R E C E N T I O N S

From Prof. Dr. Ognyan Georgiev Brankov MD, DMSc.
Surgical Clinic, Tokuda University Hospital

Subject: dissertation for the award of educational and scientific degree "Doctor", professional field MEDICINE, scientific specialty PEDIATRIC SURGERY

Author: Dr. Edmond Videnov Rangelov

" CURRENT MANAGEMENT AND APPLICATION OF MININVASIVE SURGERY IN THE TREATMENT OF UNDESCENDENT, NONPALPEBRE TESTIS IN CHILDHOOD"

Scientific supervisor. Prof. Dr. Hristo Ivanov Shivachev, MD.

submitted for the acquisition of the educational and scientific degree "Doctor", in the scientific specialty "General Surgery", professional field 7.1. Medicine, in the field of higher education 7. Health and Sport.

Reason: Participation in the composition of the scientific jury under Art. 3 of the Regulations for the Development of the Academic Staff at the University Hospital "N.I. Pirogov" , according to the Decision of the Scientific Council with Minutes № ND-01-3/21.09.22 of the University Hospital "N. I. Pirogov“ – Sofia

Dr. Edmond Rangelov was trained as a free doctoral student at the Clinic of Pediatric Surgery of the University Hospital "N.I. Pirogov" in the scientific specialty of pediatric surgery. The submitted set of materials are in accordance with the requirements of the Scientific Council of the University Hospital "N.I. Pirogov" for the disclosure of the procedure for the defense of a dissertation.

The doctoral student has presented 10 scientific titles directly related to the topic of the dissertation, including 2 real publications in the journal "Emergency Medicine" and 8 participations in Bulgarian and international congresses and conferences.

2. Brief biographical data about the doctoral student

Dr. Edmond Videnov Rangelov completed his higher education as a Master of Medicine at the Medical University - Sofia. He holds two medical specialties - "General Surgery" and "Pediatric

Surgery" - acquired in 2002 and 2012, respectively. In addition, he has increased his professional qualification in the field of laparoscopic surgery with additional specialized trainings. He is a member of the Society of Paediatric Surgery and EUPSA.

Dr. Rangelov started his professional development as a doctor at the R. Angelova Hospital in Sofia. In 1995. In 2005 he was appointed as a single surgeon at the Clinic of Pediatric Surgery at the University Hospital "N.I. After obtaining a specialty in pediatric surgery he was appointed as a team leader, then deputy head, and currently holds the position of head of the Department of Pediatric Abdominal Surgery. He speaks German and English.

3. Relevance of the topic

Cryptorchidism, or still undescended (retained) testis, is one of the most common endocrine gland disorders in boys and the most common anomaly of the male genitalia in the newborn. The problem of undescended testis is very serious and raises questions about the methods of diagnosis, timing, and type of treatment for testicular descent abnormalities. This is because of the extreme importance of the gonads for the future reproductive capabilities of the boy.

While there are largely standardized guidelines for the management of boys with palpebre nondescended testis (PNT), the best approach for abdominally localized testis is still being sought. Over the past two decades, considerable experience has been gained in this regard, particularly due to the introduction of minimally invasive surgery. As a consequence, a number of European and American associations of pediatric surgery and urology have published basic guidelines (Guidelines) on the general management of the diagnosis and treatment of cryptorchidism.

The use of the laparoscopic technique in children with nonpalpable testis (NPT) has opened up new possibilities for the diagnosis and treatment of this disease. Improvement in the technical characteristics of minimally invasive technical tools and their mastery by surgeons, as well as advances in anesthetic equipment and monitoring, have led to significant advances in laparoscopy in pediatric surgical practice and in the treatment of NPT in particular. A large number of studies and meta-analyses have investigated the advantages of laparoscopy in the diagnosis and treatment of NDT and introduced new management algorithms, displacing multiple imaging studies and surgical techniques. There is only one article on laparoscopy in cryptorchidism in Bulgaria, which shows the relevance and timely development of the topic.

Structure of the presented dissertation

The dissertation entitled "**Current management and application of minimally invasive surgery in the treatment of undescended, nonpalpebre testis in childhood"** is written in 128 pages, illustrated by 54 figures and 31 tables. The structure and the way of writing the dissertation are in accordance with all the requirements. The thesis is written in high scientific language, precise and concise, which clearly and comprehensibly sets out the meaning of the content. It contains 12 distinct parts as

follows : Introduction,Literature review,Aim and objectives, Clinical material,Methodology, Results and group discussion, Discussion, Conclusion, Conclusions, Contributions, Publications and congress participation, Booklist.
I disagree with the wording "nonpalpable" testicle, as I think it is more correctly defined as "nonpalpable".

The introduction presents the general characterization of the issue of undescended (retained) testis and outlines the main directions in the development of the work. The author points out that the use of laparoscopic technique in children with NPT opens new possibilities for the diagnosis and treatment of this form of the disease.

The literature review is divided into 12 main sub-points. The review is based on a bibliography of 181 sources, of which 179 are in Latin and 2 in Cyrillic. Their detailed analysis shows how deeply the dissertator has penetrated into the essence of the problem, considering it in all its aspects and analyzing it from a contemporary point of view. The bibliography is arranged in order of citation. This is a modern technique, which, however, does not give an overview of the authors cited. It has been adopted throughout the world, but in this country the guidelines of editorial boards and university research centres still require alphabetical order. The fact that the dissertator has adopted the modern way of ordering the cited literature is not a mistake, but he himself does not strictly observe this requirement in his presentation.

It is noteworthy that there are only two citations of Bulgarian authors - one self-citation (No. 144) and one of Neykov (158), both of which are misquoted without indication of the source. Other such misspellings are e.g. 151, 152, 153. There is no uniform citation system - for example : volume, year, number, pages from - to. Since a brief historical overview is being given, it was appropriate to cite the first dissertation on cryptorchidism by Mara Georgieva (1969), who was a senior research fellow at the Pediatric Surgery Clinic of Pirogov Hospital. The monograph by I. Viktorov and T. Patrashkov "Cryptorchidism" (1969) cannot be overlooked. From more recent publications it was right to cite A. Yonkov 2006, F. Kumanov 2007, S. Andreev and S. Peev 2019, O. Brankov 2019. And, of course, the publication of D. Zlatanov and K. Davidov in MEDICAL MAGAZINE NOVEMBER, 2020, pp. 76-79, on the application of laparoscopy in the treatment of cryptorchidism, with which one can argue for the primacy in the introduction of this minimally invasive methodology. This is, of course, the author's choice and in no way detracts from the extensive and thorough literature review.

It should be emphasized that the dissertation of Dr. Edmond Rangelov is the first in Bulgaria on the issue of laparoscopy in the treatment of cryptorchidism and the second after that of A. Yonkov from Plovdiv Pediatric Surgery (2005) on the topic of treatment of this genital disease in boys, written after a period of more than 30 years of silence on this topic.

I have a few more remarks to add to the review. The dissertator has very well presented the problem of the abdominal retained testicle with the corresponding classification, which he subsequently used as a basis in his scientific work. In contrast, there is no clarity in the presentation of the classifications of the forms of retained testis as per the recommendations of the American and other urological associations. On page 8 the definition "acquired testicular" (spelled as tessis) is used which is a non-existent term, presumably referring to acquired cryptorchidism. When we speak of acquired cryptorchidism we actually mean ascending testis. In contrast, testicular retention after hernioplasty is called secondary cryptorchidism, and in my opinion, retention after orchidopexy represents

recurrence. The author speaks of a retractile testis (with the popular name elevator testis), but another term introduced by some European authors, namely gliding testis, could also be meant.

The literature review continues with a detailed and up-to-date presentation of embryogenesis and especially the pathway of testicular descent, pathophysiology, diagnosis, types of surgical treatment and outcomes after orchidopexy. Surgical techniques are presented in detail and depth, with the greatest emphasis on the laparoscopic approach. The very good and scientific illustration with anatomical figures and slides of laparoscopic findings is impressive. I would like to make one clarification - page 57 describes the so-called Prentiss manoeuver (1955), which in the original consisted in cutting the epigastric vessels to shorten the path of the cordon to the scrotum. The original methodology belongs to Frangenheim (1920), who liberated the epigastric vessels but kept them intact by passing the cordon under them.

The dissertant describes each stage of laparoscopy and laparoscopic orchidopexy, which he illustrates with appropriate slides. In this part, the dissertation can serve as a guide to the application of the methodology. The Fowler- Stephens method is discussed in detail. In the summary, the dissertation points out that the treatment of NPT is controversial and can be difficult, which is evident from the multiple modalities of assessment and proposed therapy. Accurate preoperative assessment and localization will aid in the selection of the appropriate surgical approach: one- or two-stage laparoscopic, laparoscopic and open or fully open surgical procedure.

Based on the findings of the literature analysis, the dissertation outlines the scales of presentation of the problem and sets the **OBJECTIVE**: To introduce minimally invasive surgery as a diagnostic and therapeutic method in the treatment of undescended, nonpalpebre testis and to perform a comparative study with respect to classical surgical methods. To achieve this goal, 5 objectives were formulated.

Clinical material

The dissertation is based on 96 children with undescended, nonpalpebre testis, unilateral or bilateral, treated in the Department of Pediatric Surgery at the University Hospital "N.I. Pirogov" for the period 2013 - 2021. With the help of minimally invasive surgery, 43 children with PNT were operated on, and 53 children with PNT were operated on conventionally. A large group of children with palpable inguinal or prescrotally located testis were excluded. The number of children analyzed is relatively large and quite sufficient to draw scientifically valid conclusions.

Research Methodology

In addition to the therapeutic and diagnostic methodology, the doctoral student used a number of analytical statistical and mathematical methods that lead to a clear presentation of the results, divided into two clear groups.

In the analysis of the clinical material and the results of the statistical data, the dissertation draws important conclusions for practice, which are innovative and confirmatory. The entire diagnostic process preceding laparoscopic intervention is described in detail and step by step to arrive at a proposal for a surgical management algorithm based on experience and analysis of the results obtained. The complexity of the treatment of PNT, the limitations of instrumental studies, and the likelihood of false-positive or false-negative results when using CT and MRI are considered. The

processes of improving the technical characteristics of minimally invasive equipment and its mastery by surgeons are examined.

The interpretation of the clinical results allows the dissertator to derive basic principles of diagnosis and laparoscopic orchidopexy that have important implications for surgical practice. An extremely valuable diagnostic and therapeutic algorithm is proposed. The conclusion summarizes the data of the study. There are 9 conclusions that are properly formulated and meet the objectives, fully outlining the fulfilment of the aim of the thesis.

I accept all the contributions mentioned by the dissertant, namely:

1. A detailed contemporary literature review on the possibilities offered by minimally invasive surgical techniques in the diagnostic and therapeutic treatment of PNT has been performed.

2. A summary of the literature on the sensitivity, specificity, feasibility and shortcomings of imaging in the diagnosis of NPT is presented.

3. The advantages of laparoscopic technique over conventional technique in the diagnosis and treatment of NPT in terms of trauma and postoperative outcomes are demonstrated

4. Laparoscopy has been introduced as a routine minimally invasive method in the diagnosis and increasingly involved in the treatment of NPT.

5. First study of the involvement of laparoscopy as a minimally invasive method in the diagnosis and treatment of NPT.

6. A diagnostic and treatment algorithm for children with NPT is introduced.

7. The learning curve of the method has been studied, showing a trend towards shorter operative time and mastery of more complex minimally invasive techniques, in the treatment of NPT.

In conclusion:

The dissertation of Dr. Edmond Rangelov presented for review is devoted to the application of minimally invasive surgery in the treatment of nonpalpebre testis, where a thorough comparison of the results of the use of laparoscopic and conventional methods is made. This work is the first of its kind in Bulgaria and has considerable scientific and practical value.

The dissertation thesis on **"Current management and application of minimally invasive surgery in the treatment of undescended, nonpalpebre testis in childhood"** by Dr. Edmond Rangelov fully meets the criteria for the award of the scientific and educational degree "Doctor" and complies with all the requirements of the Law for the Development of Academic Staff in the Republic of Bulgaria, the Regulations for its implementation 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".

24.11.2022 г. Reviewer:

Prof. Prof. Dr. Ognyan Brankov, M.D., D.M.Sc.