

REVIEW

by

Assoc. prof. PhD Margarita Petrova Atanasova, MD

at the Department of Anesthesiology and Intensive Care at the Medical University
- Sofia

Clinic of surgery USBALE "Acad. Ivan Penchev" EAD, Sofia

Regarding: The thesis of Dr. Yassen Svetlomirov Getsov, doctoral student of independent training from OAIL at the Cardiovascular Center - "Ajibadem City Clinic UMBAL" EOOD on the topic: "**Change in operative tactics based on intraoperative transesophageal echocardiography**" for the award of educational and scientific degree "Doctor"

Procedural comments

By order No. 10-07-33#5 of 26.07.2023 based on Art. 4, para. 2 of the Law on the Development of the Academic Staff in the Republic of Bulgaria, on Art. 2, para. 2 of the Regulations for the Implementation of the Law on the Development of the Academic Staff in the Republic of Bulgaria, and Art. 3, paragraph 2 in connection with Art. 32, para. 3 of the Regulations on the terms and conditions for awarding scientific degrees and holding academic positions at "Ajibadem City Clinic UMBAL" EOOD and decision of the Scientific Council of "Ajibadem City Clinic UMBAL" EOOD with Protocol No. 18 of 19.07.2023, I have been designated as an external member of the Scientific Jury for the review writing procedure.

General presentation of the procedure and the PhD student

Dr. Yassen Getsov graduated from the Medical University of Sofia in 1999. From 2000 to 2007, he worked at UMBAL "St. Ekaterina" as a resident doctor and specialized in Anesthesiology and intensive care. He acquired a specialty in Anesthesiology and intensive care in 2006. From 2007 to 2013, he was an anesthesiologist at Tokuda Hospital

Sofia. Currently, Dr. Yassen Getsov holds the position of physician-anesthesiologist in the OAIL of "Ajibadem City Clinic UMBAL" - cardiovascular center. In 2009, he graduated with a master's degree in Health Management. From 2011 to 2012 and from 2017 to 2018, he worked at University Hospital Southampton NHS in the positions "Clinical fellow" and "Specialist registrar" respectively.

The thesis of Dr. Yassen Getsov, submitted for defense, consists of 167 standard printer pages, of which 88 pages are an introduction and literature review, 55 pages are own studies and 17 pages are the attached bibliography. 10 tables, 9 diagrams, 1 scheme, and 84 figures are included in the thesis. The bibliographic reference presents 134 sources - 11 in Cyrillic and 123 in Latin, listed in alphabetical order. The PhD student has 3 publications on the topic.

Relevance of the topic

Intraoperative echocardiography is a procedure in cardiac surgery that is increasingly gaining interest and entering the domain of knowledge and skills among anesthesiologists working in the field of cardiac surgery. The use of combinations of ultrasound techniques intraoperatively allows not only to confirm the preoperative diagnosis and stages of the operation before CPB, leads to corrections and refinements related to the surgical plan such as cancellation or addition of a procedure on the valve, positioning of cannulas in the cardiac chambers, change in the concept of cardioplegia, but also enables the working out of an assessment in terms of hemodynamics, changes in the therapeutic plan and objectification of the immediate result of the operation. The presentation of the essence and the disclosure of the intraoperative transoesophageal echocardiography (TOE) potential, which can be used in anesthesiology practice, are the prerequisites for the development of the thesis presented by Dr. Yassen Getsov.

Knowledge of the problem

In the literature review, after a brief historical highlights presentation of the discovery and development of echocardiography, a protocol for a complete intraoperative TOE examination of the heart is presented. The physical foundations of ultrasound and Doppler imaging, the types of ultrasound images, and sources of imaging artifacts and errors are detailed. The approach to presenting the position of intraoperative TOE in mitral and aortic valve operations is systematized, the anatomical features, the types of valve lesions are successively described, and the evaluation of the condition of the valves before and after CPB is justified. The doctoral student refers to the undeniable advantages of the methodology when applying it to assess the dimensions, volumes and function of the heart

chambers, studying the global and regional kinetics of the walls, the presence of communications and shunts at the ventricular level, as well as thrombotic and tumor lesions. In the context of the specificity of cardiac surgeries and their complications, attention is paid to the possibilities of diagnosis of myocardial ischemia after exiting the CPB, verification of atheromatous plaques and calcification of the aorta, navigation of decisions in the course of operative interventions in aortic dissection and follow-up of early results and immediate complications. The heterogeneous applications of intraoperative TOE are complemented by the specific tasks performed by the procedure in minimally invasive cardiac surgery, such as confirming the diagnosis, excluding the presence of aortic regurgitation, detecting atrial septal defect, tricuspid regurgitation, and monitoring cardiac drainage. The doctoral student completes the applications of intraoperative TOE, by describing the methodology for positioning venous cannulae, the guide of the aortic cannula, the balloon pump intraoperatively and for deaeration of the heart chambers. I would note the lack of general conclusions from the literature review, which are mentioned in the text, but would give completeness to this detailed review of the issues concerning intraoperative TOE.

The doctoral student precisely and clearly defines the goal of the dissertation work, namely: "To determine how intraoperative TOE affects the operative technique in cardiac surgical patients operated in the conditions of CPB". The tasks, 9 in number, are composed specifically and correspond to the set goal. Tasks №1 and 2, referring to the determination of the basic data of the included patients and the division of the obtained information into essential, supplementary, informative and non-essential can be combined into one respectively.

Research methodology

The presented study is retrospective, hospital-based, and includes 183 patients in whom interpretable reports of intraoperative TOE are found. The control group is composed of patients who underwent open heart surgery without routine intraoperative TOE. Patients' data is presented in a table. Separate patients' groups are formed on the basis of planned surgery, as patients with planned MICS are separated, as well as those in whom TOE is requested and those in whom it is routine. The doctoral student describes in detail the research methodology for performing the set tasks.

Characterization and evaluation of the thesis and its contributions

The statistical package SPSS version 20.0 is used for data systematization and processing, and methods of correlation, regression, dispersion analysis and tests for non-

parametric analysis are applied. The results are presented through appropriate tables and graphical representations. The relationships and dependencies between the average stay of patients in the intensive care unit, the development of postoperative delirium and mortality, and the presence or absence of intraoperative TOE are investigated. The comparative analysis between preoperative and intraoperative TOE and the distinction of the type of information: essential, supplementary, informative and non-essential, as well as the impact of intraoperative TOE on the initial plan of the operative intervention, have been studied and presented in a graphical and tabular form. An analysis of the results of surgical interventions is also carried out towards their optimization when conducting intraoperative TOE both before and after CPB.

Dr. Yassen Getsov forms 8 conclusions meeting the requirements of the tasks set at the beginning of the study. Particularly valuable conclusions, in my opinion, are № 1, № 2, №3 and №5. These are the conclusions concerning the confirmation of intraoperative TOE as a precise method for diagnosis and clarification of valve pathology, detection of hitherto undiagnosed pathology, assessment of the immediate result of surgical intervention and differentiation of the causes of hemodynamic instability after exiting the CPB. I believe that it is also necessary to point out as separate conclusions the results obtained in mitral and aortic valve surgery. I suggest that conclusion No. 8 be removed, as it is correct in its meaning, but it is not the object of the study.

The thesis is well written and properly structured. The following recommendation of technical nature can be made - to separate the contributions into those of a theoretical and a scientific-applied nature.

Abstract of the PhD Thesis

The abstract meets the content of the thesis and the requirements for its preparation, and reflects the main points of the study.

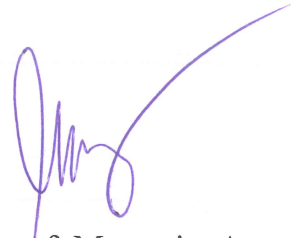
Critical remarks

Critical remarks were indicated in the course of the presentation. However, they do not diminish the merits of the thesis.

Conclusion

In conclusion, I believe that the thesis submitted for defense by Dr. Yassen Svetlomirov Getsov on the topic: "**Change in operative tactics based on intraoperative transesophageal echocardiography**" is up-to-date, in-depth, with an exceptional practical orientation and perspective for anesthesiology practice, and contains important conclusions. The work is complete and in a scientific aspect meets the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria and the Regulations for its Application for the Acquisition of the Educational and Scientific Degree "Doctor". I give my positive assessment and recommend the members of the honorable Scientific Jury to positively support the thesis submitted for defense.

07. 09. 2023



Assoc. prof. Margarita Atanasova, DM

