Long-term Seizure Outcome Following Intracranial Cavernous Malformation Resection

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Introduction

For patients with intracranial cavernous malformations presenting with seizures, various factors can affect postoperative seizure control. We sought to examine long-term seizure outcomes and identify specific prognostic factors that affect seizure freedom following cavernoma resection.

Methods

-Retrospective study of patients who underwent resection of supratentorial cavernomas at our institution between 1992 and 2010.
-The following factors were investigated: age, gender, seizure type and duration, presence of generalized tonic-clonic seizures, cavernoma size, location, multiplicity, and extent of resection. Seizure outcome was scored using the Engel classification.

Statistical analysis

-Descriptive statistics were used to describe the baseline demographics.
-Univariate non-parametric analyses were performed using Fisher's exact test for unadjusted associations between seizure outcome and categorical variables (sex, presence of GTC pre-op, seizure frequency, laterality, lobe, multiplicity, GTR).
-Two sample t-test were used for associations between seizure outcome and a continous variable (age, seizure duration, size).
-Multivariate analyses were performed using logistic regression to determine the independent predictie value of several variables on seizure outcome.

Results

-56 patients met inclusion criteria.
-Mean length of follow-up was 87.9 months.
-At most recent follow-up 46 patients (82%) were free from impairing seizures (Engel Class 1).
-Ten patients (18%) had persistent seizures and were classified Engel Class 2-4.
-48 out of 56 patients (86%) had longer than 24 months follow-up.

Conclusions

The presence of multiple cavernomas is a predictor of poorer postoperative seizure control following cavernoma resection.

Learning Objectives

1) Resection of epileptigenic supratentorial cavernous malformations is associated with an excellent rate of postoperative seizure freedom.
2) The presence of multiple cavernous malformations is predictive of seizure persistence following surgery.

References

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Tables

Table 1. Univariate analysis of predictors of postoperative seizure outcome in patients with supratentorial cavernous malformations

		Engel Class[1]		
	Number (%)	1 (n, %)	2-4 (n, %)	P value
Total	56 (100)	46 (82.1)	10 (17.9)	
Age, mean (yrs)	37.5	37.5	37.3	0.96
Sex, male	27 (48.2)	20 (35.7)	7 (12.5)	0.17
Generalized tonic-clonic seizures (GTC)	31 (55.4)	27 (48.2)	4 (7.1)	0.32
Seizure frequency				0.06
Daily	16 (28.6)	10 (17.9)	6 (10.7)	
Weekly	9 (16.1)	7 (12.5)	2 (3.6)	
Monthly	6 (10.7)	6 (10.7)	0 (0)	
1 or 2 total	25 (44.6)	23 (41.1)	2 (3.6)	
Seizure duration, mean (mos)	61.0	52.4	100.4	0.23
Size, mean (cm)	1.59	1.50	1.99	0.23
Side				0.72
Left	34 (60.7)	27 (48.2)	7 (12.5)	
Right	22 (39.3)	19 (33.9)	3 (5.4)	
Bilateral	0 (0)	0 (0)	0 (0)	
Location				1.0
Frontal	16 (28.6)	13 (23.2)	3 (5.4)	
Parietal	9 (16.1)	8 (14.3)	1 (1.8)	
Temporal	27 (48.2)	22 (39.3)	5 (8.9)	
Other[2]	4 (7.1)	3 (5.4)	1 (1.8)	
Multiple	9 (16.1)	4 (7.1)	5 (8.9)	0.006
Gross total resection	54 (96.4)	44 (78.6)	10 (17.9)	1.0

[1] For categorical variables, the n and % are shown for each Engel Class; for continuous variables, the mean value is shown for each Engel Class
[2] Basal ganglia, corpus callosum, occipital, thalamus

Table 2. Multivariate analysis for predictors of postoperative seizure outcome

	Odds ratio	95% Confidence interval
Seizure duration	1.00	0.99, 1.00
Multiple CM	0.17	0.03,0.99*
GTC	1.47	0.27, 8.08
1 or 2 seizures in total	1.93	0.29, 12.73
Diameter > 1.5 cm	0.47	0.09, 2.54

*Significant