



Original Contribution

**TRANS-SULCAL MICROSURGICAL APPROACH
TO INTRA-CEREBRAL METASTASES**

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ABSTRACT

Objective: The surgical treatment of cerebral metastases is an everyday problem in neurosurgical practice. The subject of treatment is mostly single metastases of the brain. To minimize therapeutic morbidities, such as cortical injuries, a transsulcal approach was applied by taking the results of neuroimaging into consideration. We aimed at introducing in the everyday clinical practices this approach to the surgical treatment of this pathology. **Methods:** We present 61 cases of intra-cerebral metastases treated surgically by trans-sulcal microsurgical approach at the Neurosurgical Clinic of Stara Zagora University Hospital. 39 of them are men and 22 are women, aged 42 to 69. According to the outcome of CT and MRI, the chosen sulcus was opened toward the lesion. Following complete dissection of the sulcus to remove the lesion. **Results:** The trans-sulcal microsurgical access was successfully conducted. In the early post-surgical period, all patients experienced a regress of the neurological deficit and improvement of the overall condition. **Conclusion:** The trans-sulcal microsurgical approach ensures less traumatic surgical interventions and preserves as much as possible the physiological and anatomical structures of the cerebrum.

Key words: trans-sulcal approach, metastases – surgical treatment

INTRODUCTION

The surgical treatment of cerebral metastases is an everyday problem in neurosurgical practice. The most common metastatic tumors of the brain are cancer metastases and their frequency varies between 10% and 38% of sufferers of cancer (1). In 80% metastatic brain tumors are located supratentorially, in 50% of cases with CT and MRI are established single metastases (2). The subject of treatment is mostly single metastases of the brain. The modern diagnostic possibilities of CT and MRI allow for their accurate location and choice of surgical approach thereto (2, 3, 4).

Prof. Yasargil used and popularized the idea of approaching lesions that were previously thought to be inaccessible by using the subarachnoid system surrounding the brain (4, 5). Natural anatomic routes (cisternal, sulcal, fissural, ventricular) can be used to reach deep localized tumors and perform a pure “tumorectomy”, thereby avoiding compression or resection of normal neural tissue (6, 7). The trans-sulcal approach is applied to minimize therapeutic morbidities, such as cortical injuries during the removal of the lesion (8). We aimed at introducing in the everyday clinical practices the trans-sulcal microsurgical approach to the surgical treatment of this pathology.

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MATERIALS AND METHOD

We present 61 cases of intra-cerebral metastases treated surgically by trans-sulcal microsurgical approach at the Neurosurgical Clinic of Stara Zagora University Hospital. 39 of them are men and 22 are women, aged 42 to 69. For the surgical intervention we used Carl Zeiss surgical microscope, AESCULAP micro-set and ERBE 350 bipolar coagulator.

Following craniotomy projected over the top of the process localized prior to the surgery with CT and MRI tests (**fig. 1**), we opened the dura mater under optical enhancement (**fig. 2**). We localized and chose a sulcus in which there were no large veins (**fig. 3**). Using an arachnoid knife to cut the arachnoid mater

above the sulcus. Using micro-scissors we cut the upper arachnoid layer 3-4 cm along the length of the sulcus. We opened the walls of the sulcus carefully by dull dissection with the shoulders of the bipolar forceps and the sulcus widely opened. This allowed entrance into the depth of the sulcus (**fig. 4**) with minimal brain retraction and no tissue loss. Once the bottom of the sulcus was reached a limited resection was performed to expose the lesion which was completely extirpated using bipolar forceps, aspirator and tumorfaszang (**fig. 5**). Following thorough hemostasis (**fig. 6**) we restored the dura mater, performed epidural pipe drainage and restoration of the bones, muscles and skin.

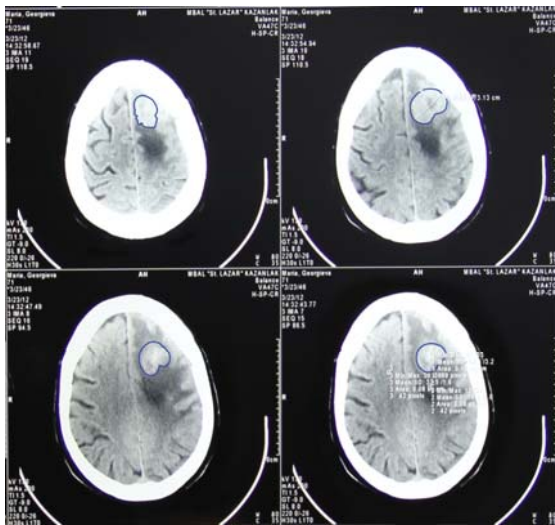


Fig. 1. Pre-operative CT

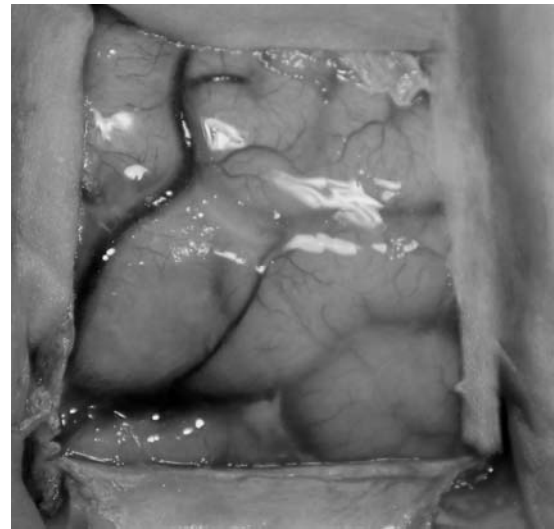


Fig. 2. The exposure of the sulci after craniotomy



Fig. 3. Chose of a sulcus in which there were no large veins.



Fig. 4. Dissection of the sulcus.

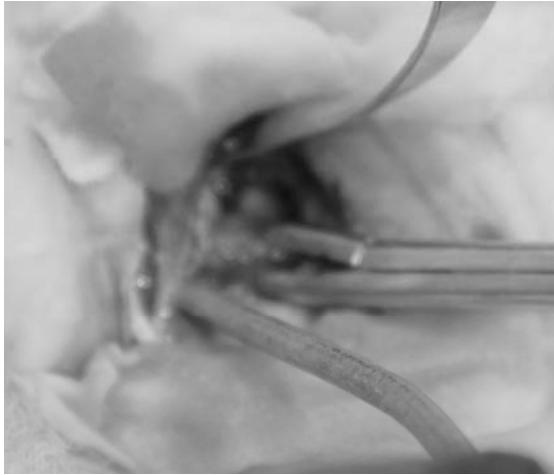


Fig. 5. Exterpation of the metastase.



Fig. 6. The sulcus after the dissection.

RESULTS AND DISCUSSION

The surgical interventions for the 61 patients through trans-sulcal microsurgical access went without any complications. Several authors have suggested that the shortest, linear, transcerebral route through normal tissue to lesion should not be followed, but a cisternal pathway, which will maintain the integrity of normal tissues should be used (6). This is confirmed by our cases in which, in the early post-surgical period, all patients experienced a regress of the neurological deficit and improvement of the overall condition (fig. 7). This corresponds with the results of using transsulcal approach to intracerebral lesions by many authors (6, 7, 8, 9)

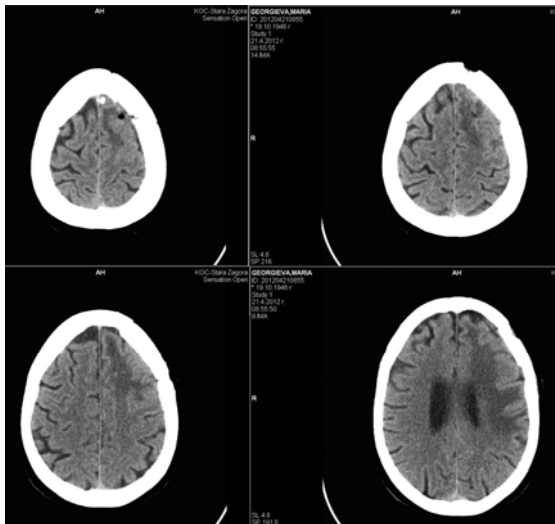


Fig. 7. Post-operative CT.

CONCLUSIONS

1. The trans-sulcal microsurgical approach ensures less traumatic surgical interventions.
2. Preserves as much as possible the physiological and anatomical structures of the cerebrum.

3. The surgical intervention creates the least amount of discomfort for the patient.
4. The recovery post-surgical period is fast and with minimum complications.

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