

RECENSIONS

By Prof. Dr. Ognyan Georgiev Brankov, PhD, DsC

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Subject: dissertation, submitted for the award of the educational and scientific degree "Doctor" in the scientific specialty "Pediatric Surgery", professional field 7.1. Medicine 7. Health and Sport, scientific specialty PEDIATRIC SURGERY

of

Dr. Nikola Kostadinov Kartulev

**BRONCHOSCOPIC OBTURATION IN PERSISTENT AIR LEAK AFTER
VIDEO-ASSISTED THORACOSCOPIC ABSCESSOTOMY IN
CHILDHOOD**

Scientific supervisor: prof. dr. Hristo Ivanov Shivachev, PhD.

I have been selected to write a review as a member of the scientific jury appointed by the Order of the Executive Director No. RD-26-683/03.04.2024 under Art. 32(3) of the Regulations for the Development of the Academic Staff at the University Hospital "N.I. Pirogov" EAD, according to the Decision of the Scientific Council with Protocol No. ND-01-3/30.11.23 of the University Hospital "N. И. Pirogov" EAD – Sofia

General information

I have received the set of paper/electronic materials needed for the review. They are in accordance with Article 4, paragraph 2 of the Law on the Development of Academic Staff in the Republic of Bulgaria and Article 10 of the Regulations on the Development of Academic Staff at the University Hospital "N.I. Pirogov" for the disclosure of the procedure for the defense of a dissertation.

The dissertant was trained in the PhD program at the Clinic of Pediatric Surgery of the University Hospital "N.I. Pirogov" in the scientific specialty of PEDIATRIC SURGERY. The training was carried out in free form.

The dissertant has submitted a list of 36 scientific publications on the topic, including 14 full-text publications and 22 papers and posters from national and international scientific forums. In 11 of them he is first or second author. Four of the scientific articles were printed in English in foreign journals.

The titles in the presented list are grouped according to the year of their appearance. It is appropriate to arrange the list in sequential order by date, divided into four parts: full-text

scientific publications in Bulgaria, those in foreign journals, presentations at our scientific forums, and those at foreign forums.

The abstract is written in concise scientific language and reflects the main ideas and results presented in the thesis. An oversight on the part of the author and his supervisor is the printing at its end of the sources cited from the literature review, a list of 124 titles, rather than a list of titles directly related to the dissertation topic. These are: 2 scientific articles published in reputable Bulgarian scientific journals and 5 presentations at scientific forums, one of them abroad. This is quite enough as a contribution at the PhD stage.

Biographical data

Dr. Nikola Kostadinov Kartulev graduated as a Master of Medicine at the Medical University - Sofia in 2014. He began his professional development as a surgeon-resident at the Clinic of Pediatric Surgery at the University Hospital "N.I. Pirogov" EAD, Sofia. in 2015. After acquiring a specialty in pediatric surgery in 2020, he was appointed to the same structure as a specialist physician, where he has worked until now. He is currently enrolled for a second specialty "Thoracic Surgery". At the same time, he qualified in the field of laparoscopic surgery by participating in Advanced Course Laparoscopic Neonatal Surgery, Naples, Italy /07.2016/, Fresh-up Laparoscopische chirurgie, Bochum, Germany /03.2017/, Endoscopy Summer School, Sheffield, United Kingdom /06.2022/.

Member of the Society of Paediatric Surgery and SIOP EUROPE.

Relevance of the topic

The dissertation develops a very important topic in the field of pediatric pulmonary disease. The treatment of inflammatory pleuropulmonary diseases is an important part of pediatric healthcare due to the still high incidence as well as the common serious complications on the pleura and lung parenchyma side. The introduction of video-assisted thoracoscopic surgery (VATS) in 2004 as a routine intervention for children with parapneumonic pleural complications (PPC) at the Department of Pediatric Surgery of the N.I. Pirogov University Hospital, has enabled the application of minimally invasive surgical tactics for these disease processes. The fundamental dissertation of Prof. Hristo Shivachev in 2011 made a comparative clinical study of the results of the application of VATS and classical surgical methods. The methodology has proven its advantage over open surgical techniques and contributes to faster postoperative recovery of children. The subsequent dissertation of Dr. Yanko Pahnev in 2018 marked a new stage in complex treatment by introducing thoracoscopic abscessotomy for the treatment of primary parapneumonic lung abscess. The goal is adequate drainage of the pleural and abscess cavity. The peculiarities of the pediatric organism and the specificity of the pathogenesis of pleural abscess, which differs from that in adult patients, are highlighted. As indications for secondary open lung resection arise in some patients due to persistent air-leak, a new alternative approach has been introduced in the clinic since 2016. This newly introduced method of endoscopic occlusion of the persistent bronchial fistula to significantly reduce open lung resections is the subject of this thesis.

General characteristics

The dissertation work is a retrospective and prospective study on 120 children treated with pleuro-pulmonary parapneumonic complications (PPPC) and was carried out personally by the author together with the team of the Department of Pediatric Thoracic Surgery of the Department of Pediatric Surgery of the University Hospital "N.I. Pirogov".

The work contains 118 pages of text and 10 pages of bibliography. It is illustrated with 62 figures and 19 tables. The bibliography contains 124 references. It is noteworthy that quite a number of cited authors are from the 80-90s who dealt with temporary endoscopic filling (occlusion) of bronchial fistula. This is understandable because they cover a long-standing and serious problem. However, there are relatively few cited titles from the last 5-10 years. I accept, as the dissertator himself points out, that this topic has been developed by few authors, which makes his work all the more significant and contributory.

Another thing I would like to point out is that the bibliography is arranged in order of citation, not alphabetically, which does not give a clear overview of the authors cited. This method has been adopted around the world, but in this country the guidelines of editorial boards and university research centres still require alphabetical order. Moreover, there is no uniform method of listing works cited: for example, author, title, volume, number, year, pages. Citations in the bibliography are literally on a copy/paste basis. Some are cited with a doi:, others without; some citations are incomplete, or in other words there is a lack of synchrony in the layout of the bibliography.

Structure of the dissertation

In Chapter I INTRODUCTION, the dissertator presents the main complaints on the topic, pointing out that there is no systematic study of the incidence of the disease in the pediatric population in the scientific literature, as well as the corresponding diagnostic and treatment problems. It discusses the incidence of pulmonary and parapneumonic complications in children and notes an increase in cases with pulmonary abscess and necrotizing pneumonia. The serious problem, according to the author, is the aggravated postoperative period complicated with persistent air leak.

Chapter II LITERATURE REVIEW occupies 35 pages, i.e. 30% of the entire text. It shows that the author has an in-depth knowledge of the subject, which he discusses in various aspects. Differences in the characteristics of inflammatory pulmonary processes between adults and children are highlighted. The various definitions of pulmonary pathology, the classification of air leak and pleural complications by Light, and the phases of body changes during bronchoscopic obturation are discussed. Different methods and techniques of occlusion and different obturators are discussed in detail. In my opinion, the discussion of pleurodesis methods is presented in unnecessary detail. In conclusion, it is the author's opinion that bronchoscopic obturation with a synthetic obturator is the most adequate method of management in the target patient population.

On the basis of the data in the scientific literature and taking into account the specificity of the pediatric organism regarding the mechanism of pleuro-pulmonary complication, the

dissertation aims "To develop and introduce a comprehensive approach to persistent air leak after VATS abscessotomy in childhood". The aim is formulated specifically and clearly. To accomplish this goal, it sets 5 objectives that are quite sufficient to capture the entirety of the problem and provide a basis for relevant conclusions.

Chapter IV CLINICAL MATERIAL includes 120 children with PPPC in whom the inflammatory process occurred in a normally developed lung. The patients were divided into three groups according to the course of the disease and the treatment methods:

- Those with VATS-abscessotomy and smooth postoperative course;*
- those in whom pulmonary resection was necessary due to persistent air leak*
- and those in whom persistent air leak was treated with bronchoscopic obturation.*

The comparison groups were sufficiently numerous to statistically summarize results and to draw scientifically significant conclusions.

After the CLINICAL MATERIALS chapter should come the METHODS chapter, but instead the dissertation continues quite out of place with Demographic Results, Clinical Characteristics, and Imaging Results. As you can tell from the subheadings, this should all go to the RESULTS chapter.

The METHODS chapter details the types of clinical and laboratory investigations, with the transthoracic ultrasound examination using the Hilliard scale modified by Shivachev being relevant. The various surgical techniques are described as well as the newly introduced technique of bronchial occlusion with a synthetic obturator.

The RESULTS chapter covers 38 pages and is one of the most significant parts of the thesis. The author provides a thorough analysis of the data in the three groups of children, which he illustrates in detail with photographs, tables and clinical examples.

In the DISCUSSION chapter, the dissertator points out that despite the good results of VATS after an abscessotomy, patients with uncontrolled air leak were previously subjected to open lung resection, and now with the introduction of the bronchial occlusion technique, postoperative outcomes are significantly better in this group of children. The method is an interventional rather than a resectional surgical method, preserving lung parenchyma and shortening postoperative recovery.

In Fig. 61, the dissertator presents his own algorithm for the management of children with PPC, which is his personal contribution of a scientific and practical nature. In addition, he also presents the indications for the different surgical tactics.

The CONCLUSIONS are 9 in number and are based on the comprehensive analysis of the literature review, clinical material, results and their discussion. The conclusions are formulated accurately and fully meet the aim and objectives.

I accept all the contributions presented by the author.

I can highlight the following contributions of high scientific and practical value:

1. The advantages of bronchoscopic obturation for bronchial air leak compared to the resection lung technique are proved. The time of prolonged drainage was reduced by an average of 3.7 days and the hospital stay by an average of 5.66 days. Success rate of bronchoscopic obturation was achieved in 94% of cases.
2. Bronchoscopic obturation has been introduced as a routine procedure in practice, building on the existing management algorithm for patients with PPC and PPPC.
3. During the learning curve, baseline criteria for the indications, timing and duration of obturation are established.
4. The methodology has been applied with success not only in patients after VATS-abscessotomy, but also in other pulmonary diseases proceeding with air leak.

Conclusion:

The dissertation "Bronchoscopic obturation with a synthetic blocker - an alternative to pulmonary resection in persistent air leak after video-assisted thoracoscopic abscessotomy in childhood" by Dr. Nikola Kartulev fully meets the criteria for the award of the scientific and educational degree "Doctor" and meets all the requirements of the Law for the Development of Academic Staff in the Republic of Bulgaria, the Regulations for the Implementation of the Law for the Development of Academic Staff in the Republic of Bulgaria and the relevant Regulations of the University Hospital "N. I. Pirogov". The submitted materials and dissertation results fully comply with the specific requirements of the University Hospital "N.I. Pirogov". The scientific work of Dr. Nikola Kartulev has a contributory character with high scientific and practical value.

In spite of some critical remarks, I give my positive vote and recommend to the honorable members of the scientific jury to award to Dr. Nikola Kartulev the educational and scientific degree "Doctor" in the scientific specialty "Paediatric Surgery" in the professional field 7.1.Medicine 7. Health and Sport.

23.05.2024 г.

Reviewer:

Prof.D-r Ognian Brankov, MD, PhD