

REVIEW

by Prof. Dr. Nikola Yordanov Kolev, PhD, DSc
Vice-Rector "Postgraduate Studies" at
Medical University "Prof. Dr. Paraskev Stoyanov" - Varna

on dissertation

"CHANGES IN WATER-ELECTROLYTE BALANCE IN ORGAN DONOR
WITH BRAIN DEATH AND THEIR CORRECTION IN INTENSIVE CARE
CLINIC"

by Dr. Boryana Ivanova Georgieva

for the award of the scientific and educational degree "Doctor" in the scientific specialty
"Anaesthesiology and Intensive Care" - 03.01.38

Scientific supervisor: Assoc. prof. Dr. Boryana Naydenova Ivanova-Sabeva, MD, PhD

The dissertation was discussed and approved for public official defense at the Departmental Council of the Department of Anesthesiology, Emergency and Intensive Care Medicine of MU - Varna on 14.05.2024 and according to the Order R-109-169/ 22.05.24 of the Rector of MU "Prof. Dr. Dr... Paraskev Stoyanov - Varna is approved for public defense.

The topic of the dissertation is contemporary and dissertable. Organ donation is one of the highest acts of humanity. In the conditions of current modern medicine, the use of different modalities to assess the functionality of different organs and systems, in patients with brain death, is essential for the upcoming donor situation. This process is extremely demanding, involving a multidisciplinary team of specialists, chief among whom are precisely anesthesiologists. They are the first specialists to recognise and report the first signs of brain death in patients. This scientific paper addresses the changes in water-electrolyte balance in an organ donor with brain death, and the necessary adjustments in the intensive care clinic. Causes of brain death are varied, including craniocerebral trauma, cerebro-vascular accidents, anoxia,

infectious and others, which result in specific metabolic changes that must be recognized and corrected in detail in order to optimally prepare the patient for the upcoming transplantation.

The problem under discussion is of great clinical relevance and discusses a topical issue in order to optimize the work of the multidisciplinary team needed for a donor situation. Against the backdrop of the ever increasing need for organ donors, Bulgaria ranks last among the European Union countries in the number of transplants per million population.

The thesis is presented in 132 pages and contains 52 tables and 45 figures. The literature review is presented in 34 pages, aims and objectives - 1 page, material and methods - 7 pages, results and discussion - 57 pages. The literature review includes 124 titles and is presented in 9 pages.

The presentation of the literature review has a very good cognitive value in an optimal volume and focuses on the following topics: definition of brain death, clinical examination, determination of GCS, functional tests to confirm brain death, changes in water-electrolyte balance. The individual steps leading to the confirmation of brain death, dysmetabolic changes occurring at different levels in the water-electrolyte balance are presented in detail. The role of the multidisciplinary team is discussed.

The dissertation has a clearly formulated aim, namely: to identify the changes in the water-electrolyte balance in an organ donor with brain death, the causes of their occurrence and the ways of their correction in the intensive care unit. To achieve it, five tasks were set, which fully meet the stated objective, namely:

1. To identify clinical cases of patients who have suffered brain death at St. Marina University Hospital, Varna for the period from 01.01.2014 to 31.12.2020.
2. To identify the type and compare the frequency of changes in water-electrolyte balance occurring in the patients in the sample formed.
3. To identify the type and compare the frequency of causes that led to the changes in water-electrolyte balance that occurred in the patients in the formed sample.
4. To ascertain the type and compare the frequency of use of various medications and techniques for correction of the changes in water-electrolyte balance that occurred, administered to the patients in the formed sample.
5. To propose an algorithm for correction of water-electrolyte balance in a potential organ donor with brain death.

The work of Dr. Georgieva was realized in the Clinic of Anesthesiology and Intensive Care at the University Hospital "St. Marina - Varna. Patient population comprised 73 patients diagnosed with brain death, each of them was considered as an independent case in the study.

To solve the set tasks, Dr. Georgieva applied a number of methods on the patients included in her study, which highlights the scientific merits of the work. Clinical, imaging, laboratory, and therapeutic methods are included, as well as methods for invasive and noninvasive monitoring of patients with brain death. A highly accurate and clear algorithm of sequential laboratory, imaging, and functional tests is presented to adequately assess the functionality of individual organs and systems. This enables adequate replacement and corrective therapy to optimally prepare the organs for the upcoming donor situation. A statistical method was also applied to assess the specificity, sensitivity and diagnostic accuracy of the methods.

The results and discussion are presented comprehensively, illustrated in detail and illustrated with graphs, tables and figures. Dr. Georgieva investigates which are the main causes among the patients leading to brain death, and the changes in the water-electrolyte balance in each individual case are dynamically monitored, with subsequent correction. The author's ability to compare his own results with those of the scientific literature is impressive. To this end, Dr. Georgieva skillfully uses statistical analyses for evaluation. The incidence of the development of diabetes insipidus among the patients in the sample was monitored on the basis of clinical and paraclinical indicators. Hyponatremia was found to be a common abnormality in the water-electrolyte balance in organ donor brain death. In order to monitor in what proportion of patients such changes are observed, serum sodium values were determined at the time of hospitalization of patients, at the time of recording brain death, and at the 6th, 12th, and 24th hours thereafter. The results of the application of the methods, the technique used, and the frequency of specific changes in water-electrolyte balance are presented.

The discussion shows the author's attitude to the research problem and Dr. Georgieva's ability to analyze her own results, comparing them with the results of other author teams.

The conclusions are 6 in number and derive from the own obtained results - they reliably summarize the results of the study.

As contributions of the dissertation I can acknowledge:

1. The number of patients diagnosed with brain death in the cohort is gradually decreasing, necessitating intensification of identification and initiation of the conditioning process.
2. There is a high incidence of the development of diabetes insipidus, which is reported to be a major contributor to changes in water-electrolyte balance.
3. Hyponatremia and hyperchloremia were recorded in more than 50% of patients in each of the periods after diagnosis of brain death.

4. Hypokalaemia is one of the most difficult abnormalities of the water-electrolyte balance to control, as despite replacement therapy the number of patients with hypokalaemia persists and the proportion of those with severe hypokalaemia is increasing.
5. A large percentage of patients retain normal serum calcium values.
6. Regular monitoring of serum magnesium and inorganic phosphorus is necessary.

Dr. Boryana Georgieva is a young, reliable and promising specialist. The dissertation work of Dr. Georgieva is of high scientific and practical value, which contributes to the optimization of the management algorithm for patients diagnosed with brain death and subsequent conditioning and preparation for transplantation. This gives me the right to propose to the highly respected Scientific Jury to award to Dr. Boryana Georgieva the educational and scientific degree "DOCTOR".

15.07.2024 г. /...../

Signature:

Prof. Nikola Kolev, MD, PhD

Заличено на основание чл. 5, §1, б. „В“ от Регламент (ЕС) 2016/679
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