

OPINION

on a dissertation for acquiring an Educational and Scientific degree "DOCTOR"

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EVALUATION OF THE VOLUME DISTRIBUTION OF BODY FLUIDS AND THE EFFECT
OF FLUID THERAPY IN INTENSIVE CARE BY BIOIMPEDANCE ANALYSIS

in the scientific specialty "Anaesthesiology and Intensive care" code: 03.01.38

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The dissertation on the topic "EVALUATION OF THE VOLUME DISTRIBUTION OF BODY FLUIDS AND THE EFFECT OF FLUID THERAPY IN INTENSIVE CARE BY BIOIMPEDANCE ANALYSIS", by Dr. Emral Seyfiyev Kosebekirov is written on 119 standard typewritten pages. It is illustrated with 41 figures, 25 tables and 3 appendices. 166 literary sources are cited.

The dissertation is structured according to the requirements:

The literature review is on 34 pages.

In the **Literature Review**, Dr. Kosebekirov examines a very important component of the treatment of patients - infusion therapy (IT) and the problems associated with it: the lack of convincing data on the exact volume and choice of infusion solutions (IS) and the non-unified assessment of the effect of the applied IS in critically ill patients. It examines the physiological foundations of IT, the pharmacokinetics and pharmacodynamics of IS, their benefits and their main side effect – volume overload (VO), which is also an independent risk factor for morbidity and mortality in the perioperative period and in ICU. The dissertation discusses modern aspects of infusion therapy - makes a complex analysis of the indicators used in the assessment of total body water (TBT) and its distribution. It examines in detail the dynamic and static hemodynamic indicators, their informativeness and limitations in their use. Following the indications for the application of IS: resuscitation of hemodynamically unstable patients, replacement of existing or developing deficits and maintenance of homeostasis, the dissertation presents in detail different strategies of IT, application of IS during the different phases of damage and the problems to be solved.

The second part of the literature review is focused on Bioimpedance Analysis (BIA) and its application for the assessment of: 1) nutritional status and metabolic response in critically ill patients; 2) volemic status and the risk of complications in the perioperative period; 3) hydration status. The author examines the importance of Bioimpedance Analysis in renal failure, hepatic failure, heart failure, in the perioperative period and in critically ill patients. Based on the presented data, the dissertation candidate concludes that the experience with BIA in critically ill patients is currently relatively small and this requires additional research to establish its advantages and disadvantages, as well as to confirm its application in ICU, which is also the basis for developing his dissertation.

The goal of the dissertation is precisely and specifically formulated. The stages of the study are presented as four separate tasks.

Material and methods: The study is prospective and includes 94 patients in intensive care. The inclusion/exclusion criteria in the study, the stages of the study, the indicators for determining the volemic status, and the methods of clinical monitoring are well defined. The equipment for performing bioimpedance studies and the methodological principles in assessing the volemic status by BIA are described in detail. The two components of impedance - resistance (R) and

reactance (Xc) are well explained. The framework of a summary table with results is shown and Bioimpedance Vector Analysis is discussed in detail. The methodological principles for central vein cannulation and central venous pressure measurement and the used clinical and laboratory methods of examination are described in detail.

The statistical methods used are described in detail, which determines the reliability of the obtained statistical results.

The obtained **results** are comprehensively and correctly described:

The study included 94 patients in intensive care. The distribution of patients by age, sex, BMI, length of stay in the ICU, length of general hospital stays, by diagnosis upon admission, by the cause of sepsis is well illustrated. A Sequential Organ Failure Assessment (SOFA) Score was calculated for all patients. The mortality of patients in the different groups by diagnosis was analysed, as well as mortality according to BMI, gender and diagnosis.

The dissertation has very well shown in tables the indicators used to assess the volemic status upon admission, at 24, 48 and 72 hours, namely TBW, ECW, ECW/TBW, ICW, OHY, IR, VL, CVP. The author represents the comparative analyses of: the volemic status indicators at 24 hours compared to those at admission; the calculated cumulative water balance (CWB) and the volemic status indicators at 24 hours; the volemic status indicators at 48 hours compared to 24 hours; the calculated CWB and the volemic status indicators from 24 to 48 hours; the volemic status indicators at 72 hours; of the calculated central venous pressure (CVP) and indicators of the volemic status from the 48th to the 72nd hour; of the calculated CVP and indicators of the volemic status from admission to the 72nd hour; of the CVP and indicators of the volemic status from admission to the 72nd hour; of the indicators of the volemic status at the 72nd hour according to the outcome of the disease and of CWB compared to CVP. The average change in the indicators of the volemic status according to the stay in the ICU and according to the BMI from the admission to the 72nd hour was also calculated. The indicators of the volemic status according to the admission diagnosis were analysed.

The discussion analyses the obtained data in detail. It argues the reason why most of the studied patients were admitted to the ICU in a state of significant excess of extracellular water. It reports that BIA can be a useful tool in the diagnosis and monitoring of the dynamics of body fluids in the different compartments of the body. The merit of the work is that it considers the shortcomings of the application of the methodology, especially in critically ill patients: inability to measure the current body weight, inability to determine perspiration insensibility, gravitational oedema.

The indicators of volemic status according to the admission diagnosis were discussed, and an in-depth analysis of the volemic status of patients with sepsis, polytrauma, TBI and an intragroup analysis of the causes affecting volemia in this contingent of patients were made.

Based on the results of the study and those of the international studies published to date, the dissertation author presents a ***clinical protocol for optimizing infusion therapy in critically ill patients.***

The **conclusions** made by the dissertation author are formulated in 6 points. They correspond to the set goal and objectives of the study and are fully justified by the results of the study.

As a result of the dissertation research, 6 contributions were received, 3 of a scientific-theoretical and 3 of a scientifically applied nature.

Three publications related to the dissertation work have been presented.

In conclusion, I believe that the presented dissertation work of Dr. Emral Seyfiyev Kosebekirov meets the requirements of the Act on the Development of the Academic Staff in the Republic of Bulgaria for obtaining the "Educational and Scientific Degree of Doctor" and I give a positive opinion for public defence.

12.03.2025

Sofia

Reviewer:

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Заличено на основание
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