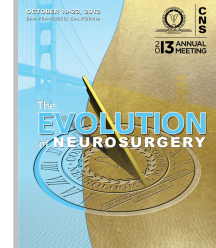


# MRI Characteristics of Angiomatous and Microcystic Low Grade Meningiomas

Paula Eboli MD; Avetis Azizyan MD; Doniel Drazin; James Mirocha; Marcel Maya; Serguei Bannykh  
Cedars Sinai Medical Center, Los Angeles CA.



## Introduction

Meningiomas, the most common benign brain tumors, comprise 13% to 26% of intracranial neoplasms<sup>1</sup>. In a series of 1809 meningiomas, Hasselbat et al<sup>2</sup> reported the prevalence of microcystic meningioma as 1.6% and the angiomatous variant as 2.1%. On CT and MRI, meningiomas usually appear as solid with a classical appearance. However, meningioma variants, such as microcystic and angiomatous meningiomas, show unusual MRI features, making pre-operative diagnosis and surgical planning more difficult<sup>1</sup>.

## Methods

Seventy patients with meningioma were included in our series. Their tumors were divided by morphology into 3 groups. Group 1 included 12 pure microcystic, 3 pure angiomatoid and 7 mixed tumors. Group 2 was comprised of 28 atypical (WHO Grade II) and 9 anaplastic (WHO Grade III) meningiomas. Group 3 included 3 fibrous and 8 meningotheliomatous (WHO Grade I) tumors. We measured peritumoral edema using the edema index volume. Additionally, the ADC ratio and tumor perfusion values were obtained.

## Results

The edema indexes of tumors in Groups 1 and 2 were significantly higher than in Group 3 ( $p=0.003$  between Group 1 and 3,  $p<0.0001$  between Group 2 and 3). The highest meningioma ADC values, as normalized to the lateral ventricle, were compared. The values in the high grade Group 2 were significantly higher than either of the two low grade Groups 1 and 3, with  $p$  values of 0.0007 and 0.001, respectively. Groups 1 and 3 were not significantly different with respect to ADC values. The CBV values showed no significant group differences.

## Conclusions

The peritumor edema index and CBV values both failed to distinguish microcystic and angiomatous meningiomas from aggressive WHO Grade II and WHO Grade III tumors. This distinction, however, could be accomplished by the use of internal ADC values and will potentially aid surgeons in their pre-operative diagnosis.

## Learning Objectives

To aid physicians in their differential diagnosis by characterizing the MRI features of angiomatous and microcystic meningiomas and comparing them to other types of low and high grade meningiomas.

## References

1. Gasparetto EL, Leite Cda C, Lucato LT, et al. Intracranial meningiomas: magnetic resonance imaging findings in 78 cases. *Arq Neuropsiquiatr* 2007;65(3A):610-4.
2. Hasselblatt M, Wilhelm K, Paulus W. Angiomatous Meningioma: A Clinicopathologic Study of 38 Cases. *Am J Surg Pathol* 2004;28(3):390-393.

## Histology

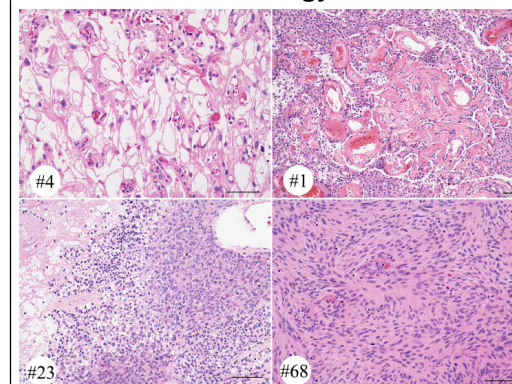
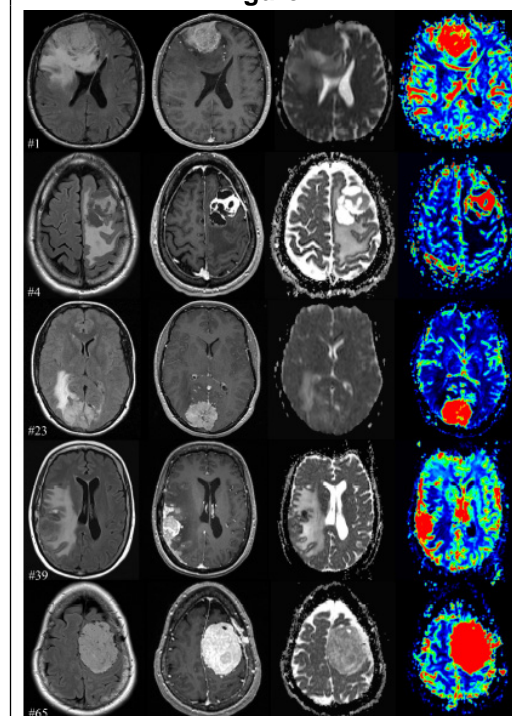


Figure 2



Characteristic MRI features