

A Modern Minimally Invasive Transcallosal Approach to the Third Ventricle. A personal experience of 30 patients

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Abstract

Introduction: Expansive processes around the third ventricle have always been a major neurosurgical challenge. Despite all the technological and scientific progress recorded over the last few years, third ventricle tumors are still a very difficult pathology to approach due to their formidable complexity. Treating such a tumor demands a good knowledge of local anatomy, pathophysiology, pathology and a good capacity to integrate all the data gathered from the patient prior to and during surgery. Last but not least, the correct means to approach such a tumor involves using modern neuronavigation technology which might be too expensive to access in certain clinics (1,2).

Objective: This article presents the personal experience of the authors, gathered while using a novel surgical approach, configured to maximize the success rate of interventions for tumors within the third ventricle, without using neuronavigation technology.

Materials and methods: The authors have developed a study of neuroanatomy using 30 adult human brains, without any pathological lesions, harvested during routine autopsies and analysed using a standard protocol (Protocol of the Ludwig-Maximilians University Clinic of Neurosurgery, Laboratory of Microanatomy – Munich, Germany). The authors assessed a series of anatomic elements which were later used as landmarks to build the neurosurgical operative field. After completing the anatomic study the authors moved on to record morphometric data for 30 volunteers. The authors used sagittal T1 weighted images. The volunteers were males and females, all adults, with the mean age of 45.3 years. (The age interval: 21-83 years, sex distribution: 17 males and 13 females). The images were digitally enhanced and the specific targets were outlined using Corel Draw, thus allowing for a systematic identification of contours and landmarks. Each contour was recorded and saved as a sequence of dots. The next stage of the study, after having studied all the data recorded, consisted of establishing the appropriate transcallosal surgical corridor (transforaminal or interforaminal) for each of the 30 patients (not to be mistaken with the 30 volunteers) who were admitted for third ventricle tumors and who were included in this study. After having performed surgery for the resection of the above mentioned third ventricle tumors, the authors observed pre- and postoperative clinical data which were corroborated with the neuropsychological examination which was also performed prior to and after surgery.

Conclusions: The results obtained through observation and anatomical measurements have proven to be highly valuable in determining a standard access corridor through the corpus callosum. The data gathered and the patient's MRI exam images helped obtain an optimal surgical corridor of the third ventricle. In what regards the surgical act in 23 cases (77%) the authors managed to achieve a complete resection of the tumor. In 6 cases (20%) the authors managed a subtotal resection of the tumors. In a single case the authors performed only a biopsy. A number of 24 patients (80%) achieved an excellent outcome (Glasgow Outcome Scale - GOS V). Minor deficits were recorded in 5 patients (17%) (disabled but independent) (GOS IV). No cases were recorded with serious impairment (GOS III) or vegetative state (GOS II). One patient with anaplastic glioma died 4 months after surgery after an initial favorable evolution. The tumor had spread to the hypothalamus. A single postoperative complication was linked to the surgical approach in a 73-year-old female patient who suffered a venous infarction due to a venous thrombosis in a

tributary vein of the superior sagittal sinus in the access area. The patient, after a slow recovery managed to improve her condition reaching GOS IV. There were no other complications connected to the surgical act.

Key words: third ventricle tumors, new approach, minimally invasive surgery, global outcome

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