Pediatric Meningioma: A Single-center Experience with Fifteen Consecutive Cases

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Introduction

Meningiomas are uncommon childhood tumors. Cushing and Eisenhardt's 1938 monograph meticulously categorized meningiomas, including their presentation, clinical outcome, and surgical strategies, and recognized the occurrence of child and adolescent meningioma separately [1]. Management approaches have been drawn from such reports and extrapolated from the treatment of adult meningiomas [2], without clear, statistically validated guidelines for the management of child and adolescent meningiomas. Most tumors are sporadic. However, risk factors for the development of meningiomas include history of radiation therapy (RT) or diagnosis of neurofibromatosis type 2 (NF2).

This report is an attempt to evaluate clinical and pathological features and surgical outcome in a single-center series of pediatric patients who underwent surgery for the treatment of meningiomas in the context of published literature.

Methods

Clinical data of 15 patients under 18 years of age operated on for meningiomas from January 1994 to December 2010 were reviewed.

This study was approved by the Research Ethics Committee of the University Hospital of Ribeirao Preto Medical School—USP (Proc. 6591/2007).

Results

The study group included nine males and six females (mean age of 13 years at surgery). The most common symptoms at presentation were headaches in 6 out of 15 (40 %), raised intracranial pressure in 3 out of 15 (20 %), and seizures in 3 out of 15 (20 %). Sole operated tumors were found in 12 out of 15 (80 %), whose location is as follows: parasagittal in 4 out of 12 (33.3 %), 2 in the convexity (16.6 %), 2 at the skull base (16.6 %), and 4 in other sites (33.3 %). Six children presented with radiation-induced (RT) meningiomas and five had evidence of neurofibromatosis type 2 (NF2). Three patients had multiple meningiomas (all of them had NF2.). Simpson's grade I excision was achieved in 12 out of 15 (80 %). On histopathology, 11 out of 15 (73.3 %) were grade I and 4 out of 15 (26.6 %) were grade II (all of them atypical). Five tumors (33.3 %) recurred, four of which had RT or NF2. During the mean follow- up period of 5 years, 12 out of 15 (80 %) had a good outcome (GOS = 5)

Conclusions

Intracranial meningiomas are uncommon in the pediatric population. They have a male predominance and show higher rates of atypical features when compared with adult meningiomas. Total resection is associated with a better prognosis, and should always be attempted. RT should be reserved to selected cases.

Location, associated factors (RT/NF2), and extent of excision appear to be more important than histology in predicting outcome.

Learning Objectives

By the conclusion of this session, participants should be able to: 1) Describe the importance of meningioma in pediatric series and associate factors as RT and NF2, 2) Discuss, in small groups specific considerations for children 3) Identify an effective treatment for meningioma in pediatric patients

References

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2-Rushing EJ, Olsen C, Mena H, Rueda ME, Lee YS, Keating RF, Packer RJ, Santi M (2005) Central nervous system meningiomas in the first two decades of life: a clinicopathological analysis of 87 patients. J Neurosurg 103 (Pediatrics 6 Suppl):489–95

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Pediatric meningiomas: a single-center experience with 15 consecutive cases and review of the literature.

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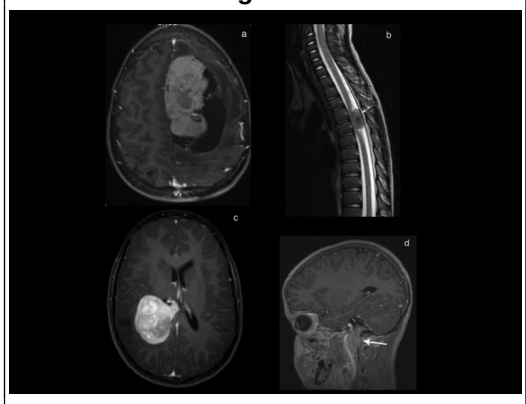
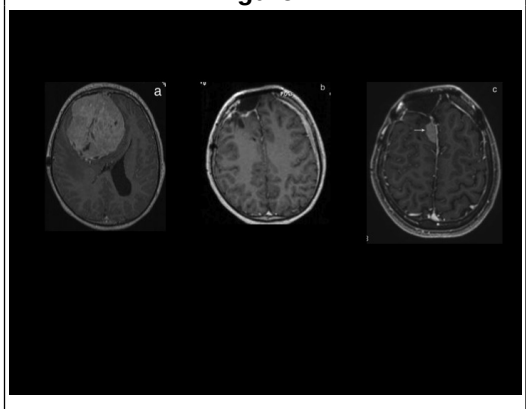
Figure 1



(a) cystic meningioma in a 5-yr-old girl; (b) an intradural D4–D5 meningioma in a 6-yr-old boy with NF2; (c) an intraventricular meningioma in an 11-yr-old girl; (d) a jugular foramen meningioma in a 12-yr-old boy with NF2

Figure 2



Radiation induced meningioma (a) Fronto parietal parasagittal meningioma; (b) post-resection with no residual lesion; (c) follow-up 12 months post-surgery showing recurrence of the tumor (arrow)