damages to the organism[8]. Therefore, the regression of this scenario will possibly lead to metabolic imbalance, making organ preservation impracticable[8]. The prevention of initial infections invloves simple care, such as washing hands and asepsis during the execution of invasive and non-invasive procedures. In case of presumed or diagnosed infections it is necessary to give antibiotics, which may also be useful for the prevention of scabs and the need for changes in position[13].

Again, it is worth highlighting the importance of nurses to ensure the care for the potential donor by carrying out prevention measures against infection, containing haemorrhage risks and performing body hygiene. The nurse must not only pay attention to giving care, but also supervise the team in the assistance given to the potential organ donor[8].

Final considerations

Organ donation is perceived by society as a solidary act through which there is the possibility of supplying a part of the body to help care for people who cannot find other ways of treatment, favoring ther life expectancy evolution. The nursing team plays an important role in the maintenance of the vital functions of the potential donor, but for that to happen it is necessary for the nurse to have scientific and technical knowledge on all aspects of brain death, because the viability of the organs or tissues to be donated depends directly on their adequate preservation.

The health team must be trained for the organ procurement process in its technical aspect, but also be able to act regarding the social - both ethical and psychological - factors related to the donor and the support to the family. It is a part of the ethical duty of these professionals to act under the principle of charity and treat the organ donor as a being, not as an object.

Therefore, even if the donors are no longer alive they must be treated with compassion, with consideration to the persons that they once were and who, given the principle of dignity of the human condition, deserve the same amount of respect as any patient in the ICU. Since nurses are the professionals who deal directly with sensitized people in need of attention and care, it is also fundamental that they are able to give clarification to the families in order to facilitate their understanding of the situation, while respecting their beliefs and feelings regarding the deceased and donation.

In general, nurses may inform the population about the processes and circumstances involved in transplants, as well as the importance of donation, by supporting initiatives of dissemination of information in the institutions where they work and in media campaigns to encourage everyone to save the lives of people who need only an organ to survive.

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Therefore, institutions must implement strategies for training and increasing hospital structures, and provide constant training and update courses to improve the knowledge of their professionals both in terms of the technical advances and, especially, regarding the ethical and bioethical issues that directly involve the process of organ donation and procurement for transplantation.

Institutions and managers of public policies must also stimulate the improvement of early notification practices in brain death cases and quality of organ transportation. They will thus consolidate technical criteria and will influence the improvement of the ethical parameters which guide the policies of organ donation in Brazil.

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