OPINION

From
Assoc. Prof. Dr. Vladimir Stefanov Nakov MD
Acibadem City Clinic, Tokuda Hospital, EAD - Sofia

About
Defense of the dissertation of
Dr. Martin Nikolaev Moynov

On the topic:
"Neuronavigated needle biopsy in cranial neurosurgery"

Presented for the award of
Educational and scientific degree "Doctor"
In the scientific specialty "Neurosurgery"
Professional field 7.1. Medicine,
Area of higher education 7. Health and sports.

Brief biography of the author:

The doctoral student Dr. Martin Moynov is born in 1985 in the town of Veliko Tarnovo. He graduates from the IV EG "Frederic Joliot Curie" - Varna in 2004. In 2012 he graduates in medicine from the Medical University - Varna, and then specializes in neurosurgery at the Clinic of Neurosurgery at Hospitals "St. George"- Plovdiv and "St. Marina"- Varna. Since 2017 he works as an assistant at the Department of ENT and Neurosurgery, MU-Varna. Since 2018 he is a PhD student at the Medical University of Varna on the topic "Neuronavigated needle biopsy in cranial neurosurgery". Since 2019 he is a specialist in neurosurgery. During his periods as a medical student, resident and neurosurgeon he has long-term and short-term specializations, courses, congresses and symposiums in a number of leading medical and in particular neurosurgical centers in Bulgaria, France, Hungary, Switzerland, Romania, Ghana, Palestine. Dr. Moynov is a member of the Bulgarian Society of Neurosurgery since 2013, and a member of the international AOSpine society since 2017.

Relevance of the topic:

Histological diagnosis is a major factor in modern oncological treatment of brain lesions. To date, frame based stereotaxy has been at the forefront of minimally invasive biopsy interventions for intracranial lesions. The rapid pace of technological development and the timely introduction of computer-based technologies in medicine have allowed the application of image-based neuronavigation systems in oncological neurosurgery for minimally invasive histological verification. To date, data on efficacy, safety and diagnostic value are encouraging, but research in the literature is limited. A lack of standards significantly complicates the objective comparative analysis of the various surgical results. This makes the topic of the dissertation relevant and significant.

Structure of the dissertation:

The presented dissertation on "Neuronavigated needle biopsy in cranial neurosurgery" is a volume of 173 standard typewritten pages. Its structure fully meets all accepted requirements. It consists of Introduction and Literary Review - 38 pages, Purpose and tasks - 1 page, Materials and methods - 26 pages, Results - 57 pages, Discussion - 26 pages, Conclusion and conclusions - 2 pages, Contributions - 1 page, Bibliography - 15 pages. The

presented material is illustrated with 135 figures and 71 tables. The author used 260 literary sources.

Literature review:

The literature review related to the topic is detailed and thorough, using well all the presented cited titles. The principles of neuronavigation, the problem of brain displacement, as well as the application of neuronavigation in onconeurosurgery are discussed in detail. The biopsy instrumentarium used in modern surgery is presented as well. The introduction and the literature review bring out the unsolved problems and formulate the purpose of the research.

Purpose and tasks:

Optimization of the minimally invasive neuronavigated technique for diagnosis and treatment and introduction of a surgical algorithm based on analysis and summary of the experience gained with neuronavigated needle biopsy in patients with supratentorial intraaxial lesions. The goal set by the doctoral student is achieved by solving seven precisely and clearly formulated tasks.

Materials and methods:

The study included a total of 40 patients operated under general anesthesia with supratentorial intraaxial lesions in the Clinic of Neurosurgery of the University Hospital - "St. Marina"-Varna for the period January 2019 - December 2021, during which a neuronavigated needle biopsy was performed intraoperatively. The used literature is described and the used intraoperative technique is explained in detail. The methods of creating and implementing the protocol for intraoperative neuronavigated needle biopsy are described. The descriptive and analytical statistical methods used by the author are clearly defined.

Results:

The results are presented in 57 pages and are richly illustrated with tables and figures. The patients are divided into two groups - 15 patients with isolated neuronavigated needle biopsy and 25 patients with biopsy and excision of the histologically verified formation. Given the retrospective nature of the analysis and the need for detailed presentation of information on the representative sample of patients, the doctoral student arranges and presents the data in tables and figures, demonstrating and commenting on statistically significant differences in the two groups of patients. Indications and contraindications for imaging based needle biopsy are discussed and a retrospective analysis of the operative time, size of lesions and number of biopsy materials is performed. Correlation dependence is performed including used imaging studies and postoperative complications. Factors

influencing diagnostic yield including age, intraoperative MRI sequences and anamnestic data for previous radiotherapy, previous surgery and previous biopsy are analyzed.

Discussion:

A critical and analytical discussion of the results is conducted in the context of current literature sources for biopsied patients with intraaxial lesions. The imaging studies used for intraoperative navigation, the technical aspects of neuronavigated biopsy in relation to the types of biopsy needles, the technique of aspiration, factors influencing diagnostic yield, the technique of obtaining valuable intraoperative biopsy material, intraoperative and postoperative measures are discussed. The individual approach related to the choice of the operator in relation to the degree of radicalism of the conducted intervention is also discussed.

Conclusions:

Based on the results and their discussion, Dr. Moynov formulates conclusions illustrating that neuronavigated needle biopsy, under general anesthesia, used in patients over 18 years of age, with supratentorial intraaxial lesions, has excellent results, high diagnostic yield, increases the surgeon's confidence in taking a decision on the need for radical surgery, while remaining an efficient, safe intervention with high diagnostic value, with the possibility of application in routine neurosurgical practice.

Publications:

The doctoral student has 4 scientific publications in connection with the dissertation. Of these, two full-text articles have been published in journals, and two scientific papers have been presented at conferences and published in joint compendiums. The doctoral student's publications bring him enough credit in relation to the standard requirements for the award of the Educational and Scientific Degree "Doctor" in the surgical specialty - Neurosurgery.

Conclusion:

I believe that the presented dissertation on "Neuronavigated needle biopsy in cranial neurosurgery" by Dr. Martin Nikolaev Moynov, contains theoretical and applied scientific results that contribute to neurosurgical science and meet the criteria for awarding educational and scientific degree "Doctor". For those reasons i wholeheartedly give a positive vote.

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Sofia

Assoc. Prof. Dr. Vladimir Stefanov Nakov MD

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