

To a Scientific jury

Constituted according to order № RD-26 – 2089/5.10.2022

To the Executive Director of UMBALSM "N. I. PIROGOV" EAD

POSITION

by Assoc.Prof. Maya Tsvetanova Belitova, MD, PhD

Head of the Department of Anesthesiology and Intensive care -Medical University – Sofia,

Head of Clinic of Anesthesiology and Intensive care – UMBAL "C. YOANNA - ISUL" – EAD

ABOUT: awarding the educational and scientific degree "PhD" in the scientific speciality "Anesthesiology and Intensive Care" with a training base: UMBALSM "N. I. Pirogov" EAD

SUBJECT: "Ultrasound-guided supraclavicular brachial plexus block in children"

I. About the Procedure:

The position was prepared following the above – mentioned order of the Executive Director of UMBALSM "Pirogov", according to which I was appointed as an external member of the Scientific Jury. The position is in accordance with the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria (ZRASRB) and the Regulations for the Development of the Academic Staff in UMBALSM "N. I. Pirogov" EAD. In my capacity as a member of the jury under this procedure, I declare that: I have no publications in common with the author and there is no other reason for a conflict of interest subject to declaration.

Author of the PhD thesis: Dr. Albena Sashova Atanasova, free PhD student in "Anesthesiology and Intensive Care" at UMBALSM " N.I. Pirogov" EAD, discharged with the right of defense by Order № RD-26-1848/06.08.2021.

Scientific supervisor of the PhD student: Associate Professor Romyana Ruseva Andonova, MD, PhD

II. Analysis of the PhD candidate's career profile.

University education: Dr. Atanasova graduated in 2012 from Medical Faculty, Medical University - Sofia with very good success - specialty "Medicine". In 2016 she graduated from the Faculty of Public Health and Health Management, Medical University-Sofia, speciality in "Public Health and Health Management", with which she obtained a second master's degree. In 2018, she acquired a specialty in Anesthesiology and Intensive Care. For the period March-April 2017, she conducted several internships in Regional Anesthesia in various European regional and university hospitals.

Professional experience: In the main workplace from 2012 to the present, Dr. Atanasova has worked as an anesthesiologist in the Clinic of Pediatric Anesthesiology and Intensive Care at UMBALSM "N. I. Pirogov" EAD Sofia; she has a very good theoretical training, rich erudition and a broad general culture. Her research interests are in the field of Emergency Medicine, Pediatric anesthesiology and intensive care; the application of regional anesthetic techniques in children; mechanical ventilation during prolonged operations, etc. The PhD candidate has excellent written and spoken English, uses German languages; has a very good computer literacy.

Dr. Atanasova is a member of authoritative scientific societies and societies at Bulgaria and abroad, such as: Society of Anesthesiology and Intensive Care in Bulgaria, BULSPEN and BLS, European Society of Anesthesiology (ESA), European Society of Regional Anesthesiology (ESRA).

III. Significance and Relevance of the topic.

The PhD work of Dr. Atanasova is significant both from a scientific and from a practical-applied point of view, because is devoted as a whole to an extremely important problem, namely the study of the effectiveness of analgesia by US-guided Supraclavicular block in pediatric upper extremity fractures. In recent years, concepts such as pain control and regional anesthesia have increasingly entered everyday life of the anesthesiologist, being an up-to-date and invariable part of good anesthesiologic practice. The development and implementation of ultrasound as well as ultrasound-guided regional blockade has led to improved safety of the techniques, reduced side effects on the patient and better pain control, which is an extremely attractive option especially in the pediatric population. Therefore, in addition to affecting a very wide target group of patients, basically children, the topic is developed comprehensively and provides a clinical solution in pediatric upper extremity surgery.

IV. Structure of the PhD thesis

The PhD thesis is written on 136 standard pages, well-illustrated with 24 figures and 24 tables. It is written in a solid scientific style, which allows an easy and comprehensive overview of the issues under consideration, as well as the author's contribution. The references contains 103 sources, of which 14 are in Bulgarian and 89 are in Latin. It includes the following separate parts: 1. INTRODUCTION – 3 pages; 2. LITERATURE REVIEW - 29 pages; 3. PURPOSE OF THE PhD thesis - 1 page; 4. TASKS – 1 page; 5. MATERIAL AND METHODS – 22 pages; 6. RESULTS – 47 pages; 7. DISCUSSION – 6 pages; 8. CONCLUSION – 3 pages; 9. OUTCOMES - 1; 10. SCIENTIFIC CONTRIBUTIONS OF THE PHD THESIS - 1 page; 11. PUBLICATIONS AND REPORTS - 2 pages; 12. REFERENCES - 12 pages, which means that its structure contains the necessary sections of scientific work for obtaining the scientific and educational degree "PhD". The proportions between the individual structuring parts of the work reflect the views of the author.

As an exceptional value of the work, I define the **Literary review**. It contains a sufficient volume of material that reflects the wealth of literature and research information on the subject to date. It is presented systematically, analyzed critically and reveals a very good knowledge of the matter related to the application of the US-guided brachial plexus block with supraclavicular access in orthopedic operations in the area of the upper extremity in children. Accessible to the reader, the techniques of scanning the neural structures and the specific complications of this type of regional anesthesia are presented with an abundance of scientific facts, which justifies the topic chosen by the author. It is divided into parts that are considered in sequence: features of fractures in childhood; regional anesthesia and in particular brachial plexus blocks in humerus fractures; technical features and behavior when scanning the brachial plexus area, causes of failed block and complications. The value of this part of the PhD work are obvious: right from the beginning, the way the information is presented makes an impression - clear, logical, easy to read; and the rich content of information

regarding all the separate parts described above. These are circumstances that allow it to be shaped and published as a separate book written on the basis of a dissertation work with great practical application to students, trainees or practicing anesthesiologists/neurologists who routinely in their practice perform scans and punctures/anesthesia in the brachial plexus area.

As a working hypothesis in the **Main objective** of the PhD, the assumption is outlined that the application of US -guided block of the brachial plexus with supraclavicular access is applicable in children, because it reduces pain levels in the intra- and postoperative period; reduces the level of stress; it is a safe technique, due to the direct visual control during its technical execution; the lower doses of LA, the lack of complications and the low risk of systemic toxicity.

The tasks, a total of 6 in number, arise from the set goal. Of particular interest to me, given the rapidity of general anesthesia and the difficulty of scanning neural structures, especially in younger children, was Task Number 4: comparative analysis of anesthesia time and wake-up time.

The materials and methods used in the PhD thesis are classic and well-known, and in the methodological aspect, an electronic database has been created for each individual patient, which allows a quick review and processing of the results. Statistical processing was carried out with the SPSS.20 program, and the selected methods were classical and relevant. Also, as a special value of the work, I define the questionnaire descriptive methodology for the study of pain in the postoperative period according to the QUESTT approach: through a combination of three evaluation scales VAS, NS, and FLACC scale, formed as an anonymous individual questionnaire, filled in by the parent at the specified time intervals.

The obtained **results** are presented clearly and well-structured for each aspect of the study, accompanied by figures and tables. Particularly impressive is the extensive and detailed analysis of the medico-demographic profile of the patient group, the determination of the type of the most common upper extremity fractures in children requiring surgical intervention and therefore anesthesia (distal humerus and proximal elbow fractures), which substantiates the relevance, the importance and advantages of the supraclavicular block. However, the wide age range of the children is striking - from 3 to 17 years old, which is important for the interpretation of the results. In addition, the value of the work are all the obtained results of the pain assessment, at each time of the study. The obtained results clearly show that both anesthetic techniques provide sufficient analgesia, are safe; take approximately the same total times, but the regional technique provides additional analgesia in the early postoperative hours (up to the 6th hour), which is expected due to the longer time to last the block.

In the **Discussion section**, the author presents an analysis of world experience that justifies the chosen access for plexus brachialis block with supraclavicular access with ultrasound navigation. The argumentation for this is, on the one hand, the frequency of typical fractures in children, which are the target areas of the densest analgesia in supraclavicular access for brachial plexus blockade, and on the other hand, the possibility with one puncture to obtain adequate duration and density regional block, superior in quality to other types of access to the brachial plexus.

The conclusions are logically systematized, in accordance with the collected and analyzed data. I accept 7 of the eight, considering that Conclusions 1, 2, 4 have a confirmatory nature. As original and valuable for clinical practice, I define Findings 3, 6, 7 and 8 - which state that both anesthetic techniques provide conditions of hemodynamic stability to patients, but highlight the advantages of SCB compared to the widely used general anesthesia - it does not consume more general operative time, lack of complications, better analgesia in the early postoperative period, better recovery of

consciousness and reflexes, early nutrition and rehabilitation, better assessment by parents and less care and costs by staff.

VI. Contributions of the PhD thesis - with certain clarifications, I agree and accept the reference for the contributions of the PhD thesis.

VII. Abstract and publications - the abstract has been prepared according to the requirements of ZRASRB, contains 68 pages and correctly reflects the essence of the PhD thesis.

In accordance with the requirements, the PhD candidate presents three publications in the Bulgarian refereed scientific publication "Emergency Medicine" (vol. 4, 2022), which are in the "in print" mode, for which I was provided with notes by the Editorial Board of the journal. Dr. Atanasova is the first author of all publications, which clearly speaks and is indisputable proof of her leading role and her personal involvement in the process of developing the topic.

VIII. Critical Notes:

1. The title page of the work "Medical University - Sofia, Department of Anesthesiology and Intensive Care" must be removed

2. Regarding the structure of the PhD thesis: it is logical, the literature review to be ended with conclusions, based on which to formulate the purpose and tasks of the PhD thesis.

3. The proportions between the individual structuring parts of the work are NOT balanced and reflect only the views of the author. The "Discussion" section, for example, is only 6 pages, and parts of the discussion of the obtained results are found in other sections of the work. From the references - 8 authors are not cited in the text of the PhD thesis

4. Regarding the design of the PhD thesis: there is no real randomization

5. About the Tasks:

✓ Task number 2: "...to do a prospective study, dividing the patients into two groups - experimental and control..." is a Method, not a Task

✓ Task number 3: to study intraoperative analgesia through BP and PR – is of low scientific value, due low specificity of follow-up indicators! This is even more underestimated, due to the lack of an adequate statistical method - calculation of normal values of the indicators, which makes it impossible to compare individual patients who are of different ages and for whom the "normal" values and variability of BP and PR are different

6. Regarding the Methods: there is no description of the methodology for measuring and tracking the clinical indicators. The patients of the experimental group are subject to different degrees of depth of sedation - from awake state to deep sedation, through the administration of Propofol, Ketamine, Midazolam in a dose regime with a wide range - which are drugs that change the indicators of blood pressure and heart rate, as well as their variability and reduce the scientific value of the work. The methodology becomes even more complicated, due to the fact that about 60%: 40% of the children in both groups, respectively, underwent "open" and "close" fixation of the fractures, which "per se" is associated with different intensity of pain, both intra-/ and post-operatively, and from here – the scientific value of the work decreases even more

7. Scientific-theoretical contribution number 1 requires the clarification that the standard intravenous analgesia was carried out in the conditions of general anesthesia with an inhalation anesthetic, and SCB was carried out in the conditions of varying degrees of sedation.

8. Scientific-theoretical contribution number 2 requires the same clarification, with the addition that it refers to a certain type of fracture, not all upper extremity fractures.

9. I propose that scientific-theoretical contribution number 3 should be formulated as follows: Through the PhD thesis (and not "In the PhD thesis...") debatable aspects regarding SCB in Bulgaria and world scientific literature.

10. From scientific-practical contribution number 1, I think it is imperative to drop the word "developed" and leave only the words "used"

11. I strongly recommend that all statistical data and analyzes of parametric and nonparametric variables—whether presented graphically, numerically, or tabularly—be reported directly from the SPSS statistical program. This speaks to the reality of the data, otherwise it raises doubts about compilations.

Despite these critical remarks concerning the structural layout of the work and the style of exposition, I approach the assessment of each PhD thesis as an expression of the individual work of the PhD student, her ability to state and prove the scientific thesis, which I believe they do not significant impact on my overall evaluation and do not detract from the values of the PhD thesis.

IX. Conclusion: PhD student Dr. Albena Sashova Atanasova has mastered valuable research, methodological and clinical skills. The written PhD thesis shows that she is able to independently formulate a scientific hypothesis, correctly build a methodology and conduct scientific research, choose and work with appropriate statistical methods, as well as accurately and adequately interpret the obtained results.

All this gives me reason, convinced, to vote with a positive vote for awarding the educational and scientific degree "PhD" in the scientific specialty "Anesthesiology and Intensive Care" to Dr. Albena Sashova Atanasova.

12.11. 2022

Sofia, Bulgaria

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/ Assoc. Dr. Maya Tsv. Belitova, MD,PhD/