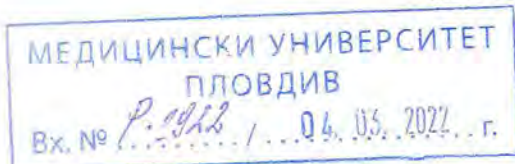


TO THE CHAIRMAN OF THE SCIENTIFIC JURY
DETERMINED BY ORDER № P- 203/11 .02. 2022
OF THE RECTOR OF MU, PLOVDIV



REVIEW

by Assoc. Prof. Dr. Svilen Ivanov Maslyankov , MD, PhD.
Department of Surgery, Second Surgery
UMHAT "Alexandrovska"

of PhD degree in

**„Intraoperative ultrasound for nonpalpable breast tumors –
implementation and simulation training“**

in the scientific specialty "General Surgery"

of **Dr. Valentin Valentinov Ivanov** ,

PhD student on individual study,

To the Department of Special Surgery , MU-Plovdiv

WITH SCIENTIFIC SUPERVISORS:

Prof. Dr. Rosen Dimov, MD , FRCS

Prof. Dr. Blagoy Marinov, MD

After an internal meeting of the commission of the scientific jury I
was chosen as a reviewer of the current dissertation on **„Intraoperative
ultrasound for nonpalpable breast tumors – implementation and
simulation training“**

The topic on which the PhD student focuses has important scientific, clinical and practical significance due to several facts. First of all, this pathology is the most common in the overall oncological ranking, with a clear tendency to increase the number of affected women on an annual basis. In order for modern surgical treatment of breast cancer to be effective, as part of the multimodal view, adequate planning and precise surgical technique are required. Despite the good results in the modern treatment of breast cancer, in the aspect of the 21st century in which we live, it is necessary to constantly improve the diagnostic process in order to improve and optimize treatment.

Existing recommendations and consensus opinions call for relatively large-scale operations, despite the discovery of smaller and smaller lesions. This is due to the possibility of missing the lesion or allowing a positive resection line. Thus, subsequent, repeated surgery could compromise the oncological outcome less often, and more often the physiological and aesthetic appearance of the female breast. Which results in a reduction in the quality of life of these patients. All these findings determine the significance and relevance of the present study.

The rational idea for scientific research of Dr. Valentin Ivanov on the problem of application of intraoperative ultrasound and his in-depth knowledge of the available medical literature are reflected in the literature review. The aim is to introduce the method of removing non-palpable mammary gland formations and to invent an original simulator for *ex vivo* training. The critical analysis of the available scientific information shows that the author is well acquainted with the issues related to the diagnosis and treatment of breast cancer.

The dissertation „Intraoperative ultrasound for nonpalpable breast tumors – implementation and simulation training“ is a well-planned and

developed research. It is written on 154 standard typewritten pages and contains 50 figures, 22 images and 15 tables. The research is structured as follows:

- introduction - 1 page,
- literature review - 32 pages,
- aim and objectives - 1 page,
- materials and methods - 14 pages,
- results - 69 pages,
- discussion - 12 pages,
- conclusion
- implications and contributions - 4 pages
- bibliography - 14 pages.

The latter contains 226 authors, of which 6 in Cyrillic and 220 in Latin.

In ***the literature review*** on 32 pages Dr. Ivanov has developed in depth the main aspects of the breast cancer problem - anatomical data, epidemiology, breast-conserving surgery, historical data, methods for intraoperative navigation and simulation medicine. The summarized analysis of the literature data allows the PhD student to correctly formulate the purpose of the study and to justify the individual tasks for its implementation.

The aim of the dissertation is formulated precisely - to study the application of intraoperative ultrasound as an approach for precise navigation in the excision of non- palpable tumors of the mammary gland and to create, comparable to the intervention, a realistic model for simulation training.

To achieve this aim, 3 specific and realistically feasible ***objectives are presented*** :

1. *To ascertain the epidemiological characteristics, complex assessment and analysis of the prevalence of breast cancer in Plovdiv, Pazardzhik and Smolyan regions for a period of 10 years.*

2. *To make a prospective, randomized, multicentre comparative analysis of two groups of patients, in one of which only sector resection is to be performed, and in the other group the excision is to be performed with the aid of intraoperative ultrasound.*

□ *To determine the effectiveness of the application of intraoperative ultra-sound.*

□ *To compare the average time duration of the surgical intervention in the two groups of patients.*

□ *To compare the status of the resection margins between the two groups of patients.*

□ *To compare the closest and farthest distance from the tumor formation.*

□ *To assess and compare the need for re-operation between the two groups of patients.*

□ *To compare the "total resection volume" and the "calculated resection ratio" in the two groups of patients, thus assessing the preservation of a healthy glandular parenchyma.*

3. *To create an original realistic model, allowing the intervention in a simulation environment.*

The section "**Materials and methods**" is developed on 14 pages. From a research point of view, it is structured correctly. The way of thinking in the realization of the project is outlined, with formulation and

implementation of the indicated objectives, differentiation of criteria excluding from the research. The methodology used is modern, impressing the opportunity to do a multicenter , prospective study in our conditions. Patients are randomized to be included in the group with and without intraoperative ultrasound, without affecting the safety of treatment.

From a methodological point of view, all the most modern diagnostic tools have been used, with very good illustrations. According to the set objectives, the resection volume is calculated in detail and the possibilities of the intraoperative ultrasound device are used adequately. I also welcome the persistence in the difficult task of creating a simulation model, which is a methodological contribution and could enter the practice of training young breast surgeons. The statistical methods used are well selected and adequate for the analysis of the materials.

The results of the set objectives are described in detail, which emphasize the importance of the research. This is the most voluminous part of the development - 67 pages.

The results of two actual studies are presented:

- retrospective comparative study aimed at making an epidemiological characterization, comprehensive assessment and analysis of the prevalence of breast cancer in Plovdiv, Pazardzhik and Smolyan regions for a period of 10 years
- prospective , randomized, multicentre comparative analysis of two groups of patients (total - 53), one of which uses only sectoral excision , and in the other group the excision was performed by intraoperative ultrasound.

With the result of the prospective study, the author proves the advantages of the use of intraoperative ultrasound in the excision of benign and malignant lesions of the mammary gland. With this pioneering study for Bulgaria, when comparing the two groups of patients, Dr. Ivanov achieved 100% negative resection lines, no cases of re-operations and preservation of approximately 4 times more healthy glandular parenchyma.

Special attention should be paid to the created original realistic model of a woman's breast, allowing the performance of both diagnostic interventions and excision of a nonpalpable tumor under ultrasound control.

In the **discussion section** , covering 11 typewritten pages, the author compares the results obtained according to the set objectives. The second objective is most extensively analyzed, and the advantages of the used intraoperative ultrasound are unambiguously presented, both in the operational-tactical aspect and in the pathological anatomical aspect. The obtained results were compared with similar ones in a systematic analysis of 17 conducted ones , with comparable data.

The dissertation has drawn 7 conclusions, 6 contributions with original and three contributions with confirmatory character.

Three publications in connection with the PhD thesis are attached. They are in English, one of which is in prepress in a refereed journal.

The abstract is structured correctly. Its content reflects the main results of the tasks, which fully corresponds to the structure of the dissertation.

In **conclusion** , I can say that the PhD thesis, that was proposed for my evaluation is up-to-date, properly constructed, with a precisely

chosen methodology and reliable results. It contains scientific and applied data, which are original contributions to science and meet all the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria, the Regulations for its implementation and the Regulations of MU - Plovdiv. The presented materials and dissertation results fully comply with the scientific requirements of these regulations.

The dissertation of Dr. Valentin Ivanov shows that the doctoral student has in-depth knowledge and a number of professional skills in the scientific specialty of General Surgery. At the same time, he demonstrates qualities and the ability to independently conduct research.

Due to the above, I confidently give my positive assessment of the work of Dr. Valentin Valentinov Ivanov and strongly recommend the esteemed scientific jury to award him the scientific and educational degree "DOCTOR".

Reviewer:

City. Sofia

Assoc Prof. Dr. S. Maslyankov , PhD.

March 2, 2022

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