

REVIEW OF THE OFFICIAL OPPONENT

Professor Martin Smrčka.

**Dissertation of Abdalrahman Nassar " Prognostic factors in
surgical outcomes of sphenoid wing meningioma"
for the degree of Doctor of Philosophy in the field of knowledge
22 Health care in the specialty 222 Medicine**

Relevance of the topic and connection to the scientific projects.

The dissertation of Abdalrahman Nassar is devoted to the important problem of modern neurosurgery: the prognosis in surgical outcomes of intracranial tumors. Sphenoid wing meningiomas (SWM) represent a great surgical challenge due to their invasion of the bone and their close relationship to internal carotid artery, middle cerebral artery and cranial nerves. It is known that the different preoperative factors can influence the postoperative outcome and quality of life of patients with meningiomas. Despite a large number of published meningioma studies, no research has shown the role of different preoperative factors in surgical outcome and quality of life in early postoperative and long-term period in patients with SWM. Particularly, there are no studies concerning the role of peritumoral brain edema, its correlation with other clinical and radiological factors, its impact on postoperative period in patients with SWM. All above mentioned reasons were the rationale for planning and realization of this research.

The presented scientific work was performed within the framework of planned complex works of State Higher Educational Institution "Uzhhorod National University" according to the number of state registration № 0116U005251 "Scientific rationale for monitoring of the factors influencing the health of Zakarpatska region population and forming the modern management in health care system" (2016-2020).

The aim of the study was to improve the surgical outcome of sphenoid wing meningiomas by analysis of the different prognostic factors and the effectiveness of different surgical methods influencing the treatment results.

The degree of validity of scientific statements, conclusions and recommendations formulated in the dissertation, their probability.

Based on the analysis of the scientific literature, the dissertation of Abdalrahman Nassar managed to describe the problem, for the solution of which the goals and objectives of the research were methodically correctly chosen. The scientific work is based on the analysis of results of consequent 67 surgically treated patients with SWM. This amount is sufficient for obtaining reliable results and justification of the scientific conclusions.

The technical and methodical level of the study is high, modern methods of medical diagnostics and treatment and scientific research are used. Based on the electronic database the mathematic analysis with the use of adequate methods of medical statistics is done. All this has allowed author to obtain the convincing data and make the conclusions and practical recommendations which are reasonable and reliable.

Novelty of the obtained results.

This research is the first which statistically has proved the significant impact of different preoperative predictors (peritumoral brain edema, tumor volume, preoperative vision impairment and motor weakness and preoperative KPS score) on surgical outcome in early postoperative period and quality of life in the three-months follow-up in patients with sphenoid wing meningiomas.

The scientific work is the first extensive study of peritumoral brain edema (PTBE) of sphenoid wing meningiomas. It was revealed that PTBE is one of the important risk factors in the surgical outcome and complication rate, while it has no effect at long-term outcomes in neurological function and quality of life. PTBE is associated with short-term negative risk factor for surgical outcomes. It was shown that

extensive PTBE also occur in small medial sphenoid wing meningiomas, these results do not support the prevailing brain parenchyma compression theory.

It was proved that the use of the skull base technique with extradural anterior clinoidectomy for surgical resection of medial SWM is preferred approach which improve the surgical outcome and quality of life of the patients with this pathology.

Practical Significance of the Obtained Results.

It was shown that complete tumor resection can be achieved in most of lateral (80.9%), middle (77.8%) and sphenoid-orbital meningiomas (75.0%). The reasons for incomplete resection of sphenoid wing meningiomas are strongly related to anatomical location of SWM and tumor volume. The research has proven that the functional neurological outcome following surgical resection of SWM is influenced by several factors: extent of surgical resection, histopathology of the tumor, tumor volume, anatomical location of SWM and presence of PTBE.

It was shown that the recurrence rate (16.4%) for the sphenoid wing meningiomas (mean follow-up period 87 months) is not related to age and gender. The pathological grade 2, atypical type and Simpson grade III-V are important impact factors for sphenoid wing meningioma recurrence.

Evaluation of the content and design of the dissertation, its completion, analysis of its sections.

The dissertation consists of an introduction, 5 chapters, conclusions, list of sources and 4 appendices. The work is illustrated with 39 tables and 24 figures, 33 diagrams, contains 228 titles.

In the introduction the relevance, aim and tasks of the research are mentioned. The aim correlates with the topic of the scientific work. The tasks correspond with the aim of the research. The novelty and practical implication of the scientific work are formulated properly.

In the chapter 1 the analysis of the scientific literature is presented on 38 pages of printed text. It begins with the detailed description of anterior and middle skull base anatomy, SWM classifications, diagnostic and management options. Scientific articles analyzing different factors influencing surgical results are presented.

In general, the chapter is written well, critically analyzing many scientific articles. It ends with a short conclusion which indicates the relevance of this work.

The **next chapter “Materials and Methods”** defines the conceptual approach and design of the study, describes the clinical, radiological, surgical, histological investigations, as well as statistical processing of the results. Different characteristics of the clinical material are analysed. Then used statistical methods for processing the results of the study are presented.

By analysing the variety of statistical correlations between different clinical and diagnostic data the author evaluates the importance of them on surgical **outcome in chapter 3**. The special attention is paid to the peritumoral brain edema in SWM, this part of the research is one of the most important and new from scientific point of view. Peritumoral brain edema has an important impact on the incidence of preoperative seizures and motor weakness, whereas no significant effect was found on the preoperative KPS. A strong correlation was found between peritumoral brain edema and anatomical location, irregular margin of meningioma, pathological grade, while weak and insignificant with tumor volume. It is shown that peritumoral brain edema is one of significant impact factor on the incidence of occurrence of intra- and postoperative complications, quality of life of patients and surgical outcomes, it should be accurately evaluated to correctly plan the surgery of the patients with SWM. The quality of life of patients in long-term perspective are based on the KPS, in 3 months and 24 months period.

In chapter 4 the analysis of surgical outcomes, complications, recurrence rate, morbidity and mortality in 24 patients with **medial SWM** is presented. All of them underwent skull base approach with extradural anterior clinoidectomy. The comparison of the author’s surgical results with the outcome presented in the

scientific literature confirms that the use of this approach for surgical resection of clinoidal meningiomas should be the preferred due to favourable neurological outcome.

The “Discussion and summarizing of the obtained data” chapter outlines the results of the scientific paper.

The conclusions themselves are formulated clearly, concisely. They reflect the main content of the research, correlate with the assigned tasks of this scientific work.

The list of used literature sources contains 228 titles which shows a large amount of analyzed scientific literature.

The dissertation is written in English in scientific style but with some grammar mistakes. An overall impression from the paper is positive.

The completeness of the scientific provisions, conclusions and recommendations formulated in the dissertation, in published works.

The results of the research are covered in 4 scientific papers, of which all 4 articles (3 in Ukrainian scientific journals and 1 - in the international journal which is indexed in Scopus database). The results of the research are presented at the Congress of the Ukrainian Association of Neurosurgeons. The materials of the dissertation are fully covered in the publications and are not repeated.

Data on the absence of textual borrowings and violations of academic integrity.

The dissertation was tested by the certified Unicheck program. Unicheck text matches (citations) have references to primary sources and are included to the list of literature. Borrowings in the text have no signs of plagiarism. The dissertation is recognized as an independent work.

Remarks and questions.

1. In the new 2021 WHO classification of tumors of the central nervous system tumor grading have changed for Arabic ones. The author uses Roman numerals.
2. It is written in conclusion 1 that "Surgical outcome in patients with sphenoid wing meningiomas range as follows: excellent in 41.8% of cases, good in 40.2%, fair in 10.5% poor in 7.5%". How did you assess the outcome?
3. How has the big vessel involvement influenced the outcome of SWM?

The remark is not of a fundamental nature. The questions are of discussive nature.

9- Conclusions on the compliance of the dissertation with the established requirements.

The dissertation of Abdalrahman Nassar is a completed scientist research in which new scientifically and practical significant results are achieved. It solves an important scientific task: to improve the surgical outcome of sphenoid wing meningiomas by analysing of the different prognostic factors and the effectiveness of different surgical methods influencing the treatment results.

The dissertation of Abdalrahman Nassar " Prognostic factors in surgical outcomes of sphenoid wing meningioma" is a qualified, completed, independent scientific paper. Regarding the relevance of the topic, modern research methods, the practical significance of the results obtained, their novelty and informative conclusions, the paper meets the requirements for theses submitted for obtaining the scientific degree of Doctor of Philosophy in the field of study 22 "Health Care", specialty 222 "Medicine" according to the "Procedure for awarding the degree of Doctor of Philosophy and cancellation of the decision of the one-time specialized academic council of a higher education institution, scientific institution to award the degree of Doctor of Philosophy", approved by Resolution No. 44 of the Cabinet of Ministers of Ukraine dated January 12, 2022, and its

author deserves to be awarded the scientific degree of Doctor of Philosophy in the field of study 22 "Health care", specialty 222 "Medicine".

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Fakulta nemocnice Brno
Neurochirurgická klinika
Jihlavská 20, 625 00 Brno

Official opponent:

Prof.MUDr.Martin Smrčka, Ph.D.

Chairman of Neurosurgical Department

Deputy for Science and Research of the University Hospital Brno

President of the Czech Neurosurgical Society

University Hospital Brno

Jihlavská 20, 625 00 Brno

Czech Republic


Prof. MUDr. Martin Smrčka, Ph.D., MPA

Approved by:

Prof.MUDr. Tomáš Kašpárek, Ph.D.

Vicedean for Research and Doctoral Studies

Faculty of Medicine, Masaryk University Brno

Czech Republic


prof. MUDr. Tomáš Kašpárek, Ph.D.

MASARYKOVA UNIVERZITA
Lékařská fakulta
625 00 Brno, Kamenice 5
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Martin

Smrčka

Автор цифрового
підпису Martin
Smrčka

Дата: 2022.09.01
17:34:57 +03'00'