



# The Efficacy of Carmustine Wafers for Older Patients with Glioblastoma Multiforme: Prolonging Survival

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## Introduction

Peak incidence of glioblastoma multiforme (GBM) occurs in individuals 65 years and older. The goal was to evaluate the efficacy of carmustine wafers in prolonging survival for older GBM patients.

## Methods

133 consecutive patients 65 years and older who underwent surgery for an intracranial primary (de novo) GBM from 1997-2007 were retrospectively reviewed. Among these 133 patients, 45 patients with carmustine wafer implantation were matched with 45 patients without implantation. These groups were matched for factors consistently shown to be associated with survival (age, KPS, extent of resection, radiation therapy, temozolomide). Survival was expressed as estimated Kaplan-Meier plots, and Log-rank analysis was used to compare survival curves. Variables with  $p < 0.05$  were considered statistically significant.

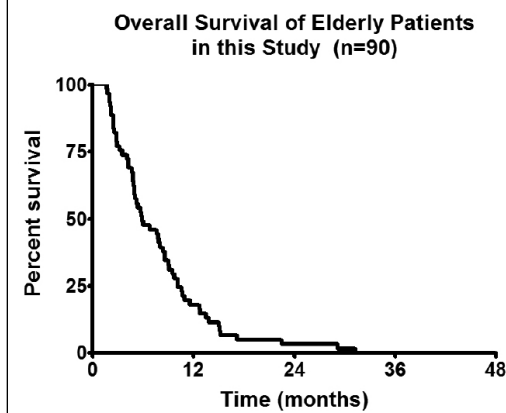
## Results

The mean ( $\pm$  standard deviation) age of the cohort was  $73 \pm 5$  years, and the median survival of the entire cohort was 5.9 months. Among patients with and without carmustine wafers, there were no significant differences in pre- and peri-operative variables. However, patients with carmustine wafers demonstrated prolonged survival as compared to patients without wafers. The median survival for patients with carmustine wafers was 8.7 months, while median survival for patients without wafers was 5.5 months ( $p=0.007$ ). Likewise, in subgroup analysis, patients older than 70 ( $p=0.0003$ ) and 75 years ( $p=0.04$ ) who had carmustine wafers had significantly longer survival than matched patients without wafers.

## Conclusions

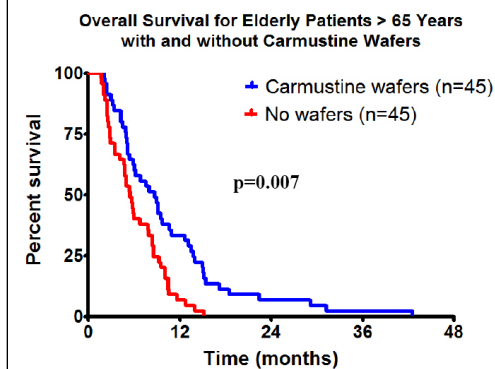
Older patients with GBM may benefit from carmustine wafers. The survival for older patients who received carmustine wafers is significantly longer than matched patients who did not receive carmustine wafers.

Figure 1



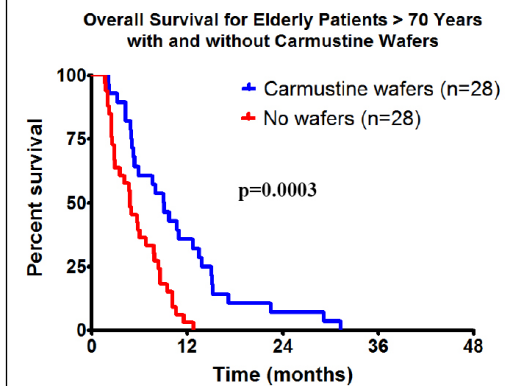
Kaplan-Meier plots of survival for all patients  $> 65$  years. Median survival was 5.9 months, where the 3-, 6-, and 12-month survival rates were 77%, 48%, and 18%.

Figure 2



Kaplan-Meier plots of survival for patients  $> 65$  years who did and did not have carmustine wafer implantation. Median survival in the carmustine cohort was 8.7 months as compared to 5.5 months for patients without wafers ( $p=0.007$ ).

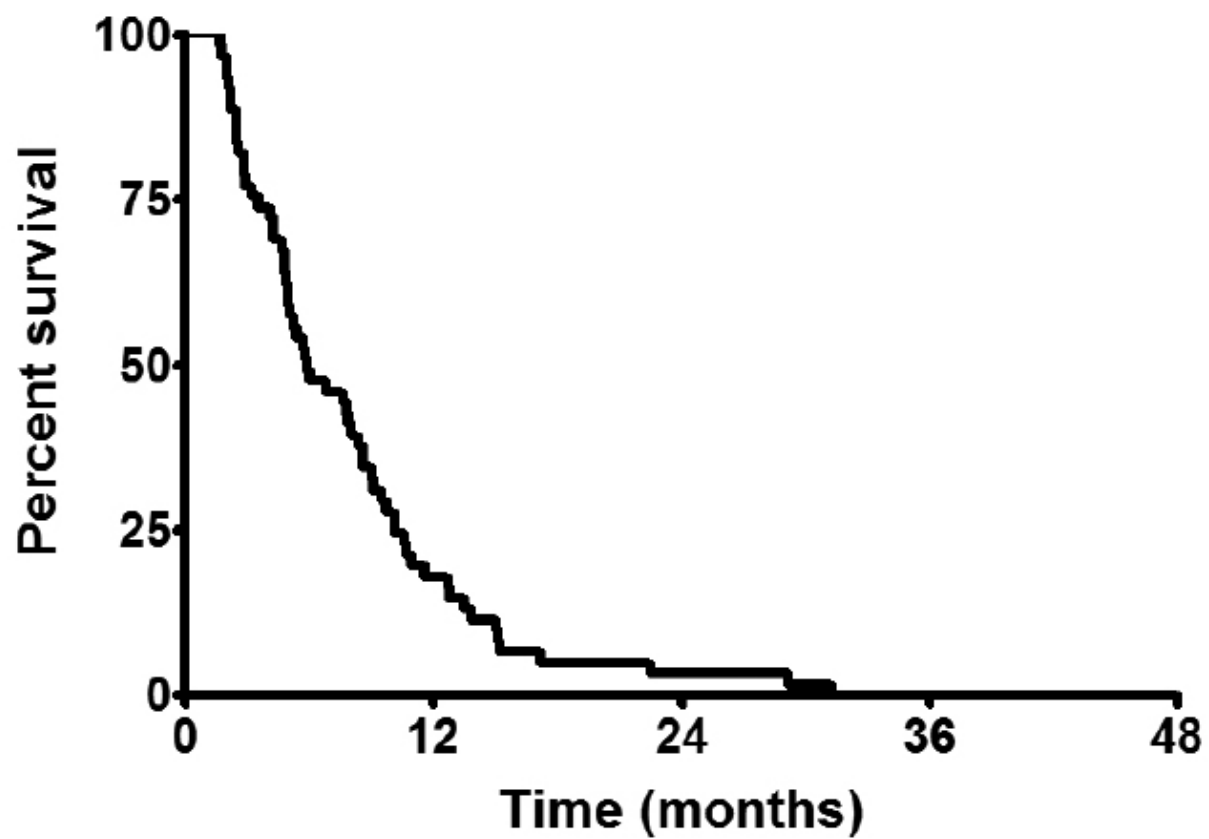
Figure 3



Kaplan-Meier plots of survival for patients  $> 70$  years with GBM who did and did not have carmustine wafer implantation. Median survival was 9.0 months for patients with wafer implantation as compared to 4.8 months for patients without implantation ( $p=0.0003$ ).

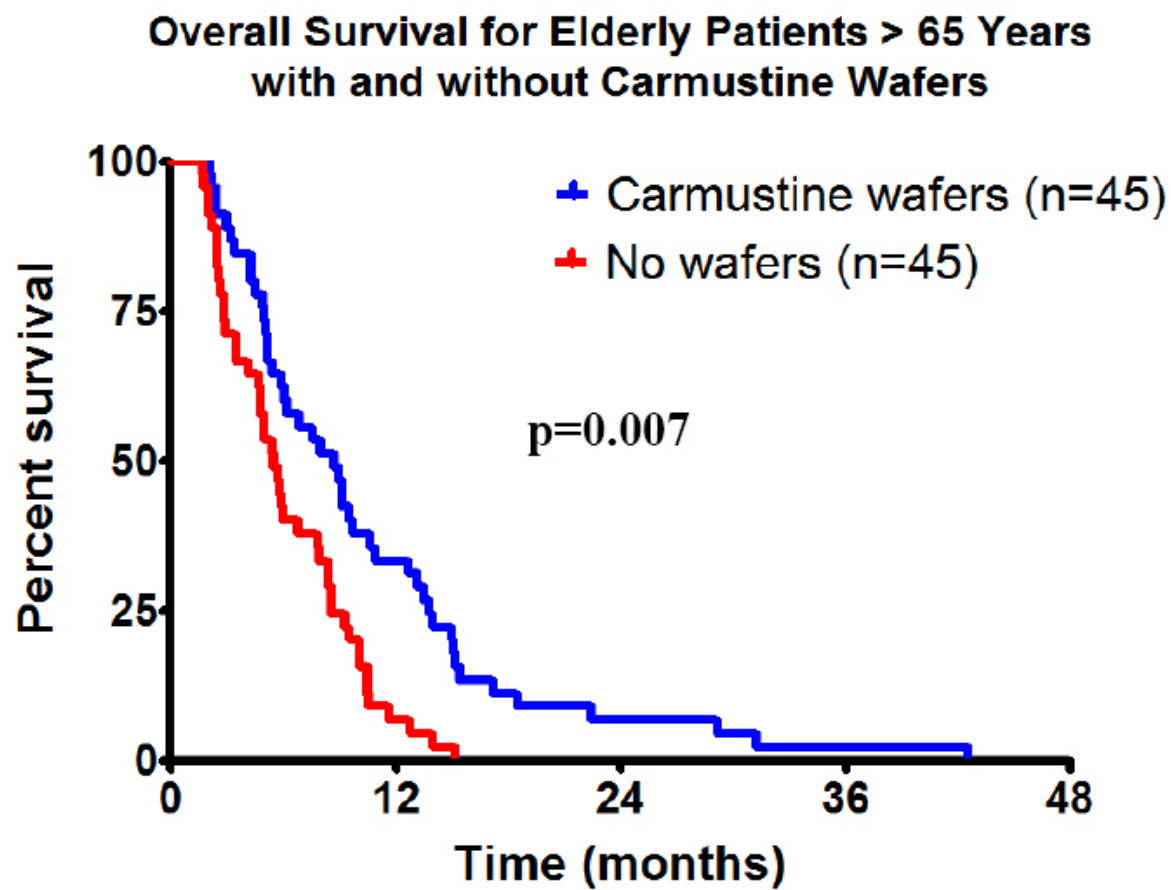
Figure 1

### Overall Survival of Elderly Patients in this Study (n=90)



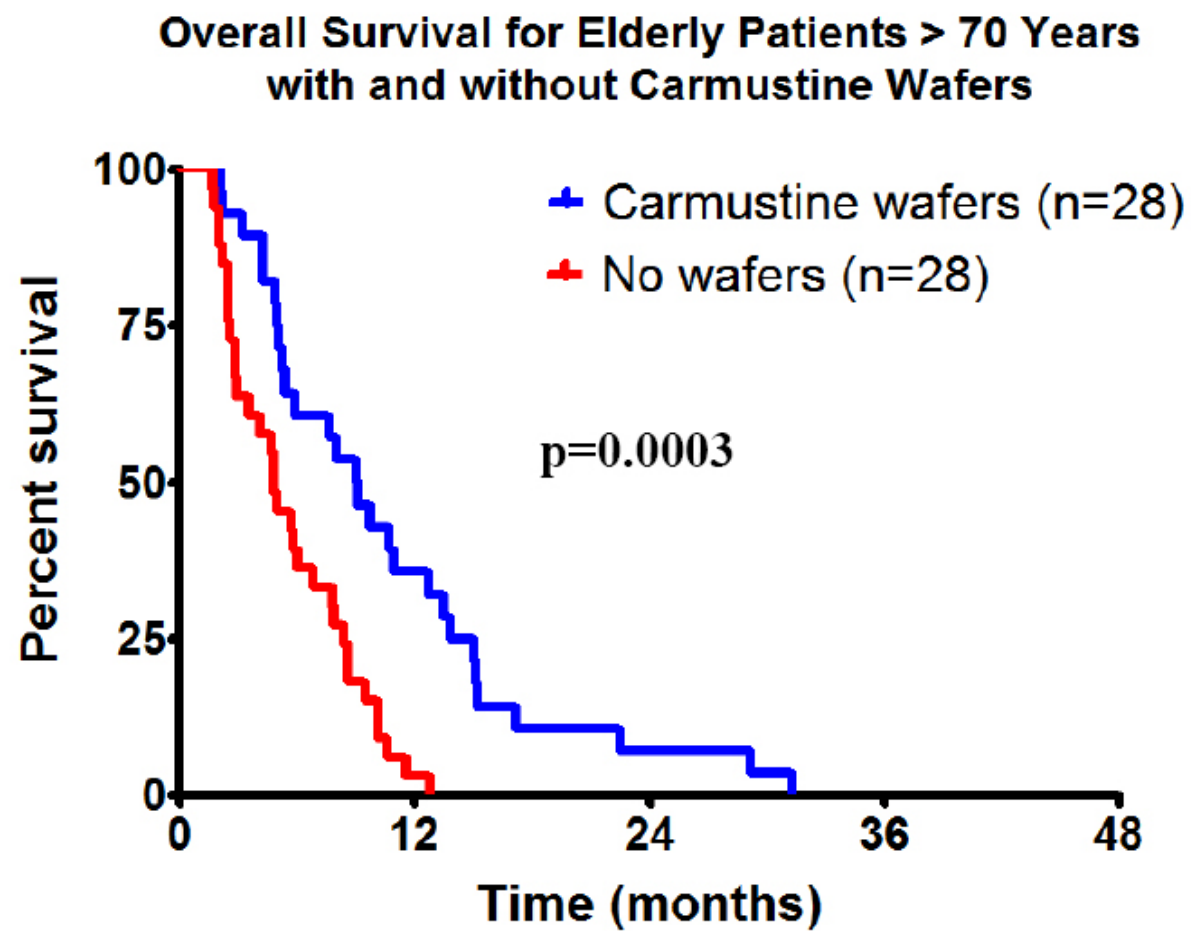
Kaplan-Meier plots of survival for all patients >65 years. Median survival was 5.9 months, where the 3-, 6-, and 12-month survival rates were 77%, 48%, and 18%.

Figure 2



Kaplan-Meier plots of survival for patients > 65 years who did and did not have carmustine wafer implantation. Median survival in the carmustine cohort was 8.7 months as compared to 5.5 months for patients without wafers (p=0.007).

Figure 3



Kaplan-Meier plots of survival for patients > 70 years with GBM who did and did not have carmustine wafer implantation. Median survival was 9.0 months for patients with wafer implantation as compared to 4.8 months for patients without implantation (p=0.0003).