

# Effectiveness of Radiotherapy for Elderly Patients with Anaplastic Gliomas

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### Introduction

Postoperative radiotherapy (RT) is utilized routinely in the management of anaplastic WHO Grade III gliomas (AG), including anaplastic astrocytoma (AA) and anaplastic oligodendroglioma (AO). However, the optimal role of RT in elderly AG patients remains controversial. We evaluated the effectiveness of RT in elderly AG patients using a national cancer registry.

#### Methods

The SEER database (1990-2008) was used to query patients greater than 70 years of age with AA or AO. Independent predictors of overall survival were determined using a multivariate Cox proportional hazards model.

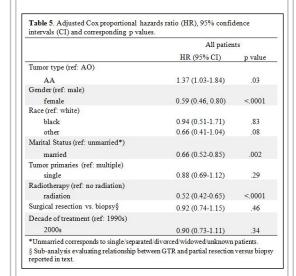
Variables	Astrocytoma (N=333)	Oligodendroglioma (N=57)	p value
Age at diagnosis			.93
mean (SD)	77.0 (4.7)	77.0 (4.7)	
median	77	76.0	
range	71-93	71-86	
Gender			.11
male	166 (49.8)	35 (61.4)	
female	167 (50.2)	22 (38.6)	
Race, N (%)*			.13
White	301 (90.7)	56 (98.3)	
Black	10 (3.0)	1(1.7)	
Other	21 (6.3)		
Marital status, N (%)			.80
single	17 (5.1)	3 (5.3)	
married	207 (62.3)	40 (70.2)	
separated	3 (0.9)	0 (0)	
divorced	13 (3.9)	3 (5.3)	
widowed	80 (24.0)	10 (17.5)	
unknown	13 (3.9)	1(1.8)	
Tumor primaries			.28
single	261 (78.4)	41 (71.9)	
multiple	72 (21.6)	16 (28.1)	
Radiotherapy, N (%)			.89
radiation	213 (64.0)	37 (64.9)	
no radiation	120 (36.0)	20 (35.1)	
Surgery, N (%)			<.0001
biopsy/no surgery	196 (58.9)	24 (42.1)	
partial resection	46 (13.8)	11 (19.3)	
gross total resection	38 (11.4)	21 (36.8)	
surgery, NOS	53 (15.9)	1(1.8)	
Treatment Protocol			
surgery + radiation	92 (27.6)	20 (35.1)	.25
GTR + radiation	24 (7.2)	13 (22.8)	<.0001

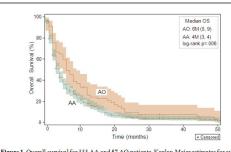
	Astrocytoma (N=333)	Oligodendroglioma (N=57)
Median survival in months (95% CI)*	4 (3,4)	6 (5, 9)
Overall survival rate, % (95% CI)		
6 month	36.3 (31.1, 41.5)	60.0 (45.8, 71.0)
12 month	19.0 (14.9, 23.4)	33.3 (21.6, 45.5)
18 month	9.3 (6.5, 12.8)	22.2 (12.4, 33.8)
24 month	5.5 (3.4, 8.4)	9.3 (3.4, 18.7)
36 month	3.8 (2.1, 6.4)	7.4 (2.4, 16.3)

#### **Results**

Among 390 elderly patients with AGs, 333 (85%) had AAs and 57 (15%) had AOs. Approximately two-thirds of AA patients (64%) and AO patients (65%) received RT. Most AO patients (58%) and many AA patients (41%) underwent surgical resection; the remainder had biopsy. The median overall survival for all patients who underwent RT was 6 months (95% confidence interval CI, 5-7 months) versus 2 months (95% CI, 1-6) in patients who did not have RT. Patients who had gross total resection (GTR) plus RT had a median overall survival of 11 months (95% CI, 7-14). Multivariate analysis for all patients showed that undergoing RT was significantly associated with improved survival (hazard ratio HR 0.52, p<.0001). AA tumor type (HR 1.37, p=.03) was associated with worse survival than AO tumor type; female gender (HR 0.59, p<.0001) and being married (HR 0.66, p=.002) significantly improved survival. Patients that underwent GTR had a significant reduction in the hazards of mortality compared to biopsy (HR 0.72, p = .04).

	Median survival in months (M)		
	All patients	log-rank p value	
Gender		.007	
female	5M (4, 6)		
male	3M (3, 4)		
Race, N (%)		.43	
White	4M (3, 5)		
Black	8M (3, 14)		
Other	6M (2, 15)		
Marital Status		.11	
married	4M (3, 5)		
unmarried*	3M (3, 4)		
Tumor primaries		.56	
single	4M (3, 5)		
multiple	4M (3, 6)		
Radiotherapy		<.0001	
radiation	6M (5, 7)		
no radiation	2M (1, 6)		
Surgical Resection		.0003	
biopsy	4M (3, 4)		
partial resection	5M (3, 8)		
gross total resection	7M (4, 10)		
other	3M (2, 4)		
Treatment protocol		<.0001	
surgery + radiation	6M (5, 9)		
surgery only	2M (2, 3)		
GTR + radiation	11M (7,14)		
Decade of treatment			
1990	4M (3, 5)	.49	
2000	4M (3, 5)		





 $\label{eq:Figure 1.} Figure 1. Overall survival for 333 AA and 57 AO patients. Kaplan-Meier estimates for overal survival in months for AO (solid-line) and AA (dashed-line) GBM patients.$ 

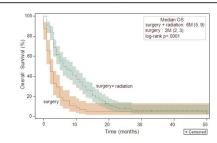


Figure 2. Overall survival for 390 AG patients. Kaplan-Meier estimates for overall survival in months for patients that underwent surgery plus radiation (dashed-line) and surgery only (soli line).

## **Conclusions**

Elderly AG patients undergoing RT had better overall survival compared to patients who did not receive RT. Treatment strategies involving maximal safe resection plus RT should be considered in the optimal management of AGs in elderly patients.

## **Learning Objectives**

By the conclusion of this session, participants should be able to: 1) describe the impact that post-operative radiotherapy has on overall survival of elderly patients with anaplastic gliomas, and 2) Be able to identify the factor(s) that independently predict survival in elderly patients with anaplastic gliomas.