MULTIPLE INTRACRANIAL MENINGIOMAS: A CASE REPORT AND A LITERATURE REVIEW

Nguyen Xuan Phuong[1], Tran Manh Cuong[1]

Summary

Multiple intracranial meningiomas refer to the presence of multiple meningiomas in multiple intracranial locations in the same patient without signs of neurofibromatosis. The incidence varies from 1% to 10%. Despite the diversity, the prognosis of multiple intracranial meningiomas has no difference from that of benign solitary meningioma. However, malignant tumors of different grades are observed to occur simultaneously in one-third of multiple meningiomas. Surgery is still the best choice for the treatment of symptomatic lesions. Our case review aims to introduce and discuss a 50-year-old female patient diagnosed with multiple intracranial meningiomas, and to describe its clinical, radiological, and histological characteristics. It also emphasizes that the patient had four tumors, underwent surgery, and had a good long-term overcome.

* *Keywords:* Multiple intracranial meningiomas; Microsurgery.

INTRODUCTION

Cushing and Eisenhardt [1], in 1938, were the first to point out the definition of meningioma. Their explanation closely resembled our contemporary understanding of the frequency of meningiomas by location. They defined multiple meningiomas as "at least two spatially separated meningiomas in a patient without signs of neurofibromatosis" [1]. The incidence of multiple meningiomas, defined by Cushing and Eisenhardt, is about 1 to 2% of all meningioma cases, and these results are comparable to those obtained by other authors [1].

[1]Military Hospital 103

Corresponding author: Nguyen Xuan Phuong (xuanphuong.pttk@gmail.com)

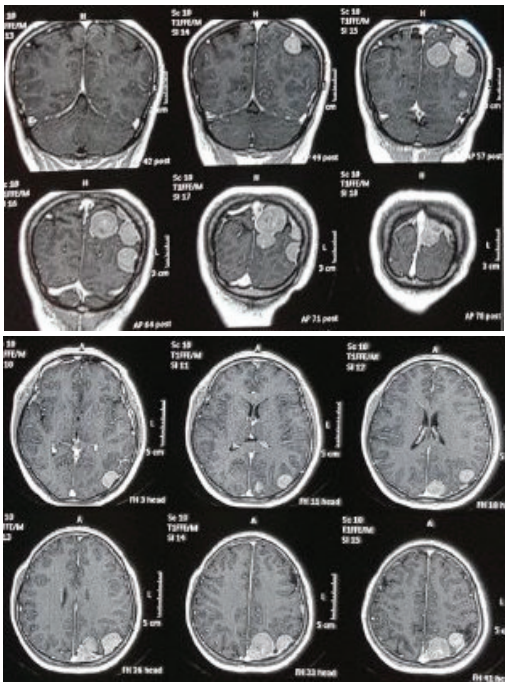
Date received: 03/8/2022

Date accepted: 17/8/2022

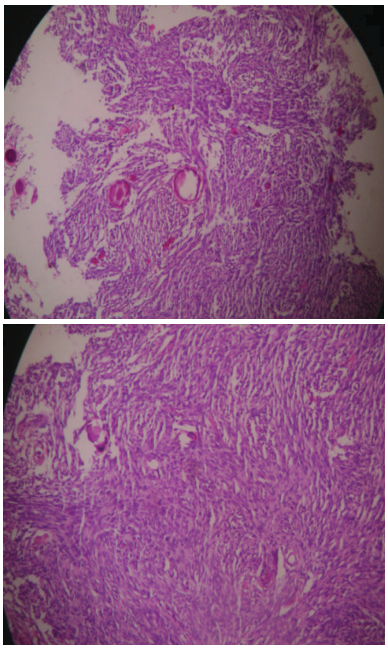
http://doi.org/10.56535/jmpm.v47i7.85

CASE REPORT

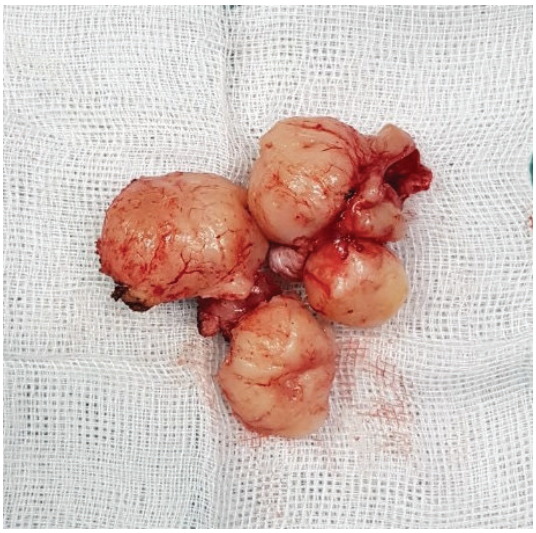
A 50-year-old female patient presented with a six-month history of headache, nausea and a change in facial sensation. She had no stigmata of neurofibromatosis. Central nervous system examination revealed a reduced sensation on the left side, a GCS of 15/15, and all cranial nerves were normal. T1W, T2W, and FLAIR magnetic resonance imaging scans (MRI) sequences showed well-circumscribed hyperintense lesions in the parasagittal falx and the left parietal hemispheric (*Figures 1(a) and 1(b)*). None of these tumours showed a significant mass effect. The MRI features of the four lesions were highly suggestive of multiple meningiomas. The patient was examined in the neurosurgery clinic and scheduled for a left parietal craniotomy to remove all tumours. The tumor removal was at Grade 1 by Simpsons. Histological examination revealed a lesion composed of many fibroblast cell plates separated by collagen bundles (*Figures 2(a) and 2(b)*). The patient improved remarkably with no headaches postoperation. The patient's first follow-up was normal and scheduled for a second follow-up with a repeat MRI at 6 months.



Figures 1: T1W images showing meningiomas in the parasagittal falx and left parietal hemispheric (a) and (b).



Figures 2: Histology results show a fibroblastic meningioma (a) and (b).



Figures 3: Four tumours removed.

DISCUSSION

Meningioma is a tumor originating from arachnoid cells, granulation, perivascular space matrix, and choroid plexus, making up 13% to 20% of all intracranial tumors [2]. The definition of multiple intracranial meningiomas should only be used when two or more meningiomas occur simultaneously or sequentially in different locations [3]. The first citation shows an incidence of only 1% to 2%. With the introduction of CT and MRI, this rate has increased [4]. With the advent of MRI, the incidence has been reported to be higher because MRI is more helpful than CT in detecting tumors, especially tumors located in the posterior fossa, skull base, and higher apex areas, especially when they are small.

Kyoi et al. [5] encountered two patients with multiple meningiomas at their clinic. Locatelli et al. [6] reported ten cases of multiple meningiomas out of 227 intracranial meningiomas from 1977 to 1984. All the patients were female in this particular series and underwent CT before the operation. Domenicucci et al. [7] reported 14 cases of multiple intracranial meningiomas, amounting to 1.1% of all meningiomas operated on at their hospital in the last over 35 years. In their series, they noted that since the introduction of CT scanning, the frequency of these cases has gone up from 0.58% to 4.5% in the authors' meningioma series. Gelabert-Gonzalez et al. [8] reported 13 cases of multiple intracranial meningiomas consecutively operated on at their hospital between 1983 and 2003. In this particular series, all the patients experienced CT-scans, and the last 10 patients were under MRI. Of all the patients, there were no manifestations of von Recklinghausen disease. Most of these multiple meningioma cases showed multiple lesions at the time of operation or after a few years of the initial operation.

One of the crucial relevant etiological factors [9] in the development of meningiomas is genes. Studies have reported that the deletion of chromosome 22 in patients to type 2 neurofibromatosis, and up to 50% of solitary menin-giomas are related to the appearance of multiple meningiomas.

The second etiological factor is hormones. Many studies show a higher frequency rate of meningiomas in women. One associated factor is the action of progesterone on progesterone receptors, which is found in 80% of meningiomas, leading to an increase during the luteal phase of the menstrual cycle and pregnancy [10]. In our case review, the patient was postmenopausal. Further endocrinological, genetic, and epidemiological studies should be performed to establish the pathogenesis of multiple meningiomas in this age group.

The location of the tumours can be varied. Theire tumors tend to be in unilateral the hemisphere. The most common locations were the supratentorial convexity and the parasagittal falx, whereas multiple meningiomas situated in the posterior fossa are rare [11]. In our case review, two tumours were located at the parasagittal falx and the others were in the left parietal hemisphere.

By histology, multiple meningiomas do not differ from the solitary types [7]. However, the simultaneous occurrence of different malignancy grades in the nodules is observed in one-third of multiple meningiomas [12]. The most common histological types reported in multiple meningiomas include psammomatous, fibroblastic, meningothelial, and transitional types [13]. In our case review, the histological type was a fibroblastic meningioma.

The treatment and prognosis of multiple meningiomas do not differ from those of solitary benign tumors. Surgery is one of the chosen treatments for multiple menin-giomas and depends on: symptomatic meningioma, asymptomatic meningioma greater than 3 cm in size and surgically accessible, and symptomatic expanding tumor [14]. Each tumor should be approached individually, and the mere presence of multiple tumours does not influence the removal.

Since it is well documented that multiple intracranial meningiomas often have benign histology, the prognosis is good and similar to solitary meningiomas. Some studies have shown no recurrence at follow-up [3, 7, 13].

CONCLUSION

Multiple meningiomas are rare and often appear in females. Their location can be varied and the most common is in the posterior fossa. The histological subtypes are similar to the solitary types, with the high rate of psammomatous, fibroblastic, meningothelial, and transitional types. The first treatment is surgically resected expansive tumours with edema and subsequent follow-up of small asymptomatic tumours.

REFERENCES

1. Cushing H., and L. Eisenhardt. (1938). Meningiomas: Their Classification, Regional Behaviour, Life History and Surgical End Result. Charles C Thomas, Springfield, Ill, USA,.

2. Russel S D., and L. J. Rubinstein. (1977). Pathology of Tumors of the Nervous System. Williams and Wilkins, Baltimore, Md, USA.

3 Turgut M., Palaoglus S., smam, and G. Gurcay, et al. (1997). Multiples Meningiomas of the central nervous system without the stigmata of neurofibromatosis: clinical and therapeutic study. *Neurosurgical Review*; 20 (2): 117-123.

4. Butti G., Assietti R., et al. (1989). Multiple Meningiomas: A clinical, surgical, and cytogenetic analysis. *Surgical Neurology*; 31(4): 255-260.

5. Kyoi. K., Yokoyama, T., Hoshida et al. (1983). Mulitiple Menin- gioma. *No Shinkei Geka*; 11(10): 1099-1105.

6. Locatelli D., Bottoni A., Uggetti C., and Gozzoli L. (1987). Multi- ple Meningiomas evaluated by computed tomography. *Neurochirurgia;* 30(1): 8-10.

7. Domenicucci M., Santoro A., et al. (1989). Multiple intracranial Meningiomas. *Journal of Neurosurgery;* 70(1): 41-44.

8. Gelabert-Gonzalez., R.Leira-Muino., J.M.Fernandez-Villa M., et al. 2003. Multiple intracranial Meningiomas. *Revista de Neurologia*; 37(8): 717-722.

9. Black P., Morokoff A., Zauberman J., Claus E., and Carroll R. (2007). Meningiomas: Science and surgery. *Clinical Neurosurgery*; 54: 91-99.

10. Gruber T., Dare A., Balos L., Lele S, and Fen- stermaker R. (2004). Multiple Meningiomas arising during long-term therapy with the progesterone agonist megestrol acetate: Case report. *Journal of Neurosurgery*; 100(2): 328-331.

11. Kim T. S., Park J. K., Jung S., et al. (1997). Multiple intracranial Meningiomas. *Journal of Korean Neurosurgical*; 26 (12): 1685-1691.

12. Mocker K., Holland H., Ahnert P., et al. (2011). Multiple meningioma with different grades of malignancy: Case report with genetic analysis applying single-nucleotide polymorphism array and classical cytogenetics. *Pathology Research and Practice*; 207 (1): 67-72.

13. Eljamel M. S. M and Foy P. M. (1989). Multiple Meningiomas and their relation to neurofibromatosis. *Surgical Neurology*; 32(2): 131-136.

14. Sheehy J. P. and Crockard H. A. (1983). Multiple Meningiomas: A long-term review. *Journal of Neurosurgery*; 59(1): 1-5.