Surgical management of giant intracranial meningioma: operative nuances, challenges and outcome

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Introduction

The surgery of giant intracranial meningioma [GIM] is unique and technically challenging due to its large size, prominent vascularity, limited visualisation and entangling of various neurovascular structures and severe cerebral edema. The study reports the authors surgical experience of 80 GIM cases, the operative challenges as well as surgical outcome and various factors influencing survival.

Methods

A retrospective analysis of 80 patients of histologically proven meningioma of size 5cm who underwent surgical treatment at LSU Health Sciences Center, Shreveport, Louisiana, USA over twenty year period is presented. The clinical and radiological data were collected and the tumours were categorised into histological groups according to WHO classification.

Results

The study included 27 males[33.8%] and 53 females [66.3%]. The mean age of the cohort was 56 years. The mean size of the tumor was 56.4 mm with a range from 50 mm to 84 mm. Skull base was the most common location[57 patients, 71.3%]. Simpson Grade 1 excision was achieved in 9 patients [11.3%] whereas Grade 2 excision was achieved in 57 patients [71.3%]. 80% of the tumors belonged to WHO grade 1. The operative mortality was seen in 4 patients [5%]. Regression analysis showed age, sex, location of the tumor, neuronavigation, Simpson grade of excision and histology of tumor were the factors which significantly affected the recurrence free survival[RFS].

Conclusions

The surgery for GIM is unique in different ways due to various reasons. The surgical outcome of GIM is worse when compared to non-GIM tumors. As surgery for GIM is formidable, radiological characteristics can be useful adjuncts for planning an effective and safe surgical strategy. Safe-maximal resection should be the goal especially for GIM located at skullbase. The factors such as young age, male sex, use of neuronavigation and skullbase location positively influence RFS while Simpson Grade of excision [Grade 3/Grade 4] and poor histological grade adversely influence the survival. A careful pre-operative evaluation, understanding of the risk factors, effective surgical approach and judicious use of intra-op adjuncts are the key factors which play a

References

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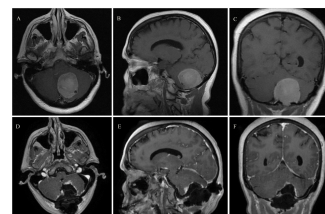
Figure file

Figure 2: Pre and post-operative contrast enhanced MRI images of giant posterior fossa meningioma in a 65 year old female presented with occipital headache and cerebellar ataxia A, B, C- Pre-operative axial, sagittal and coronal images respectively D, E, F- Post-operative axial, sagittal and coronal images respectively

Learning Objectives

1. Advanced surgical nuances vs technical challenges in Giant intracranial meningioma resection.
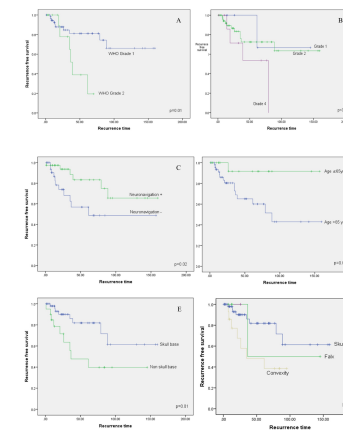2. Prognostic factors of GIM tumors.

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Figure 3: Kaplan- Meier [KM] plot showing the correlation between various factors and recurrence free survival [RFS]

A. WHO histological grade and RFS

B. Simpson grade of excision and RFS

C. Per-op navigation use and RFS

D. Age of patient and RFS

E. Tumor location [skullbase vs non-skullbase] and RFS

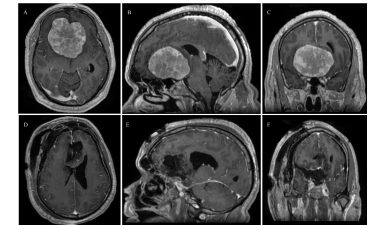F. Tumor location and RFS

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Figure 1: Pre and post-operative contrast enhanced MRI images of giant anterior skullbase meningioma in a 58 year old male presented with raised ICP symptoms and vision disturbances.

A, B, C- Pre-operative axial, sagittal and coronal images respectively

D, E, F- Post-operative axial, sagittal and coronal images respectively