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Establishing the Proper Approach to an Effective Surgical Treatment for Meningioma

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ABSTRACT

Statement of the Problem: *Meningiomas are benign extra-axial tumors, originating from the meningeal arachnoidal cells, making up 20% of the intracranial primary tumors. Surgical management of meningiomas is one of the most challenging procedures posing a high risk of affecting the critical neurovascular centers of the brain. Our study attempts to identify the way paraclinical brain investigations coupled with a well-established surgical procedure lead to an efficient and strategic treatment of meningioma, starting with a case of a 50-year-old woman.*

Case presentation: *The clinical background of the patient included frontal headaches, rare epileptic crises, and sudden dizziness. In addition to the MRI which presented a homogenous irregular expanding tumor process in the frontal-orbital left space, several other investigations such as Digital Angiography and Computed Tomography were performed. The treatment was mainly focused on the neurosurgical intervention, having several purposes: rejecting the meningioma, establishing the anatomopathological diagnosis and developing the therapeutic plan. The surgical approach involved a step-by-step incision, tumor fragmentation and Simpson 2 excision. The final result was favourable – the patient regained her balance.*

Conclusion & Significance: *Getting a better understanding of the neurosurgical steps of treating meningiomas will lead to finding strategies that will improve the patient's treatment and his quality of life.*

Keywords

Meningioma, Neurosurgery, Tumor, Sphenoid.

Introduction

Meningiomas are benign extra-axial tumors, originating from the meningeal arachnoidal cells, making up 20% of the intracranial primary tumors [1]. According to World Health Organisation, meningiomas are classified into three categories: benign - grade I (occuring in 80% of cases), atypical - grade II (4-15% of cases) and malignant - grade III (1-3% of cases) [2-3]. Surgical management of meningiomas is one of the most challenging procedures posing a high risk of affecting the critical neurovascular centers of the brain. This study attempts to identify the way paraclinical brain investigations coupled with a well-established surgical procedure lead to an efficient and strategic treatment of meningioma, starting with a real case of a 50-year-old woman.

Case Report

Symptoms and Clinical Investigations

The clinical background of the patient included frontal headaches, rare epileptic crises, sudden dizziness, blurry vision, loss of equilibrium and exhaustion. The paraclinical investigation consisting of a contrast MRI revealed a homogenous irregular expanding tumor process in the frontal-orbital left space (dimensions: 34/32/27 mm; compressing the front horn of the left ventricle; associated with perilesional edema). Localization, depth, diameters were also determined through MRI (Figure 1). Moreover, Digital Angiography (Figure 2) was used to identify the source of vascularisation, highlighting a slight displacement of the arterial irrigation of Willis Polygon towards the tumoral process. These symptoms and investigations led to the diagnosis of sphenoid left wing meningioma.

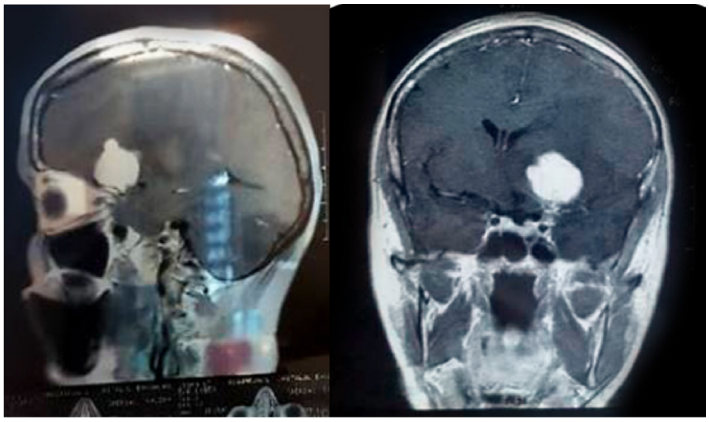

Figure 1: MRI, sagittal and coronary sections revealing an irregular tumor compressing the front horn of the left ventricle, associated with perilesional edema.

Figure 2: Digital Angiography.

Treatment

In our case, the treatment was mainly focused on the neurosurgical intervention, having several purposes: rejecting the meningioma, establishing the anatomopathological diagnosis, developing the therapeutic plan. The surgical procedure included the following steps: positioning, incision, craniotomy, tumor exposure, devascularization, decompression, extracapsular dissection, tumor removal and closure. The surgical approach was on the frontotemporal side and after a step-by-step incision, the tumor was exposed. The excision strategy was focused on fragmentation and mild dissection of the surrounding brain tissue. Also, while the tumor surface coagulated constantly, it lost volume and allowed an easy dissection. After the dissection of its margins, the dura mater from the anterior clinoid process is coagulated and Simpson 2 excision (in this case) is performed. An important surgical moment which follows this removal is the dissection of the tumor surrounding the Internal Carotid Artery and its branches. If the tumor invades the adventitia of the artery, gentle scraping using spatulas is necessary. Finally, after the tumor removal neurovascular structures are visualized. Cranioplasty is performed and the tissues are sutured back.

Postoperatory Evolution

The patient accused slight dizziness in the first days following the surgery, but afterwards her health significantly improved (Figure 3).

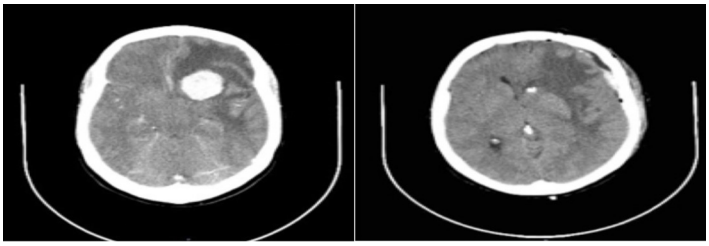

Figure 3: Axial section CT, Preoperative examination - one day before surgery and postoperative examination - first day after surgery.

Discussion

Sphenoid wing meningiomas are slow growing tumors that could develop on any part of sphenoid bone, being part of the cerebral tumors with the highest variety of etiology and evolution within the brain.

Depending on their expansive development pace, different types of surgical resections were described in literature and included in specific gradings. Over years, it has been largely accepted that there is a strong connection between the extent of resection and the tumor recurrence (SIMPSON 1957) [14]. According to the Simpson's classification there are two severe types of tumors (grade 1&2). The first case involves the complete removal, including resection of the underlying bone and dura, while in the second case only removal and coagulation of the attachments are performed. While these types of procedures plead for a radical surgical approach, on these days surgeons are looking for integrating a more conservative approach in the treatment of meningiomas. Two factors that are discussed are morbidity associated with large meningiomas resections and operation time. Considering these factors, many believe that a more conservative treatment in combination with radiosurgery can be used to successfully control difficult meningioma cases.

In case of a meningioma diagnosis, favorising and risk factors have to be analysed. Studies have shown that hormone intake such as cyproterone acetate (a synthetic steroidal antiandrogen) increases the risk of developing meningiomas, along with radiation exposure with a dose-response relationship [4-7]. Thus, the first step is the disruption of these factors, followed by the clinical and radiological follow-up. In some patients diagnosed with meningiomas, 80% decrease in the tumor volume was reported after hormone therapy interruption. Moreover, meningiomas spontaneously decreased after pregnancy [9-11]. Radiation therapy, systemic therapy and surgery are the available treatment options for treating meningioma. The surgical procedure was the best treatment option for our patient

taking into consideration the symptoms and the dimensions of the tumor. In case of an extensive skull base meningioma enclosing cerebral arteries, internal carotids and cranial nerves, resection surgery is not possible. Systemic treatment and radiotherapy are taken into consideration in this case in order to bring clinical benefits. [3]

Conclusion

Getting a better understanding of the neurosurgical steps of treating meningiomas will lead to finding strategies that will improve the patient's treatment and his quality of life.

References

1. Mendenhall W M, Friedman W A, Amdur R J, et al. Management of benign skull base meningiomas: a review. Skull base: official journal of North American Skull Base Society ... [et al.], 2004; 14: 53-60.
2. Louis DN, Perry A, Reifenberger G, et al. The 2016 World Health Organization classification of tumors of the central nervous system: a summary. Acta Neuropathol. 2016; 131: 803-820.
3. Caroline Apra, Matthieu Peyre, Michel Kalamarides. Current treatment options for meningioma, Expert Review of Neurotherapeutics. 2018.
4. Gazzeri R, Galarza M, Gazzeri G. Growth of a meningioma in a transsexual patient after estrogen-progestin therapy. N Engl J Med. 2007; 357: 2411-2412.
5. Gil M, Oliva B, Timoner J, et al. Risk of meningioma among users of high doses of cyproterone acetate as compared with the general population: evidence from a population-based cohort study. Br J Clin Pharmacol. 2011; 72: 965-968.
6. Carlberg M, Hardell L. Pooled analysis of Swedish case-control studies during 1997–2003 and 2007–2009 on meningioma risk associated with the use of mobile and cordless phones. Oncol Rep. 2015; 33: 3093-3098.
7. Claus EB, Black PM, Bondy ML, et al. Exogenous hormone use and meningioma risk: what do we tell our patients? Cancer. 2007; 110: 471-476.
8. Joung H Lee. Meningiomas: Diagnosis, Treatment, and Outcome. Springer Science & Business Media. 2008; 3-13.
9. Cebula H, Pham TQ, Boyer P, et al. Regression of meningiomas after discontinuation of cyproterone acetate in a transsexual patient. Acta Neurochir (Wien). 2010; 152: 1955-1956.
10. Botella C, Coll G, Lemaire J-J, et al. [Intra cranial meningiomas and long term use of cyproterone acetate with a conventional dose in women. A report of two cases of tumor decrease after treatment withdrawal]. Neurochirurgie. 2015; 61: 339-342.
11. Bernat AL, Oyama K, Hamdi S, et al. Growth stabilization and regression of meningiomas after discontinuation of cyproterone acetate: a case series of 12 patients. Acta Neurochir (Wien). 2015; 157: 1741-1746.
12. Yang SY, Park CK, Park SH, et al. Atypical and anaplastic meningiomas: prognostic implications of clinicopathological features. Journal of Neurology, Neurosurgery, and Psychiatry. 2008; 574-580.
13. Adult Central Nervous System Tumors Treatment. National Cancer Institute. 2016.
14. https://radiopaedia.org/articles/simpson-grade
15. Wiemels J, Wrensch M, Claus EB. Epidemiology and etiology of meningioma. Journal of neuro-oncology. 2010; 307-314.
16. World Cancer Report 2014. World Health Organization. 2014.