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Clinical and epidemiological data of brain death diagnoses occurred in Brazil - Literature review

Dados clínicos e epidemiológicos dos diagnósticos de mortes encefálicas ocorrido no Brasil – Revisão de literatura

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***Keywords*— Brain death, investigation, information.**

***Palavras chaves*— Morte encefálica, investigação, informação.**

***Abstract*—** *The concept of death was linked to the absence of heartbeats or spontaneous breathing movements. Diagnosis of brain death is complex, requiring a series of initial factors as prerequisites, such as: knowledge of the cause of the coma, absence of hypothermia and absence of action of central nervous system depressant drugs. Objective: to verify the clinical incidence and epidemiology of brain deaths in Brazil. Methodology: these are exploratory, retrospective observational or experimental studies of literature recovery and critical analysis that were carried out through a search of electronic documents published between 2010 and 2020, using scientific articles, dissertations and theses. Thirty-three articles were analyzed that dealt with the subject discussed, which deepened the knowledge about it, human beings were not involved in the research, thus dispensing with the use of the free informed term. Results: The activities carried out by the brain define all the structures of the body. The patient's vital functions are freely and spontaneously linked and linked to the heart and lungs. The most common causes for the evolution of brain death are traumatic brain injuries (TBI) resulting from car accidents or physical aggression. The act of being an organ donor is characterized as solidarity with others. The family authorizes, however, the patient must agree in life with the act of donating their organs to other people. It is important to remember that not all patients who progress to brain death can be organ*

donors, around 1 to 4% of patients who die in hospital clinics throughout Brazil are selected. Conclusion: It is concluded that, during the research, it was found that it was difficult to find the strengthening of the health care network that would help in the formulation of public policies aimed at the capture and transplantation of organs and that took into account the strategies that promoted discussions between professionals and society. Another difficulty is carrying out multidisciplinary training in public and private networks to understand possible pitfalls and analyzes of possible organ donors.

Resumo— *O conceito de morte esteve atrelado à ausência de batimentos cardíacos ou movimentos respiratórios espontâneos. O diagnóstico de morte encefálica é complexo, demandando uma série de fatores iniciais como pré-requisitos, tais como: conhecimento da causa do coma, ausência de hipotermia e ausência de ação de medicamentos depressores do sistema nervoso central.* ***Objetivo****: é verificar a incidência clínica e epidemiologia das mortes encefálicas ocorrida no Brasil.* ***Metodologia:*** *trata-se de estudos exploratório, observacionais retrospectivos ou estudos experimentais de recuperação e análise crítica da literatura que foi realizado por meio de uma pesquisa em documentos eletrônicos publicado entre 2010 a 2020, sendo utilizado artigo científicos, dissertações e teses. Foram analisados 33 artigos que se tratava do assunto abordado o qual foi aprofundado o conhecimento sobre o mesmo, não foi envolvido seres humanos na pesquisa sendo assim dispensado o uso do termo de livre esclarecido.* ***Resultados****: As atividades desenvolvidas pelo cérebro defini todas as estruturas do corpo. As funções vitais do paciente estão ligadas e vinculadas ao coração e ao pulmão de forma livre e espontânea. As causas mais comuns para evolução de morte encefálica são os traumatismos crânio-encefálicos (TCE) decorrentes dos acidentes automobilísticos ou agressões físicas. O ato de ser um doador de órgão caracteriza-se como solidariedade com o próximo. A família autoriza, porém, o paciente deve concordar em vida com o ato de doar seus órgãos para outras pessoas. É importante lembrar que nem todos os pacientes que evoluem para morte encefálica podem ser doadores de órgão, cerca de 1 a 4% dos pacientes que morrem em clinicas de hospitais espalhadas no Brasil são selecionados.* ***Conclusão****: Conclui-se que, no decorrer da pesquisa, constatou-se a dificuldade de encontrar fortalecimento da rede de atenção à saúde que auxiliasse na formulação de políticas públicas voltadas à captação e transplante de órgãos e que levassem em consideração as estratégias que promovessem discussões entre os profissionais e a sociedade. Outra dificuldade é a realização de treinamento multiprofissional em redes públicas e privadas para entender possíveis armadilhas e análises de possíveis doadores de órgãos.*

I. INTRODUCTION

Brain death or brain death (BD / MC) is the complete and irreversible loss of brain function, defined as the cessation of activity in the cortex and brainstem. During brain death, the deterministic loss of the cerebral cortex and brainstem function will gradually and irreversibly affect the homeostasis of the body, leading to the disappearance of heartbeat or breathing (HIRSCHHEIMER, 2016; CFM, 2017; WESTPHAL, VEIGA & FRANKE, 2019).

According to Freire et al (2012) the concept of brain death has changed, as it is currently possible to maintain the vital functions of human beings for long periods, even without the functioning of the brain (CFM, 2017).

Decree No. 9,175, of October 18, 2017, reinforced the task of the Federal Council of Medicine (CFM) to

determine the standards of ME. Subsequently, CFM Resolution No. 2173, of November 23, 2017 (CFM, 2017).

The most common causes of BD are: brain trauma (TBI) and cerebrovascular accident (CVA), the diagnosis is of a clinical nature and in case of aggravation or evolution the BD must be notified to the responsible family member, as it can become a donor of organ. After confirmation of BD, patients are submitted to confirmation of the diagnosis by complementary imaging tests, neurological tests and notification to the National Organ Capture and Donation Center (CNCDO). Early diagnosis of brain death can protect tissues and organs (HIRSCHHEIMER, 2016; CIOATTO & PINHEIRO, 2017; CUNHA, 2018; PINHEIRO et al., 2020). Stroke (CVA) is one of the biggest causes of death and dysfunction in the world. In some parts of Brazil, it is still the leading cause of death. It is characterized by sudden onset and rapidly evolving neurological deficits, usually focal, caused by localized damage in certain regions of the brain, which may be ischemic (AMORIM et al., 2017; HOC, 2019).

Head trauma (TBI) is responsible for 15% to 20% of deaths among people aged 5 to 35 years and 1% of all deaths among adults, having a huge impact on the health of the general public and is notorious for its importance in the morbidity and mortality. It is considered the main reason for the evolution of patients with BD (MELO et al., 2019). It is important to emphasize that the cause of death must be known and well defined and that the diagnosis of BD must be compulsorily notified to the Organ Capture and Donation Notification Center for transplantation (FREIRE et al., 2012; SEMIÃO, 2019).

Currently, 90% of transplant operations in Brazil are performed by the Unified Health System (SUS) (RIBEIRO SCP, et al., 2017). In 2019 there were approximately 23,957 organ transplants performed, such as: cornea, kidney, liver, heart and lung. Despite the growing number of transplants, the demand for donations is also increasing, but the waiting list for transplants exceeds its effectiveness, resulting in a shortage of organs. The state of Rondônia corresponds to 3.67% of organ donations (cornea) in the year 2019 (ABTO, 2019).

Given the above, interest was awakened in verifying the clinical incidence and epidemiology of brain deaths that occurred in Brazil in the last ten years, based on the collections already published.

II. MATERIALS AND METHODS

The present work is a narrative review of the literature carried out through a bibliographic review, with the purpose of analyzing publications in journals about the clinical and epidemiological indicators of the diagnoses of brain death occurred in Brazil with key words such as: Brain death, investigation, information.

Bibliographic research has the problem of asking: What were the clinical and epidemiological indications of brain death (BD) diagnoses that occurred in a public hospital in Brazil? In the inclusion criteria, it was possible to search for articles that sought to explain about All notifications related to brain death (BD) patients treated in Brazil. Exclusion criteria for everything that was incongruent and notifications that do not have the necessary information for the study. Articles that are in English were used on the online translation site (https://translate.google.com.br/).

The research was structured and is carried out between May and June 2020. In this way, the literature review study provided a direction for researchers in relation to the topic addressed, so that they could create hypotheses and formulate more precise problems or that can be researched by further studies.

Data were extracted from a journal available on electronic data platforms such as: LILACS, BVS, SciELO, REBEN, which were adequate according to the result and fit the objectives of this research. 45 articles were analyzed on the topic, in the end, 33 articles containing publications between the years 2010 to 2020 were evidenced, which had more to do with the objective of the article.

No data collection instrument was used, as, as reported throughout the text, the study is a literature review, so, not being necessary to use it, all data for the analysis were written in Microsoft Word ®.

III. LITERATURE REVIEW

Finding brain death in a patient.

The concept of death is to say that human body functions such as pulmonary and cardiac have lost their actions and are not essential for survival. The activities carried out by the brain define all the structures of the body, thus the life and death of the individual, as their neurological functions, when they do not perform their actions, evolve into what we know as brain death (PUCA, 2012; SILVA et al. , 2016).

The patient's vital functions are connected and linked to the heart and lung in a free and spontaneous way, but as science is evolving more and more, it is possible to maintain a patient for a long time even without the functioning of the neurological system (brain) by the artificial respirator (FREIRE, 2016). Once brain function stops, mechanical pulmonary ventilation must be

performed to maintain blood circulation and other important functions, but regardless of the intensity of treatment support, irreversible cardiovascular failure will occur after a few hours or days, because although some organs have their own pacemakers, they can maintain certain functions after BD diagnosis, and the nervous system is responsible for the unity of the human body, even with all possible artificial support, the nervous system can die in a short time (HIRSCHHEIMER, 2012).

According to CFM Resolution No. 1.346/91, the Federal Council of Medicine defines that brain death is the irreversible total stop of all brain functions of the individual's body, which is very often verified in an indisputable way.

According to Castro (2010); Puca (2012) the first theory on brain death was presented in 1959 by French neurologists, the same, through the condition that a brain with brain death was found in a living human was known at the time of depassé. They realized that even the brain being dead, the cardiorespiratory functions temporarily maintained (HIRSCHHEIMER, 2016).

The most common causes for the evolution of brain death are traumatic brain injuries (TBI) resulting from car accidents or physical aggression. Next, it can be considered that diffuse brain lesions, subarachnoid hemorrhage, aneurysms, massive spontaneous cerebral hemorrhage, fulminant encephalitis, meningoencephalitis are causes that can also progress to brain death (GUETTI & MARQUES, 2007; SILVA et al., 2016) .

Brain injuries (TBI), cerebrovascular accidents (CVA) and hypoxic-schemic brain injuries are responsible for about 90% of the progressions to brain death in Brazil (SILVA et al., 2016).

Research conducted in Piauí cites the most frequently evolved causes for brain death are: car accidents, brain aneurysm, stab wounds, renal and cardiac complications and respiratory failure (PAZ et al., 2011). Brain trauma has a high contribution rate for organ and tissue donations in Brazil (NORONHA et al., 2012; SILVA et al., 2014).

Potential Organ Donor

The act of being an organ donor is characterized as solidarity with others. The family authorizes, however, the patient must agree in life with the act of donating their organs to other people without this posing a risk to their physical and mental integrity (SILVA et al., 2014; HIRSCHHEIMER, 2016).

It is important to remember that not all patients who progress to brain death can be organ donors, about 1 to 4% of patients who die in hospital clinics throughout Brazil are selected and 10 to 15% in intensive care units are considered candidates to be organ donors (MATIA et al., 2010; WESTPHAL, 2016; (SOUZA, BENTO & MILAGRES, 2019). According to the Brazilian Association of Organ Transplants, about 10.7% of patients who are found to have died The demand for organ capitation is greater than transplantation, that is, greater than the supply, thus many patients waiting for transplantation die waiting in line (MATIA et al., 2010; SILVA et al., 2014). According to Westphal (2016), organ transplantation is often the only alternative for patients with terminal illnesses who are registered in programs, in this sense it is observed that the demand is very large and execute the transplantation rate is still very low.

Brazil is the country with the largest number of compatible donors in Latin America, but there is still a large number of people in waiting lists awaiting transplantation of organs in good condition for transplantation (ABTO, 2011; BRASIL, 2012a; BRASIL, 2012b). After finding BD, patients are submitted to confirmation of the diagnosis by complementary imaging tests, neurological tests and notification is made to the National Organ Capture and Donation Center (CNCDO), after being notified, CNCDO itself triggers the Organization for Organ Procurement (OPO) and Intra-Hospital Organ and Tissue Commission (CIHDOTT) (PAZ et al., 2011).

The existence of potential donors and effective donors in Brazil compared to other developed countries, refers to the high rates of indices caused by victims of traffic accidents and violence aged between 1 and 39 years (SILVA et al, 2014; HIRSCHHEIMER, 2016; PINHEIRO et al., 2020). More recent studies do not agree that the incidence of age group for the main candidates for organ capitation are between 41 and 60 years of age, the authors quote that deaths occur more frequently, and many of the patients have healthy organs (PEACE et al., 2011; MENDES et al., 2012).

Nursing care in the maintenance of potential organ donors

Nurses have an extremely important role in providing care aimed at patients with brain death, not only theoretically or practically, but extremely important in the physical, psychological, biological, economic, spiritual, sociological and historical aspects that are fully linked to professionalism, that is, it makes the nurse a mediator, to provide adequate and continuous care (ARAÚJO et al., 2017; COSTA et al., 2018).

The provision of subsidies to the assistance team in intensive care is extremely important in the recognition and validation of a potential organ donor. Valuing the team is also fundamental because the effectiveness and success

of the donation is proportional to the following steps, filling in documents and filling in data (WESTPHAL, 2016; ARAÚJO et al., 2017).

The nurse must have theoretical and practical knowledge in identifying physiological changes, because, as part of patient-oriented care, they spend most of their time monitoring and providing care to the patient and must know the physiological changes of brain death that can act in a way acceptable in closing the diagnosis of brain death, thus enabling the process and streamlining contact with possible teams for capitation of organs, in this part it is noted that the nurse has a great role as a member of the multidisciplinary team (LONGUINIERE, 2016; SOUZA, BENTO & MILAGRES, 2019).

Having a dialogue and knowing how to pass on important and extremely important information. Nurses with experiences directly linked to realities can indicate strategies for optimizing the acquisition of possible organs and tissues, one should always have good communication and make nurses from other sectors aware of and sensitize to help in the process. The lack of materials of important use in hospital sectors is a reality experienced daily by professionals, creating obstacles, creating an obstacle in the identification of a possible donor, carrying out a quality examination and poor communication with family members (MORAES, 2014; LIMA et al ., 2017).

Nurses are faced daily with several ethical conflicts related to the organ donation process, such as: difficulty of some medical professionals in accepting the diagnosis; not disconnecting the mechanical ventilator from patients who developed BD, but donation, ignorance of brain death protocols, professionals' neglect of potential donors, lack of materials, communication failure and religion are not potential (ARAÚJO & MASSAROLLO, 2014; FREIRE, 2015).

IV. FINAL CONSIDERATIONS

It is concluded that, during the research, it was found that it was difficult to find the strengthening of the health care network that would help in the formulation of public policies aimed at the capture and transplantation of organs and that took into account the strategies that promoted discussions between the professionals and society. Another difficulty is carrying out multidisciplinary training in public and private networks to understand possible pitfalls and analyzes of possible organ donors.

Another important issue concerns the carrying out of further research related to this topic, so that nursing professionals can become more fully integrated in these fields and clarify the relevance of their functions.

In this article, we intend to encourage readers to deepen their understanding of EM and its diagnostic criteria. Considering the importance of the topic for the patient's life and the family's comfort in this situation, health professionals are obliged to inform themselves and use legal means.

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