OPINION

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REGARDING: Dissertation for obtaining the educational and scientific degree "Doctor" in the scientific specialty "Anesthesiology and Intensive Care" on the topic: **Enhancing Adjuvant Technique in Peripheral Nerve Blocks of the Upper Limb**, developed by Dr. Dimcho Georgiev Gendzheliev.

The presented scientific paper titled **"Enhancing Adjuvant Technique in Peripheral Nerve Blocks of the Upper Limb"** is developed in accordance with the requirements for obtaining the scientific and educational degree of "Doctor." The presentation is made on 110 standard typed pages and 13 pages of bibliography with the following structure: introduction, literature review, aim and objectives, materials and methods, results, discussion, conclusion, findings, and contributions. It is properly structured, with the literature review spanning 32 pages, conclusions from the literature review presented over 2 pages, the material and methods chapter covering 24 pages, and 41 pages presenting the author's research – results, discussion, conclusions, and contributions.
The scientific work is illustrated with 29 figures and 35 tables.
The bibliography contains 160 sources, 4 in Cyrillic and 156 in Latin.

Relevance of the Topic
One of the most frequently performed surgical interventions in orthopedic practice is related to the upper limb. Regardless of the cause, priorities include a short stay in the operating room, management of postoperative pain, and optimization of the hospital stay by preventing potential postoperative complications, both surgical and those related to the anesthesiology technique used. In recent years, peripheral nerve blocks (PNB) have become increasingly preferred for providing adequate anesthesia in upper limb surgeries. The technique for localizing peripheral nerves has undergone significant evolution, replacing neurostimulation with ultrasound navigation, which has greatly increased success rates. The doses of local anesthetics used have been significantly reduced, favorably affecting and limiting their systemic and side effects. The main priority of PNB remains the ability to control the duration of motor and sensory blocks. For years, efforts have been made in this direction, using different combinations of local anesthetics and adding adjuvant agents to influence and prolong their effects. However, there is still no consensus and firmly established guidelines or protocols, making this topic highly relevant.

Literature Review
Dr. Gendzheliev has conducted an extensive review of the literature on the issue, primarily focusing on publications from the last 10 years. The anatomy and technical aspects of performing peripheral blocks of the upper limb have been thoroughly examined. Information about the overall profile, pharmacology, and pharmacokinetics of local anesthetics, as well as their side and toxic effects in case of overdose, has been systematically reviewed. Technical possibilities for nerve and plexus verification are presented, along with evidence from the literature regarding the possibility of reducing the amount of local anesthetics used.
In a separate section of the literature review, the possibilities for extending the motor and

sensory block are described in detail – using catheter techniques, mixing local anesthetics, and adding various adjuvants. The most popular of these are thoroughly examined, with data from large randomized controlled studies regarding their mechanisms of action and the results obtained.
The literature review is contemporary, full of evidence of the scientific, practical, and clinical significance of this problem. It concludes that there is no unified opinion in the available specialized literature, and the obtained results are quite contradictory and insufficiently objective to determine the suitable adjuvants, their significance, and the possibilities they offer for prolonging the effects of local anesthetics in upper limb peripheral nerve blocks.

Aim and Objectives
Based on the conclusions from the literature review and considering various clinical situations encountered in traumatology, Dr. Genjdzhiev defines the aim of his study: **"To determine the place, significance, and role of enhancing adjuvant techniques in peripheral nerve blocks of the upper limb."**
The aim is fully adequate, with significant potential for practical benefit from the results, and logically leads to the tasks that the author sets for himself in this dissertation, which number six. They include monitoring and analyzing the effects of different adjuvants on local anesthetics (LAs), with the goal of proposing and validating a protocol for performing peripheral nerve blocks with enhancing adjuvant techniques for surgical interventions on the upper limb, with minimal complication risk and maximal postoperative sensory block duration.

Materials and Methods
The study is prospective, conducted from June 2020 to July 2023. It includes 200 patients who underwent surgical interventions in the upper limb. The patients were operated on in the Central Operating Block of UMHATSM "N. I. Pirogov" – Sofia, with the peripheral block being performed solely by Dr. Gendzheliev.
The study protocol is well-thought-out. The inclusion and exclusion criteria are precise. The study structure defines one control group (40 patients), and the remaining 160 patients are divided into equal groups of 40, with each group receiving a different adjuvant to the local anesthetic: clonidine, dexamethasone, dexmedetomidine, dexamethasone + dexmedetomidine.
The methodology for performing PNB is described in detail, with monitoring of block execution time, the adjuvant used, the onset and duration of sensory and motor blocks, intraoperative and postoperative complications, maximum intraoperative sedation level (according to Ramsey), intraoperative sedation with propofol, and the need for additional analgesia at 6, 12, and 24 hours.
The data from the study were processed using the SPSS (Statistical Package for the Social Sciences) software, version 20.0.

Results and Discussion
In this section, Dr. Gendzheliev analyzes the results obtained from the monitored parameters. The precise statistical analysis is very impressive, clearly providing information about the role and position of different adjuvants concerning the onset and duration of the peripheral block in various aspects. The groups are large enough to accept the data and obtained correlations as valid.
With the results obtained, Dr. Gendzeliev unequivocally proves his thesis that the use of an enhancing adjuvant technique leads to a reduced need for postoperative analgesia, which, in turn, has many positive effects for both the patient and the medical staff. The lack of postoperative complications related to anesthesia in all patients in the study proves that adding

an adjuvant does not increase the risk of such complications. The analysis between the groups with different adjuvants is of great practical benefit. The results lead to conclusions with significant practical implications and represent a serious contribution to the dissertation.
The conclusions are eight in number, clearly and precisely formulated.
The doctoral candidate proposes five contributions, which I accept without objections.

The scientific paper is focused on practically solving clinical tasks that anesthesiologists face daily. There is no unnecessary theorizing or detailing. Current and modern anesthesiological techniques are used and developed, namely: ultrasound navigation and nerve stimulator. The problem examined has insufficient and often contradictory data in global literature, and the main contribution of this targeted, comprehensive, and in-depth study is the information regarding the effect of various adjuvants on local anesthetics for brachial plexus block. This topic is being discussed for the first time in Bulgaria and is applied in the algorithm created by the author to provide adequate intraoperative anesthesia and long postoperative analgesia during upper limb surgeries.
The dissertation is written in correct Bulgarian, with a clear and accurate presentation.
The doctoral candidate's personal contribution to obtaining the results in the dissertation is indisputable. The authorship is unquestionable.
The abstract accurately and faithfully reflects the content, results, and contributions of the dissertation.
Dr. Gendzheliev presents five publications related to the topic of the dissertation, presented at congresses or published in specialized literature.

Conclusion
My overall evaluation of the dissertation submitted for review is that it has all the necessary qualities for awarding the educational and scientific degree of "Doctor" and meets the requirements of ZARSRSB, PPZRASRSB, and the regulations of UMHATSM "N. I. Pirogov" – Sofia. It is an up-to-date and independent scientific study in which significant scientific results have been obtained.
Based on the above characteristics, I have grounds to give a POSITIVE EVALUATION and VOTE POSITIVELY for awarding the educational and scientific degree of "Doctor" to Dr. Dimcho Georgiev Gendzeliev.

December 11, 2024
Professor Dr. Evelina Odiseeva