Key Hole Approaches to Giant Anterior Fossa Meningiomas

Mohammed Ouwais Abdul Sattar, Melissa de Gouveia, Senyabu Bridged Tshutshu-Phalane, Frank Mmbidi, Teshar Sen Ramkisson, Christos Profyris, MD, Prof; Helen Joseph Hospital/ Netcare Milpark Hospital

ABSTRACT

Based on the location and size of anterior fossa meningiomas, there are a multitude of potential approaches and philosophies to surgical resection. This presentation explores the implementation of keyhole approaches to large and difficult anterior fossa meningiomas and explores decision making in tailoring a keyhole to specific meningioma sub-locations. Comparison between the use of endoscopy as a sole resection strategy versus endoscopic assistance will also be explored.

This presentation will explore the authors personal case series of keyhole approaches as applied to anterior fossa meningiomas. A retrospective review of the authors keyhole meningioma series was conducted, analysing pathology, approaches and results. 49 keyhole approaches for anterior fossa meningioma resections were conducted. 19 of the 49 meningiomas were sized above 6cm and termed giant meningiomas. The supraorbital approach was used in 42 patients, the mini-pterional approach was used in 2 patients and an extended endonasal approach in 5 patients. Gross Total resection was achieved in 45 of 49 patients and near total resection was achieved in 4 patients. Surgical videos and cases will be presented as illustrative examples.

Conclusions: Keyhole approaches to meningioma surgery are a viable operative strategy with a potential for excellent oncological results.

INTRODUCTION

Anterior fossa meningiomas vary significantly in size and location, necessitating tailored surgical approaches.
Keyhole techniques provide a minimally invasive yet effective strategy for resecting large anterior fossa meningiomas.
This study examines the application of keyhole approaches in addressing giant meningiomas (>6 cm), focusing on surgical decision-making and outcomes.

METHODS AND MATERIALS

Study Design: Retrospective review of a single surgeon's keyhole meningioma case series.
Patient Cohort:
- Total cases: 49
- Giant meningiomas (>6 cm): 19

Keyhole Approaches:
- Supraorbital: 42 cases
- Mini-pterional: 2 cases
- Extended endonasal: 5 cases

Outcome Metrics: Gross Total Resection (GTR), Near Total Resection (NTR), complications.

RESULTS

Gross Total Resection (GTR): Achieved in 45/49 cases (91.8%).
Near Total Resection (NTR): Achieved in 4/49 cases (8.2%).
Approach-Specific Insights:
- Supraorbital approach: Predominantly used for tumors with lateral and superior extensions.
- Mini-pterional approach: Reserved for tumors with more lateral spread.
- Extended endonasal approach: Applied in select cases of midline, inferiorly extended tumors.

CONCLUSION

Keyhole approaches are a safe and effective strategy for anterior fossa meningioma resections, even for giant tumors.
High rates of GTR with minimal invasiveness Selection of the surgical approach must be tailored to tumor-specific characteristics, including: Size and location: Lateral/superior extensions favor supraorbital or mini-pterional approaches. Midline/inferior extensions may benefit from extended endonasal approaches. Decision-making frameworks should integrate imaging findings and surgical expertise

FIGURE 1

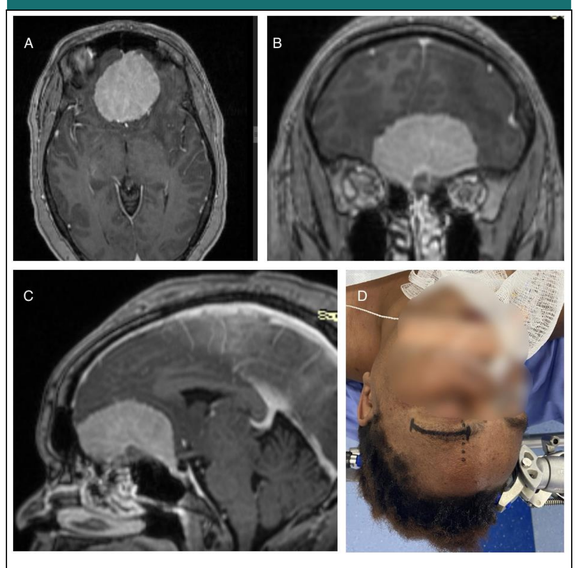


Figure 1: Imaging and Surgical Approach for a Giant Tuberculum Sella Meningioma
A - Axial T1-weighted contrast-enhanced MRI
B - Coronal T1-weighted contrast-enhanced MRI
C - Sagittal T1-weighted contrast-enhanced MRI
D - Preoperative image of patient positioning for the supraorbital keyhole approach, highlighting the planned incision

FIGURE 2

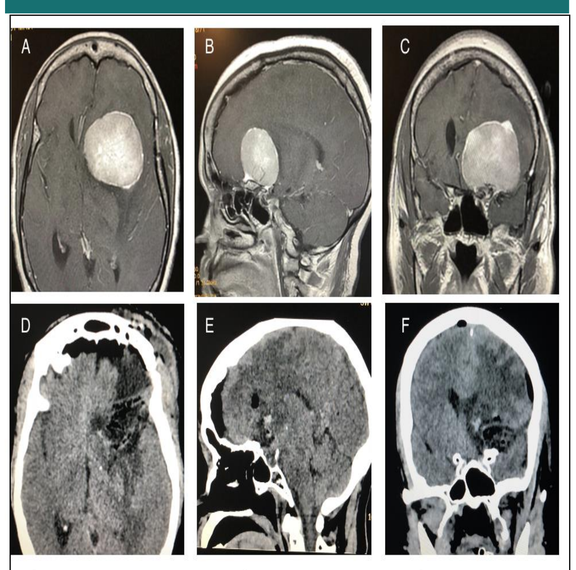


Figure 2: Pre and Post operative imaging of an Olfactory Groove Meningioma
A - Axial T1-Weighted MRI (Preoperative)
B - Sagittal T1-Weighted MRI (Preoperative)
C - Coronal T1-Weighted MRI (Preoperative)
D- Axial CT Scan (Postoperative)
E - Sagittal CT Scan (Postoperative)
F - Coronal CT Scan (Postoperative

FIGURE 3

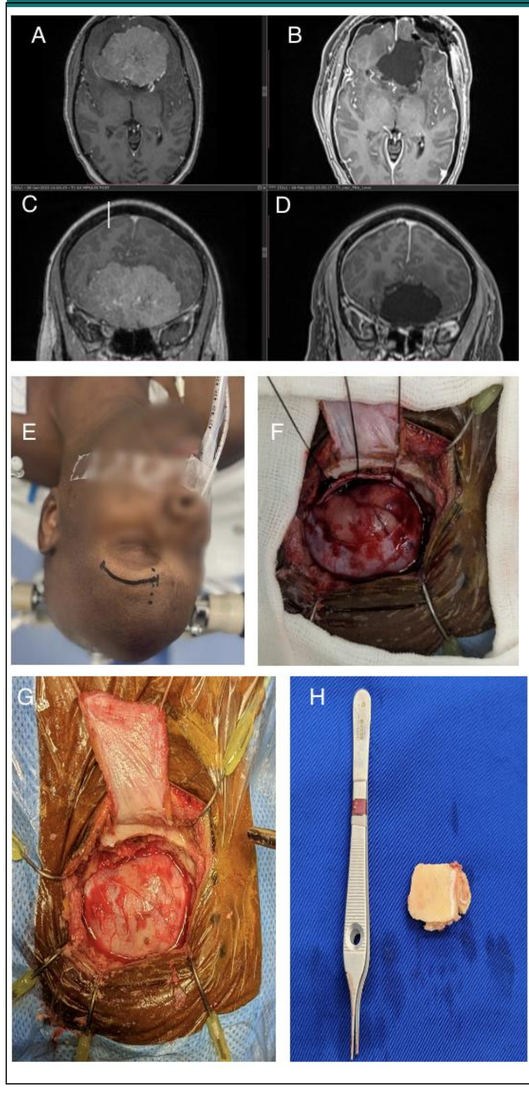


Figure 3 : Imaging, Positioning, and Intraoperative Details of Keyhole Resection for a Giant Anterior Fossa Meningioma

A - Preoperative Coronal T1 MRI
B –Postoperative Axial T1 MRI with Contrast
C – Preoperative Coronal T1 MRI
D - Postoperative Axial T1 MRI
E - Preoperative Patient Positioning
F - Intraoperative View
G - Intraoperative View
H - Bone Flap

FIGURE 4

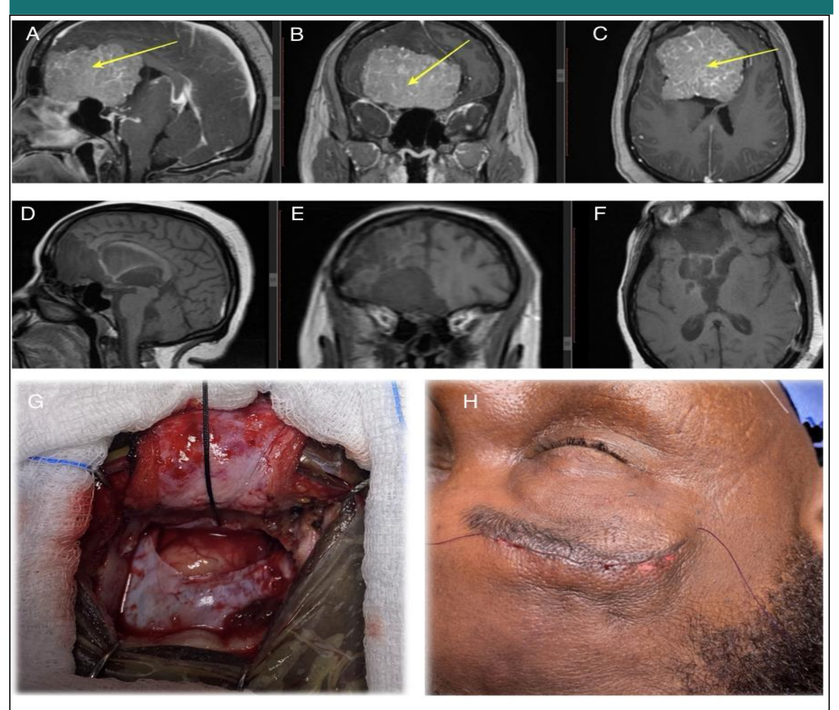
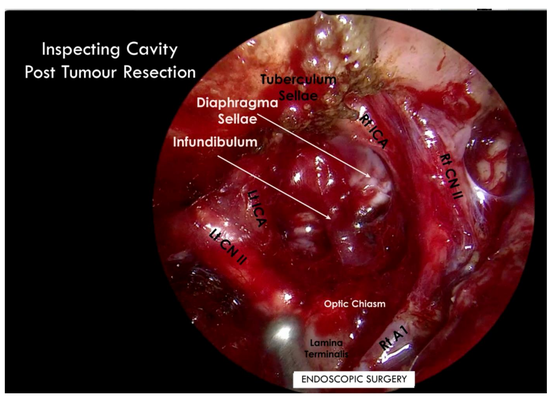


Figure 4: Imaging, Positioning, and Intraoperative Details of Keyhole Resection for a Giant Anterior Fossa Meningioma
(A–C) Pre-operative T1-weighted MRI scans demonstrating a large suprasellar mass. (A) Sagittal view, (B) coronal view, and (C) axial view (yellow arrows). (D–F) Post-operative T1-weighted MRI scans (D) Sagittal view, (E) coronal view, and (F) axial view. (G) Intraoperative image (H) Post-operative image of surgical wound

VIDEO 1

Video 1: Intra-operative video showing resection of tuberculum sella meningioma via keyhole approach



https://drive.google.com/file/d/1PiXERyxjtaXYEVS-6FsYl-I3ll0vrAbO/view?usp=share_link

WITS UNIVERSITY 100 1922 2022

WITS NEUROSURGERY