



# The Relevance of Simpson and Modified Shinsu Grading in Modern Neurosurgical Treatment of World Health Organization Grade I Meningiomas

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## Introduction

Relation between recurrence of meningioma and extension of resection is still controversial. In 1957, Simpson showed that the extended resection is related to the less the recurrence rate of the meningioma. However, recent study revealed that the benefit of more aggressive attempt to resect the WHO 1 grade meningioma with dura and bone was negligible compared complete tumor resection. In this study, authors discuss the relevance of Simpson and Shinsu grading of resection in predicting the recurrence in their experience.

## Methods

In this cohort, the authors reviewed 459 cases with WHO grade I meningioma who have undergone craniotomy for resection from 1994 to 2014 by review of each patient’s case notes, follow-up chart and radiology reports. We classified our cohort to three groups: convexity, skull base and falx and tent and studied the relevance in this sub group as well. Recurrence rate was analysis using Kaplan-Meier (KM) method.

## Results

KM analysis (KMA) revealed that patients who have under gone Simson’s grade I (p=0.005) showed and modified Shinsu grade I (p=0.001) resection showed significantly less recurrence rate compared to grade II, III, IV/IVA. In univariate analysis, Simson’s grade I resection also revealed the similar results of recurrence (p=0.015). However, Modified Shinsu grade I (p=0.0005, 0.001) and II (p=0.002, 0.035) have significantly less recurrence than Grade III and IVA respectively. There was no significant difference in recurrence rate between groups III an IVA. In KMA, when data was emphasized on the skull base meningioma (n=314), result revealed that the both Simpson’s grade I (p=0.026) and modified Shinsu grade I (p=0.015) resection group have significantly less recurrence than that in other groups.

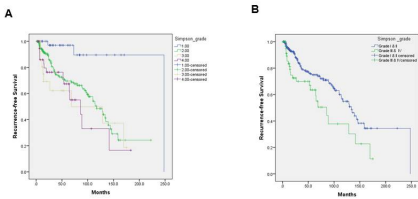
## Conclusions

The result of this cohort revealed that both Simpson’s and modified Shinsu grade I resection plays important role in decreasing the recurrence rate in WHO grade I meningioma even in skull base.

Table 1: patient's demographics	
Variables	Value
Total patients	459
Age	56
Median	13-98
Gender	
Male	127 (27.7%)
Female	332 (72.3)
Ethnicity	
Caucasians	296 (64.5%)
African-Americans	147 (31.8%)
Other	17 (3.7%)
Clinical features	
Headache	289 (65%)
Confusion	47 (10%)
Vision impairment	76 (15.2%)
Seizure	25 (5.4%)
Gait disturbance	42 (8.9%)
Forgetfulness	14 (3.1%)
Associated disorders	
Hypertension	2 (0.2%)

Table 2: Tumor characteristics	
Variables	Value
WHO Grade I	459 (100%)
Locations	
Skull base	338 (69.4%)
Convexity	102 (22.4%)
Falx and tentorial	32 (7%)
Other	7 (1.5%)
Simpson's grading	
Grade I	80 (17.5%)
Grade II	295 (64.2%)
Grade III	32 (7%)
Grade IV	52 (11.4%)
Modified Shinsu grading	
Grade I	73 (16%)
Grade II	312 (68%)
Grade III	21 (4.6%)
Grade IV	53 (11.5%)

Figure1



## Learning Objectives

Recurrence of WHO grade I skull base meningioma is related to Simpson's or modified Shinsu grading of resection

Figure 2

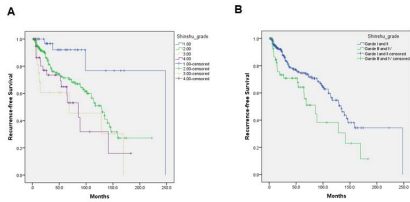


Table 3: Cox regression analysis for prognostic factors

Variables	Univariate HR (95% CI)	P value
Age		
>65 years (vs. <65 years)	0.79 (0.47-1.33)	0.38
Gender		
Female (vs. male)	0.63 (0.38-0.91)	0.016
Ethnicity		
Caucasian (vs. African American)	0.94 (0.66-1.34)	0.73
Simpson's grading		
Overall cases		
Grade I vs. II-IV	0.32 (0.03-0.40)	0.003
Grade I and II vs. III and IV	0.32 (0.32-0.42)	0.005
Skull base meningioma		
Grade I and II vs. III and IV	0.60 (0.36-0.99)	0.047
Convexity meningioma		
Grade I and II vs. III and IV	0.16 (0.04-0.67)	0.012
Shinsu grading		
Overall cases		
Grade I vs. II-IV	5.0 (1.6-16.04)	0.006
Grade I and II vs. III and IV	1.86 (1.16-2.98)	0.010
Skull base meningioma		
Grade I and II vs. III and IV	1.57 (0.95-2.62)	0.08
Convexity meningioma		
Grade I and II vs. III and IV	6.42 (1.53-26.88)	0.011
KPS		
>70 vs. ≤70	1.78 (1.05-3.04)	0.03

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