

Pterional and Frontotemporal-orbitozygomatic Approaches: Surgical Outcome and Determination of Predictors of Recurrence for Sphenoid Wing Meningiomas

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Introduction

The pterional/frontotemporal orbitozygomatic (FTOZ) approaches are the two widely used procedures for resection of sphenoid wing meningioma. However, a comparison of outcomes and complications after pterional approach with FTOZ approach has not been well described in the existing literature. Here, we investigated the outcomes, complications and predictors of favorable outcomes of these two approaches in the patients with sphenoid wing meningioma.

Methods

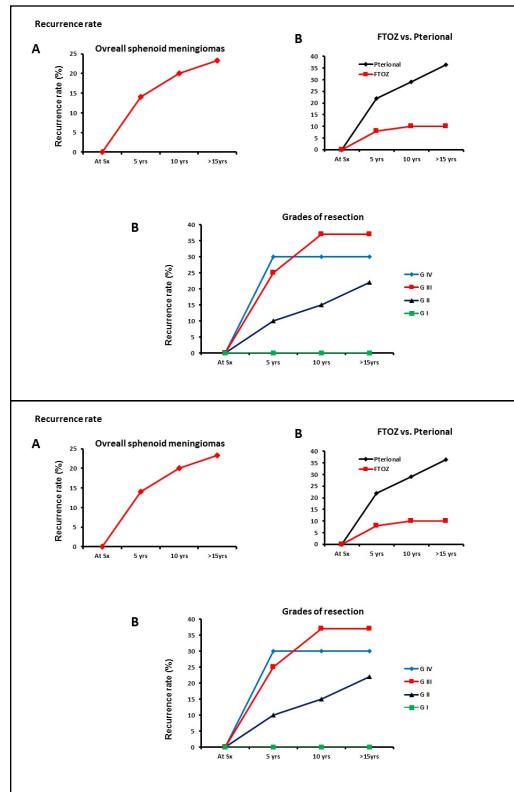
Information related to clinical history, neuroimaging studies, and microsurgical dissection: approaches and extent of resection and outcomes of 90 consecutive cases with sphenoid wing meningiomas between 1995 and 2015 was collected retrospectively. A Kaplan-Meier survival analysis and Cox proportional hazards regression model was used to determine the recurrence-free (RFS) survival and independent predictor of RFS.

Results

In this study, the overall recurrence rate after tumor excision with pterional and FTOZ approaches was 36.5% and 12.2% respectively ($p=0.001$). Based on surgical approach, the median RFS of the patients with sphenoid wing meningiomas also varied significantly (pterional, 114 months vs. FTOZ, 145 months, $p=0.03$). The median RFS for patients with sphenoid wing meningiomas also varied according to the extent of resection (gross total resection, 146 months vs. sub-total resection, 52 months, $p=0.009$). In Cox regression analysis, FTOZ approach ($p=0.041$), gross total resection ($p=0.047$), and Karnofsky performance score (KPS) >70 ($p=0.04$) were revealed as significant predictors of favorable outcome after resection of sphenoid wing meningiomas.

Conclusions

Depending on involvement of neurosurgical structures, surgical management of sphenoid wing meningioma can be performed into two ways (complete and subtotal resection). Sphenoid wing meningiomas undergoing extensive skull base approach (FTOZ) and gross total resection (GTR) had a low recurrence rate and higher RFS. Even though FTOZ with GTR is preferable to resect the sphenoid wing meningiomas, the procedure should be tailored to each patient depending on the risks and surgical morbidity.



Learning Objectives

Recurrence rate after tumor excision with pterional approach was three times higher than that in frontotemporal orbitozygomatic approach after resection of sphenoid wing meningiomas. Median recurrence-free survival was significantly higher in frontotemporal orbitozygomatic approach (FTOZ, 145 months vs. pterional, 114 months). In Cox regression analysis, FTOZ approach ($p=0.041$), gross total resection ($p=0.047$), and Karnofsky performance score (KPS) >70 ($p=0.04$) were revealed as significant predictors of favorable outcome after resection of sphenoid wing meningiomas.

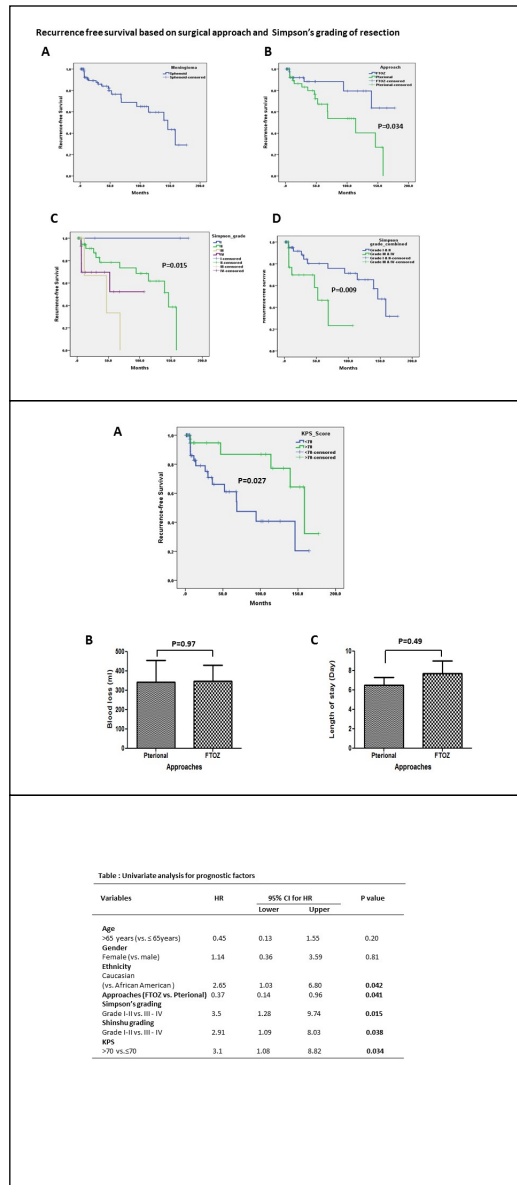


Table 1: Univariate analysis for prognostic factors

Variables	HR	95% CI for HR		P value
		Lower	Upper	
Age				
>65 years (vs. ≤65years)	0.45	0.13	1.55	0.20
Gender				
Female (vs. male)	1.14	0.36	3.59	0.81
Ethnicity				
Caucasian (vs. African American)	2.05	1.03	6.80	0.042
Approach (FTOZ vs. Pterional)	0.37	0.14	0.96	0.041
Simpson's grading				
Grade I (vs. II-IV)	3.5	1.28	9.74	0.015
Skull base grading				
Grade II (vs. III-IV)	2.91	1.09	8.03	0.038
KPS				
>70 vs. ≤70	3.1	1.08	8.82	0.034