

Treatment Outcomes in Recurrent Atypical/Malignant Meningioma

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### Object

Atypical and anaplastic meningiomas account for 20-35% of all intracranial meningiomas. In this population, histological aggressiveness varies and recurrence rates range between 9-50% after gross total resection (GTR) and 36-83% after subtotal resection (STR)(1-2). Optimal treatment of recurrent atypical/anaplastic meningiomas is complicated because they are often refractory to both surgery and radiation.

The goal of the current study was to evaluate clinical determinants of recurrence and treatment specific outcomes in patients with recurrent atypical/anaplastic meningiomas at our institution.

Variable	Level	N	%	Median	IQR
Gender	Female	33	55		
	Male	27	45		
Age at first diagnosis				58.1	50.7-6
Initial tumor volume				27	14.1-4
Total Number of Surgeries	1	12	20	2	2-3
	2	30	50		
	3	13	22		
	4	5	8		
Total Recurrences	1	19	32	2	1-3
	2	18	30		
	3	16	27		
	4	6	10		
	5	1	2		
Initial Treatment	Surgery only	39	65		
	Surgery + RT	20	33		
	Surgery + RT + Chemo	1	2		
Initial Resection Type	GTR	34	57		
	STR	21	35		
	Unknown	5	8		

## Methods

Clinical data was reviewed for all patients treated for atypical/malignant meningiomas at first recurrence between January 1985 and July 2014 at Memorial Sloan Kettering Cancer Center. Pathology was reviewed on all cases to confirm adherence to the 2007 WHO guidelines.Predictors of second recurrence were analyzed using competing risks regression models. Pathology was reviewed on all cases to confirm adherence to the 2007 WHO guidelines.

# Results

A total of 918 patients were screend of which 60 (55% female) had recurrent disease with atypical/anaplastic histology at a median age of 58.1 years at diagnosis. The median number of recurrences per lesion was 2 with an median of 2 surgeries for recurrent disease. The median follow-up from the time of diagnosis was 70.7 months, while that from first recurrence was 36.7 months with 32 (53%) patients alive at last follow-up.

Recurrence	1 st	2nd	3rd	4th	5th
Observation	1 (2%)	8 (19%)	8 (36%)	3 (43%)	1 (100%)
Surgery*	17 (28%)	11 (26%)	4 (17%)	1 (14%)	0
Surgery + RT*	23 (38%)	11 (26%)	1 (5%)	0	0
RT*	17 (28%)	11 (26%)	4 (17%)	2 (29%)	0
Chemo Only	2 (3%)	2 (5%)	6 (27%)	1 (14%)	0
Chemo Adjunct	7 (12%)	10 (23%)	9 (39%)	1 (14%)	0

 includes patients that received chemotherapy in combination
"Chemo ever" category denotes patients who had chemotherapy in combination with any other treatment modalities (i.e. surgery, surgery+RT or

RT) RT: radiation therapy Observation: Patients were observed with serial imaging and did not receive any treatment for the recurrence Median time to first recurrence was 26.4 months. The median tumor volume at initial presentation was 27 cm3. There was no effect of extent of resection (EOR) at first recurrence on time to a subsequent recurrence. Inclusion of radiation (RT) as primary or adjuvant therapy at first recurrence reduced the risk of progression or subsequent recurrence compared to surgery alone (p-value=0.07).

## Conclusion

Treatment of atypical/anaplastic meningiomas at recurrence remains a challenge. In one of the largest cohorts, our data suggests better tumor control with the addition of radiation. A multicenter effort is needed to confirm these findings and propose treatment guidelines.





Figure 2: Treatment dependent cumulative incidence of recurrence/progression after first recurrence. Patients who were treated with surgery alone were twice as likely to experience a second progression or recurrence compared to those who either had RT alone or surgery with RT (HR 2.13, 95% CI 0.944.83, p=0.07).

## Learning Objectives

By the conclusion of this session, participants should be able to: 1. Understand the aggressive clinical nature of atypical/malignant meningiomas 2. Discuss various treatment options available to treat recurrent

atypical/malignant meningiomas

3. Describe treatment outcome data of atypical/malignant meningiomas from a major cancer center

## References

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