Evaluation of the knowledge of intensive care doctors in Teresina concerning brain death

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Abstract

A descriptive study was carried out based on a questionnaire answered by 90 doctors working in the intensive care units of Teresina, Piaui, Brazil. The aim of the study was to evaluate intensive care knowledge on brain death and correlate it with time spent working in the medical profession, time spent working in intensive care units, type of unit in which the medical professional spent their Medical Residency course and whether the medical professional had the title of specialist in Intensive Care. The majority of participants demonstrated knowledge of the definition of brain death, and awareness was greater among those who had spent less time working in the medical profession. They demonstrated knowledge of the requirement for additional tests to diagnose brain death and described themselves as confident or very confident when explaining brain death to the relatives of patients. The doctors, in general, had difficulties in determining the legal time of death of patients with brain death who were classed as organ donors.

Keywords: Brain death. Intensive care units. Physicians. Knowledge.

Resumen

Evaluación del conocimiento de los médicos intensivistas de Teresina respecto a la muerte cerebral

Este es un estudio transversal y descriptivo, realizado a través de un cuestionario del que participaron 90 médicos que actúan en las unidades de terapia intensiva de Teresina. Se realizó con el objetivo de evaluar el conocimiento de los médicos intensivistas sobre la muerte cerebral y correlacionarlo con el tiempo de ejercicio de la profesión médica, tiempo de actuación en unidades de terapia intensiva, tipo de Unidad en la cual el profesional trabaja, carrera de Residencia Médica y posesión del título de especialidad en Terapia Intensiva. En general, los participantes demostraron conocer la definición de muerte cerebral, siendo este conocimiento mayor entre aquellos con menor tiempo de ejercicio de la profesión médica. Demostraron conocer la obligatoriedad de los exámenes complementarios para diagnosticar la muerte cerebral y se describieron a sí mismos como seguros o muy seguros al momento de explicar la muerte cerebral a los familiares de los pacientes. De un modo general, estos médicos presentaron dificultades para determinar el horario legal del óbito en pacientes con muerte cerebral cuando se trata de donantes de órganos.

Palabras-clave: Muerte encefálica. Unidades de cuidados intensivos. Médicos. Conocimiento.

Resumo

Avaliação do conhecimento de médicos intensivistas de Teresina sobre morte encefálica

Trata-se de estudo transversal e descritivo, realizado a partir de questionário respondido por 90 médicos atuantes em unidades de terapia intensiva (UTI) de Teresina. Teve o objetivo de avaliar o conhecimento dos médicos intensivistas sobre morte encefálica e correlacionar esse dado com tempo de exercício da profissão, tempo de atuação em UTI, tipo de unidade em que o profissional trabalha, curso de residência médica e posse de título de especialista em terapia intensiva. Os participantes demonstraram, em sua maioria, conhecer a definição de morte encefálica, com melhores resultados entre aqueles com menor tempo de exercício da profissão médica. Demonstraram saber da obrigatoriedade de exames complementares para o diagnóstico de morte encefálica e descreveram-se como seguros ou muito seguros para explicar morte encefálica a familiares de pacientes. Os médicos, de modo geral, demonstraram dificuldades em determinar o horário legal do óbito por morte encefálica de paciente considerado doador de órgãos.

Palavras-chave: Morte encefálica. Unidades de terapia intensiva. Médicos. Conhecimento.

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Declaram não haver conflitos de interesse.

Research articles

Brain death is defined as the irreversible cessation of the cortical and brainstem functions. In Brazil, it is synonymous with death as individuals in such a situation are unable to regain full control of their vital functions [1,2]. It is essential for the *post mortem* removal of tissues and organs for transplant, as regulated by Law 9,434/97, which also determines that the definition of clinical and technological criteria for the diagnosis of brain death is the responsibility of the Conselho Federal de Medicina (Federal Council of Medicine – CFM) [3].

It is essential that the intensive care doctor is fully informed of the concept of brain death and is able to identify it correctly and treat the patient appropriately, according to the medical and legal provisions in force in Brazil. The main causes of brain death are traumatic brain injury, cerebrovascular disease, primary brain tumor and anoxic encephalopathy, and those with such illnesses are often treated in intensive care units (ICUs) [2,4].

The aim of this study was to evaluate the knowledge of intensive care doctors from Teresina (considered here to be all doctors working in ICUs, regardless of whether or not they hold the title of specialist or served their residency in the area of intensive care) of brain death and the criteria for its diagnosis. Specifically, it attempts to discover how much these medical professionals know about the definition of brain death and the requirement for additional diagnostic tests, how confident they feel when explaining brain death to a patient's family, including their conduct when faced with a hypothetical situation of evaluating a patient with suspected brain death. It also especially aims to assess their knowledge of determining the legal time of death of patients, distinguishing those with brain death from organ donors. Furthermore, we tried to correlate these variables with length of time practicing medicine, length of time working in the ICH, the type of ICU in which the doctor predominantly worked (adult or pediatric), course of residency and whether or not the doctor is a specialist in intensive care.

Method

A cross-sectional, descriptive study was performed, using field research for data collection. The design of the study sample population was based on a survey of data held by the Sociedade de Terapia Intensiva do Piauí (the Piaui Intensive Care Society – Sotipi), which provided a report of hospitals in Teresina where there is an adult or pediatric ICU and the information of the doctors who worked there.

To calculate the size of the sample, a maximum sampling error of 5.5% was established, with a confidence interval of 95% and maximum variance (p) of 0.05. Under these conditions, for a finite population of 168 professionals, it was determined that a sample of 110 doctors should be assessed. Simple random type probability sampling was adopted to choose the sample. Professionals which appeared on the list were numbered and randomly drawn using the BioEstat 2.0 program. Data collection was carried out between January 6 and March 31, 2014, and all medical participants signed free and informed consent forms.

The data collection instrument was a questionnaire with closed questions, adapted from two previous studies [4,5], and divided into two sections. The first was to identify the professional profile of the participating doctors, and the second was composed of six closed multiple choice questions, to analyze understanding of brain death and its diagnostic criteria. Each question had only one correct answer. This section asked questions about the definition of brain death, if there is a legal requirement for additional tests to confirm the diagnosis, how confident the doctor feels to explain brain death to the patient's family, the conduct of the professional when faced with a hypothetical clinical case dealing with evaluating a patient according to the Brazilian protocols for brain death, and determining the legal time of death of an organ donor patient where there is no confirmed diagnosis of brain death.

A maximum no-response rate of 20% was considered, motivated by refusal to participate, the doctor not being found or the absence of an intensive care doctor during the research period. The completed questionnaires were recorded in a Microsoft Excel spreadsheet and exported to the IBMSPSS 20.0 program, which provided the results in tables and graphs. Descriptive statistical analysis was performed, so that the quantitative variables were described by measures of position (mean) and dispersion (standard deviation), and the qualitative measures by absolute and relative frequencies (percentages).

For comparison of the groups in relation to the qualitative variables, the data was grouped into 2x2 type tables, and the Chi-squared test with Yates correction and Fisher's exact test were used, both with a significance level of 5%.

Results

Among the 110 intensive care physicians selected in the draw, 11 were not located, 9 did not agree to participate and 90 participated in the study as volunteers, resulting in a non-response rate of approximately 18.2%, within the maximum limit of 20%. If the doctor worked in more than one ICU, he or she informed researchers in which he spent most of his or her time. If the doctor worked in a mixed ICU he or she should indicate whether the unit was adult or pediatric, based on the largest number of patients seen. Table 1 shows the results for the professional profile of the study participants.

Table 1. Characterization of professional profile of doctors interviewed. Teresina, 2014

Variable	Value
Time spent working as doctor (years)	
Less than 10 years	31 (34.4%)
10 years or more	59 (65.6%)
Time spent working in ICU (years)	
Less than 5 years	23 (25.6%)
5 years or more	67 (74.4%)
Type of ICU	
Adult	77 (85.6%)
Pediatric	13 (14.4%)
Medical residency	
Yes	72 (80%)
No	18 (20%)
Title of intensive care specialist	
Yes	18 (20%)
No	72 (80%)

There was a predominance of professionals with over ten years of experience of practicing medicine (65.6%). Most doctors had spent more than five years working in an ICU (74.4%), especially in adult type ICUs (85.6%). Most respondents (80%) reported having completed a medical residency, with clinical medicine most prevalent (34.4%), followed by general surgery (17.8%) and pediatrics (14.4%). Only 20% of the physicians held the title of specialist in intensive care.

Table 2 shows the responses of the intensive care doctors to the second part of the questionnaire, and Table 3 presents the correlations between the statements of the professionals and some variables.

Most (85.6%) of the doctors surveyed correctly defined the concept of brain death, data which positively correlated with length of time practicing medicine (p = 0.03), with a higher proportion of correct answers among intensive care doctors who had less than ten years of medical practice (96.8%). However there was no association between correct answers on understanding of brain death and length of time spent working in the ICU or the type of ICU in which the doctor worked. There was also no correlation between knowledge of the definition of brain death and the fact that the medical professional had attended a medical residency and whether he or she held the title of intensive care specialist.

Table 2. Responses of intensive care doctors to second part of questionnaire. Teresina, 2014

Questions	Responses
Definition of brain death	
Irreversible loss of all cortical cerebral function	13 (14.4%)
Irreversible loss of all cortical and brainstem function	*77 (85.6%)*
Depends, according to the Law	0
Did not know	0
Requirement of additional exam	
Yes	*85 (94.4%)*
No	5 (5.6%)
Self-declared confidence about explaining brain death	
1 (not confident)	0
2 (little confident)	1 (1.1%)
3 (moderately confident)	13 (14.4%)
4 (confident)	*40 (44.4%)*
5 (very confident)	*36 (40%)*
Conduct	
Following explanation to relatives and their agreement, withdraw life support, as patient is terminal	1 (1.1%)
Request computerized tomographic confirmation	10 (11.1%)
Repeat clinical exam after a minimum of 6 hours	*77 (85.6%)*
Declare the patient clinically brain dead	2 (2.2%)
Time of death in the absence of brain death	
From the first clinical exam	2 (2.2%)
From the second clinical exam	30 (33.3%)
From cardiac arrest	*58 (64.4%)*
Time of death for organ donors	
From the first clinical exam or the opening of the protocol (12 h from 10/08)	3 (3.3%)
From second clinical exam of closure of the protocol (18 h from 10/08)	*34 (37.8%)*
From additional examination showing no blood flow to brain	45 (50%)
From removal of organs	8 (8.9%)

Note: the answers considered correct are shown in italics.

With regard to the requirement for additional tests, most intensive care doctors (94.4%) responded appropriately. There was no association between

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Table 3. Correlations of knowledge of intensive care doctors with selected study variables. Teresina, 2014

Variables	TIme practicing medicine		Time in ICU		Type of ICU		Medical residence		Title of specialist	
	< 10 years	≥ 10 years	< 5 years	≥5 years	Adult	Pediatric	Yes	No	Yes	No
	(31)	(59)	(23)	(67)	(77)	(13)	(72)	(18)	(18)	(72)
Definition										
Correct answers	30 (96.8%)	47 (79.7%)	20 (87%)	57 (85.1%)	66 (85.7%)	11 (84.6%)	60 (83.3%)	17 (94.4%)	17 (94.4%)	60 (83.3%)
Incorrect answers	1 (3.2%)	12 (20.3%)	3 (13%)	10 (14.9%)	11 (14.3%)	2 (15.4%)	12 (16.7%)	1 (5.6%)	1 (5.6%)	12 (16.7%)
p	**0.03** [a]		1 [a]		1 [a]		0.452 [a]		0.452 [a]	
Additional Exam										
Correct answers	30 (96.8%)	55 (93.2%)	22 (95.7%)	63 (94%)	72 (93.5%)	13 (100%)	68 (94.4%)	17 (94.4%)	18 (100%)	67 (93.1%)
Incorrect answers	1 (3.2%)	4 (6.8%)	1 (4.3%)	4 (6%)	5 (6.5%)	0	4 (5.6%)	1 (5.6%)	0	5 (6.9%)
p	0.656 [a]		1 [a]		1 [a]		1 [a]		0,579 [a]	
Confidence										
Little/ moderately confident	2 (6.45%)	12 (20.3%)	6 (26.1%)	8 (11.9%)	12 (15.6%)	2 (15.4%)	12 (16.7%)	2 (11.1%)	2 (11.1%)	12 (16.7%)
Highly/ extremely confident	29 (93.5%)	47 (79.7%)	17 (73.9%)	59 (88.1%)	65 (84.4%)	11 (84.6%)	60 (83.3%)	16 (88.9%)	16 (88.9%)	60 (83.3%)
p	0.126 [a]		0.178 [a]		1 [a]		0.727 [a]		0.727 [a]	
Conduct										
Correct answers	28 (90.3%)	49 (83.1%)	22 (95.7%)	55 (82.2%)	69 (89.6%)	8 (61.5%)	61 (84.7%)	16 (88.9%)	14 (77.8%)	63 (87.5%)
Incorrect answers	3 (9.7%)	10 (16.9%)	1 (4.3%)	12 (17.9%)	8 (10.4%)	5 (38.5%)	11 (15.3%)	2 (11.1%)	4 (22.2%)	9 (12.5%)
p	0.530 [a]		0.171 [a]		**0.019** [a]		1 [a]		0.284 [a]	
Time of death in absence of brain death										
Correct answers	22 (71%)	36 (61%)	13 (56.5%)	45 (67.2%)	48 (62.3%)	10 (76.9%)	47 (65.3%)	11 (61.1%)	7 (38.9%)	51 (70.8%)
Incorrect answers	9 (29%)	23 (39%)	10 (43.5%)	22 (32.8%)	29 (37.7%)	3 (23.1%)	25 (34.7%)	7 (38.9%)	11 (61.1%)	21 (29.2%)
p	0.367 [b]		0.450 [b]		0.366 [a]		0.787 [b]		**0.015** [b]	
Time of death of organ donor										
Correct answers	11 (35.5%)	23 (39%)	7 (30.4%)	27 (40.3%)	28 (36.4%)	6 (46.2%)	31 (43.1%)	3 (16.7%)	8 (44.4%)	26 (36.1%)
Incorrect answers	20 (64.5%)	36 (61%)	16 (69.6%)	40 (59.7%)	49 (63.6%)	7 (53.8%)	41 (56.9%)	15 (83.3%)	10 (55.6%)	46 (63.9%)
p	0.821 [b]		0.462 [b]		0.546 [a]		0.056 [b]		0.590 [b]	

[a] Fisher's exact test; [b] Chi-squared test with Yates correction (χ^2Yates).

this data and the variables analyzed. When asked about their confidence in explaining brain death to the families of patients, the majority (84.4%) of doctors considered themselves to be within the two highest groups, with 40% very confident and 44.4% confident. There was also no correlation between this factor and the variables studied.

Most intensive care doctors (85.6%) adopted the correct behavior when faced with cases involving the evaluation of a patient with suspected brain death, saying they would repeat the clinical examination of the patient. Intensive care doctors who worked predominantly in adult ICUs had a higher proportion of correct answers than those who worked in pediatric ICUs (p = 0.019), but there was no correlation between the conduct of the medical professional and the other variables.

In situations where the patient presented symptoms suggestive of brain death in two positive clinical exams, but progressed to irreversible cardiac arrest without closure of the protocol, due to no additional examination being carried out, most intensive care doctors (64.4%) considered the time of death as the time of cardiac arrest, and so

responded correctly to the question. There was a higher proportion of correct answers among professionals who were not intensive care specialists (p = 0.015) and no correlation with the other variables analyzed.

The last issue asked doctors about determination of time of death where the hypothetical patient was an organ donor. As shown in Table 2, only 37.8% said time of death would be the time of the second clinical examination or the closure of the protocol, the most appropriate response in such a case. There was a tendency of correct answers among those who said they had attended a medical residency (p = 0.056) and no correlation with the other variables.

Discussion

The criteria for brain death diagnosis used in Brazil were defined by the Conselho Federal de Medicina (the Federal Medical Council) in Resolution 1,480/97 [6], which states that brain death must be the result of an irreversible process and cause known as apperceptive coma, with apnea and an absence of supraspinal motor activity. Thus, brain death is defined as the irreversible cessation of cerebral cortical and brain stem functions, and, in Brazil and in other countries, this condition represents human death. To confirm the diagnosis requires two clinical evaluations performed by different doctors, and laboratory tests, which provide unquestionable evidence of the absence of electrical or metabolic activity or cerebral blood perfusion.

Most (85.6%) of the participants in this study demonstrated knowledge of the concept of brain death, corroborating the results of other studies. Harrison and Botkin [5], in a survey conducted in the United States, using the original version of the questionnaire applied here, evaluated the ability of pediatricians to define and apply the concept of brain death. Of the 118 pediatric residents and 112 pediatricians surveyed, 12 were intensive care doctors (all of whom defined brain death correctly).

Another study [4] evaluated the knowledge of 246 intensive care physicians who worked in adult and/or pediatric ICUs in Porto Alegre and noted that 83% of participants displayed knowledge of the concept of brain death. A study in Recife [7] using a modified version of the questionnaire from studies by Harrison and Botkin [5] and Schein [4], surveyed 54 intensive care physicians and 54 ICU nurses from five different hospitals, of whom 70.4% correctly defined the concept of brain death. The specific proportion of physicians with such knowledge, however, was not described.

In our study, we observed a higher proportion of correct definitions of brain death by intensive care doctors who had been practicing medicine for a shorter time. No one knows for sure the reason for this, however, the definition of brain death currently accepted in Brazil is recent, and discussions about the issue have gained more prominence in the last two decades, motivated by Law 10,211/01 [8] which extinguished presumed organ donation in Brazil and CFM Resolution 1,826/07 [9], authorizing the suspension of life support for patients with brain death whose family had not authorized organ donation. The growing demand for organs for transplant and ICU beds in Brazil should also be mentioned. For these reasons, the issue has been discussed more frequently in medical schools in recent years, which may have contributed to the superior knowledge of intensive care doctors with less professional practice time.

Among the intensive care doctors interviewed in Teresina, 94.4% knew about the legal requirement for additional tests for the diagnosis of brain death. In the study conducted in Porto Alegre [4], 80.5% of physicians answered correctly. In the Recife study [7], the proportion of correct answers was 89.8%, a noteworthy figure. However, this study addressed doctors and nurses, without specifying the number of doctors who responded correctly. In the original study by Harrison and Botkin [5], all the intensive care doctors answered correctly, but unlike in Brazil, in the United States, the country where the study was conducted, there is no requirement for additional tests to confirm diagnosis, which is based on the overall clinical evaluation [4,10].

The suspicion of brain death should be assessed and confirmed in each and every patient as part of the care provided for him or her and his or her family [2,11]. The family is an element of paramount importance, as in Brazil it is they who can currently authorize or refuse organ donation, as established by Law 10,211 [8]. The majority (84.4%) of the doctors who participated in the study considered themselves to have the two highest levels of confidence when explaining brain death to relatives – agreeing with the findings of the study by Schein [4], in which 78.9% also considered themselves to have the two highest levels of confidence.

The diagnosis of brain death is based on conducting clinical and laboratory tests, the quantity and frequency of which vary according to the age of the patient. As established in CFM Resolution

CFM 1,480/97 [6], the protocol for children aged over 2 years is the same as for the adult population, consisting of two clinical trials separated by a minimum interval of six hours, and an additional test to demonstrate unquestionably the absence of electrical, metabolic or blood-brain activity. The clinical tests should identify apperceptive coma, absence of supraspinal motor activity (fixed and dilated pupils, absence of corneal-palpebral, oculocephalic and cough reflexes and lack of responses to caloric tests) and apnea proven by exams.

Brain death is defined clinically and technically as human death and, according to CFM Resolution 1,826/07 [9], time of death is considered that as recorded in the brain death declaration form, duly completed and with the additional exam attached. This exam can be performed between the two clinical exams, provided the first assessment is consistent with brain death [12]. It is not acceptable to begin procedures with the additional examination, but if the first clinical evaluation has been performed, nothing prevents the additional exam being performed before the second.

One of the questions to the intensive care doctors aimed to analyze their knowledge of the Brazilian procedure for the diagnosis of brain death, by asking them to indicate their conduct with respect to the patient – a 5 years old child – under evaluation. In the proposed case, while performing the apnea test, the patient presented a profile of labored breathing, which is equivalent to the absence of apnea and therefore did not meet the clinical criteria for brain death. Most respondents (85.6%) opted for the behavior which is considered correct, electing to repeat the clinical exam of the child. In this situation, a further examination was not justified as the clinical evaluation did not suggest brain death. It would also not be permissible to suspend the child's life support – a procedure authorized by CFM Resolution 1,826/07 [9] only for patients with brain death whose family did not authorize organ donation.

Diseases prevalent in Brazil, such as strokes and traumatic brain injury, are largely responsible for occurrences of brain death, corresponding to about 86% of cases [13,14]. While the first cause is more frequent in the population aged 45 years or over, trauma is more prevalent among younger groups, mainly due to external reasons. Both causes predominantly affect the adult population, which could explain the higher proportion of correct answers among physicians who performed more operations in adult ICUs, even though the hypothetical case featured a child. In addition, studies of death in pediatric ICUs are lower due to the relatively low mortality in these units, ranging between 7% and 15%, and the high expectation of a cure, so that the definition of irreversibility in children is a more complex and time-consuming process [15].

Approximately 64.5% of intensive care doctors correctly set the time of the death of patients without confirmation of brain death as the time of cardiac arrest. In the proposed situation, the patient had two compatible clinical exams, but died due to cardiac arrest before the performance of the additional exam and closure of the diagnostic protocol of brain death. In this situation, the time of the first or second clinical examination cannot be considered as time of death. There was a lower proportion of correct answers among the physicians who said they held the title of specialist in intensive care medicine. Since such finding has statistic limitations due to dealing with analysis of a subgroup, an assessment of this specific population is suggested.

Patients with brain death should become organ donors or have their life support discontinued by the attending physician following the agreement of the family, as determined by the CFM [12]. Therefore, in including in the last question the fact that the patient was an organ donor, it was hoped that intensive care doctors would understand that the protocol of diagnosing brain death had already been completed through clinical and additional examinations, and therefore the time of death would correspond to the closure of the protocol. However, only 37.8% of professionals said that the time of death would be the second clinical examination or closure of the protocol. Similar results were observed in other studies in which the same question was applied [4,7]. As suggested by Schein [4], we believe that the different interpretation by intensive care doctors is the result of a well-established – and probably dominant – culture of performing the additional exam after the two clinical trials, making it the final step. This would explain why 50% of the study participants considered the time of death as the time of the additional examination.

Despite the limitations noted in the question above, it is unacceptable to consider that the time of death of an organ donor patient is the opening of the protocol of brain death or the removal of organs, as responded 3.3% and 8.9% of respondents, respectively. In the Porto Alegre study [4], 4.9% of doctors considered the opening of the protocol as time of death, and 24%, the time of organ removal. In Recife [7], the removal of organs was considered as

time of death for 28.7% of the professionals, and the opening of the protocol for 11%.

The results of the study suggest that there is a need for professionals to bring their knowledge up to date, as it was observed that despite the high rate of correct answers, there are still intensive care doctors who do not know the definition of brain death, ignore the legal need for additional tests for diagnosis and have difficulties regarding the implementation of the protocol in patients and the definition of legal time of death. If death is a concrete physiological process and there are parameters to define what brain death is, professionals must have knowledge of such parameters to guarantee the safety of their patients.

Final considerations

The majority of the intensive care doctors from Teresina knew about the definition of brain death, especially those with less professional practice time. They also displayed knowledge of the requirement for additional tests for the diagnosis of brain death and described themselves as confident or very confident in explaining the situation to relatives of patients. Most of the professionals presented adequate knowledge of current procedures in Brazil, by adopting conduct considered correct in the assessment of patients with suspected brain death, with intensive care doctors who predominantly worked in adult ICUs having a higher proportion of correct answers in this situation. It was also observed that doctors generally had difficulty in determining the patient's legal time of death in organ donors.

Medicine is a science in constant renewal, whose concepts can be modified, and the questionnaire, as an artificial instrument, may not reflect the attitudes of doctors when faced with real life situations. However, the procedures described in this study for the diagnosis of brain death are considered correct from the current medical, scientific or legal perspective.

In addition to being essential for the donation of organs from the deceased, the precise diagnosis of brain death has implications for the exercise of professional ethics, as it allows improved care for patients and families and contributes to more efficient utilization of ICU beds by preventing them from being used inappropriately. It is therefore crucial that teams of health professionals, especially intensive care doctors, learn about concepts relating to brain death and are able to identify and deal with the condition according to the medical and legal regulations currently in force in Brazil.

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Participation of the authors

The authors worked together on the intial idea and planning of the project. Kelson Nobre Veras and Juliana Veloso Magalhães systemized and analyzed the results, Juliana retyped the text, which was revised by Kelson and Cíntia Maria de Melo Mendes.

Annex

Questionnaire

I. Characterization of Professional profile

1. Gender: ( ) Male ( ) Female

2. Age: _____ years.

3. Year of graduation: _____.

4. Time spent working in ICU: _____ years

5. Predominantly work in:
( ) adult ICU ( ) pediatric ICU
(Where doctor works in more than one ICU, indicate where he or she spends the majority of his time. Where doctor works in a mixed ICU, indicate whether the majority of patients attended are children or adults)

6. Did you work in an ICU in a training hospital?
( ) Yes ( ) No

7. Did you complete a medical residence?
( ) Yes ( ) No
7.1. If Yes, in what area? _____

8. Do you hold the title of intensive care specialist?
( ) Yes ( ) No

9. Have you participated in the performance of a protocol of brain death diagnosis?
( ) Yes ( ) No

II. Evaluation of knowledge of brain death and its diagnostic criteria (mark only the option you think is most correct)

10. What brain functions must be absent for a person to be declared brain-dead?
a) Irreversible loss of all cortical cerebral function.
b) Irreversible loss of all cortical and brainstem function.
c) Varies according to the law.
d) Don't know.

11. Is there a legal requirement for additional exams to establish diagnosis of brain death?
( ) Yes ( ) No

12. How would you evaluate your level of confidence about explaining brain death to the family of a patient?
(not confident at all) (extremely confident)
1 2 3 4 5

13. A 5-year-old girl is found in the bottom of a swimming pool. She initially presents apnea and no pulse and is exhaustively resuscitated. After a week in the ICU, she has no corneal, coughing or choking reflexes and is unresponsive to pain stimuli. There is no nystagmus in response to caloric tests. Two minutes of apnea testing shows weak respiratory movement. Based on these findings, would your choice of action be:
a) Following explanation to her parents and their agreement, remove life support, as the patient is in a terminal state.
b) Request a confirmatory graphical method.
c) Repeat the clinical exam after a minimum of six hours.
d) Declare her clinically brain dead.

14. The results of the first clinical examination of an adult patient at 12.00 on August 10 are consistent with brain death. The second clinical test is performed at 18.00 of the same day and shows the same results. The patient is kept on life support until suffering irreversible cardiac arrest at 20.00 on August 11. What time would you put on the death certificate?
a) Of the first clinical exam (12.00 on 10/8).
b) Of the second clinical exam (18.00 on 10/8).
c) Of the cardiac arrest (20.00 on 11/8).

15. If the aforementioned patient was an organ donor, what would be the time of death?
a) Of the first clinical exam or the opening of the protocol (12.00 on 10/8).
b) Of the second clinical exam or the closure of the protocol (18.00 on 10/8).
c) Of the additional exam showing absence of blood flow to brain.
d) Of the removal of the organs.