

## 교모세포종 환자의 여명에 관련된 인자 분석\*

우원철 · 송시현 · 고현송 · 염진영 · 김성호 · 김 윤

= Abstract =

## Analysis of Factors Affecting Survival Period in Glioblastoma

Won Cheol Woo, M.D., Shi Hun Song, M.D., Hyeon Song Koh, M.D.,  
Jin Young Yeom, M.D., Seong Ho Kim, M.D., Youn Kim, M.D.

Department of Neurosurgery, College of Medicine, Chungnam National University Taejeon, Korea

**O**bjectives : The objective of this study was to analyze the prognostic factors affecting survival in the patients with glioblastomas.

**M**ethods : We retrospectively studied 55 consecutive patients with glioblastomas who were admitted to neurosurgery department from January 1988 to March 1998. Fifteen patients were excluded from the analysis because of follow-up loss and surgical mortality.

There were 24 male and 16 female patients, with a mean age of 51 years. Surgery consisted of biopsy in 4(10.0%) patients, subtotal resection in 9(22.5%) patients and gross total resection in 27(67.5%) patients. Nine(22.5%) patients received second operation. Twenty-eight(70%) received postoperative radiation therapy. Various levels of radiation dose were used, 6,000 rad over 7 weeks in most cases. The variable factors were examined for their relationship with survival; age at the time of diagnosis, gender, duration of neurological symptoms, preoperative neurological state(Karnofsky performance score), extent of surgical resection, location of tumor, reoperation, and postoperative radiotherapy and chemotherapy.

**R**esult : The mean survival time was 55 weeks, three(7.5%) of the 40 patients survived more than two years. Survival time with biopsy only cases was 24 weeks, for those with subtotal resection 43 weeks, and for those with gross total resection 67 weeks. A mean survival time from the time of reoperation was 42 weeks.

Statistically significant survival factors in glioblastoma were extent of surgical resection, postoperative radiotherapy and reoperation.

**S**ummary : Results of our series support the views that the extent of surgery, reoperation and postoperative radiation are important prognostic factors. We also recommend radical tumor removal, postoperative radiotherapy and reoperation, if possible.

**KEY WORDS** : Glioblastoma · Survival · Extent of surgery · Radiotherapy · Reoperation.

서 론

가 가

1999

28),  
3  
5)17),  
가  
4)12)15), 5  
50  
5 6% 4)12) 15)20)26)

2)4)5)10)14)21-23)27)

연구대상 및 방법

1988 1 1998 3 10

55 가 40

(Karnofsky performance score),

Karnofsky performance score :

Karnofsky performance score 70

70 70

:

lobe 3

lobe 1, 2, 3

: 90 90

90

:

1 2 (Biopsy)

(Partial), Brain CT

(Subtotal) (Gross to-

tal)

:

(7200 4500 rad, 6000rad)

ACNU

6 6 8

Kaplan - Meier

Wilcoxon Rank Sums test

p<0.05

연구결과

1. 연령 및 성별 분포

21 68

51 24 : 16

가

55 , 1

20 (50.0%), 2 3 (7.5%),

5 0

2. 성별에 따른 생존기간

53 58

(Table 1).

3. 연령에 따른 생존기간

40 69 , 40

51

(Table 1).

4. 증상 발현기간에 따른 생존기간

90 71 , 90

52

(Table 1).

5. 수술 전 환자상태에 따른 생존기간

Karnofsky performance score가 70

60 , 70 38

(Table 1).

6. 종양 위치에 따른 생존기간

lobe

71 ,

45 , 38

(Table 1).

lobe

1 lobe 59 , 2 lobe 47

, 3 lobe 41

(Table 1).

**Table 1.** Relationship between survival period and factors affecting survival period in glioblastoma

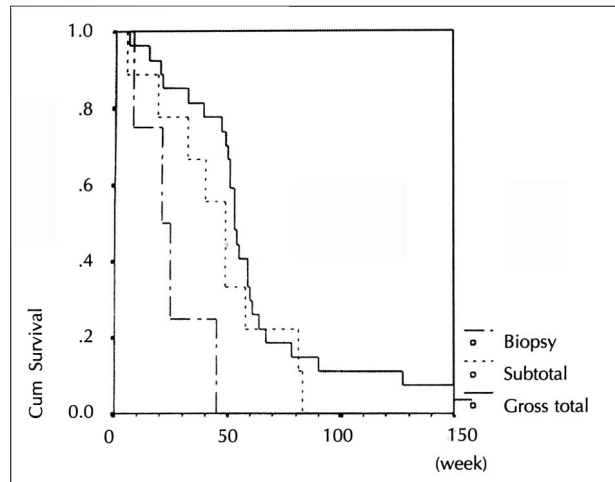
Factor	No. of cases	Survival period (weeks)	p-value
<b>Sex</b>			
Male	24	53	*ns
Female	16	58	
<b>Age (years)</b>			
<40	8	69	ns
40	32	52	
<b>Duration of symptom (day)</b>			
<90	34	52	ns
90	6	71	
<b>Karnofsky performance score</b>			
<70	9	38	ns
70	31	60	
<b>Sites of tumor (hemisphere)</b>			
Left	16	71	
Right	21	45	ns
Both	3	38	
<b>No. of involved lobe</b>			
1	26	59	
2	11	47	ns
3	3	41	
<b>Extent of tumor removal</b>			
Gross total	27	67	
Subtotal	9	43	0.04
Biopsy	4	24	
<b>Radiotherapy</b>			
Yes	28	65	0.001
No	12	30	
<b>Chemotherapy</b>			
Yes	17	60	ns
No	23	50	
<b>Postoperative radiotherapy &amp; chemotherapy</b>			
§op	12	30	
Op + radiotherapy	11	72	ns
Op + radiotherapy + chemotherapy	17	60	
<b>Reoperation</b>			
Yes	9	85	0.02
No	31	46	

1 : tumor located in 1 lobe, 2 : tumor located in 2 lobe, 3 : tumor located in 3 lobe

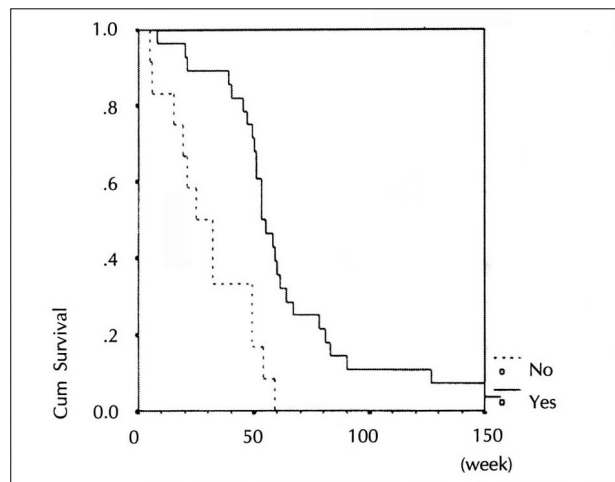
§ op : operation \* ns : non-specific

**7. 수술 범위에 따른 생존기간**

eloquent area	13	
	27	
		67 ,
	43 ,	24



**Fig. 1.** Kaplan-Meier survival curves for the patients receiving operation according to extent of tumor removal showing significant difference.



**Fig. 2.** Kaplan-Meier survival curves for the patients receiving operation alone and operation plus radiotherapy showing significant difference.

(Table

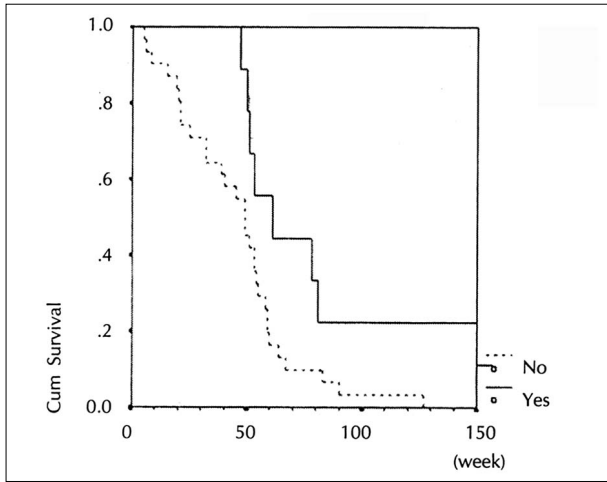
1, Fig. 1).

**8. 방사선 치료 및 화학요법에 의한 생존기간**

	65 ,
30	,
(Table 1, Fig. 2).	60 ,
	50 ,
	(Table 1).

**9. 재수술 여부에 따른 생존기간**

	85 ,
46	,
(Table 1, Fig. 3).	



**Fig. 3.** Kaplan-Meier survival curves for the patients receiving operation and reoperation showing significant difference.

고찰

MRI  
 가  
 (hyper-fractionated radiotherapy),  
 (stereotactic radiotherapy),  
 (brachytherapy),

50  
 6%<sup>4)12)</sup>,  
 4)12)14)15)28), 5  
 15)20)26)

5)21)27), Salcman<sup>21)</sup>

23)

가

가  
 4)21-23)

17p

가

22)

40

1448

69, 40

52

가

12)21)23),  
 Karnofsky performance score

가

가

1)2)4)5)11)14)27)

90

16 (40%)

70

60, 70

38

가

Salcman<sup>21)22)</sup>, Ammirati<sup>1)</sup>

가

Ruth<sup>19)</sup>

(radiation tolerance)

Onoyama<sup>16)</sup>

16)19)

lobe

3)

1)2)4)16)22)

가

10)

, Harsh<sup>10)</sup>

necrotic

debris

가

. Coffey<sup>5)</sup>

52

), 47 (9 ), 24 (4 )  
 가

가  
 6000 rad

performance score  
 6000 rad 7  
 가

Salcman<sup>22)</sup>  
 Young<sup>27)</sup>  
 Karnofsky performance score 60  
 6

Pool<sup>18)</sup>  
 Salacman Young  
 가

결 론

1)  
 2)

• : 2000 3 16  
 • : 2000 6 26  
 • :  
 301 - 721 640  
 : 042) 220 - 7361, : 042) 220 - 7364

References

- 1) Ammirati M, Galicich JH, Arbit E, Liao Y : *Reoperation in the treatment of recurrent intracranial malignant glioma. Neurosurgery 21 : 601-614, 1987*
- 2) Ammirati M, Vick N, Liao Y, Ciric I, Mikhael M : *Effect of the extent of surgical resection on survival and quality of life in patients with supratentorial glioblastomas and anaplastic astrocytoma. Neurosurgery 21 : 201-206, 1987*
- 3) Brandes AA, Rigon A, Zampieri P, Ermani M, Carollo C, Altavilla G, et al : *Carboplatin and teniposide concurrent with radiotherapy in patients with glioblastoma multiforme : a phase study. Cancer 82 : 355-61, 1998*
- 4) Chandler KL, Prados MD, Malec M, Wilson CB : *Long-term survival in patients with glioblastoma multiforme. Neurosurgery 32 : 716-720, 1993*
- 5) Coffey RJ, Lunsford LD, Taylor FH : *Survival after stereotactic biopsy of malignant glioma. Neurosurgery 22 : 467-473, 1988*
- 6) Dorigo O, Turla ST, Lebedeva S, Gjerset RA : *Sensitization of rat glioblastoma multiforme to cisplatin in vivo following restoration of wild-type p53 function. J Neurosurg 88 : 535-540, 1998*
- 7) Fine HA : *The basis for current treatment recommendations for malignant gliomas. J Neurooncol 20 : 111-20, 1994*
- 8) Florell RC, Macdonald DR, Irish WD, Bernstein M, Leibel SA, Gutin PH, et al : *Selection bias, survival, and brachytherapy for glioma. J Neurosurg 76 : 179-183, 1992*
- 9) Gutin PH, Leibel SA, Wara WM, Choucair A, Levin VA, Phillips TL, et al : *Recurrent malignant gliomas : survival following interstitial brachytherapy with high-activity iodine-125 sources. J Neurosurg 67 : 864-873, 1987*
- 10) Harsh GR, Levin VA, Gutin PH, Seager M, Silver P, Wilson CB : *Reoperation of recurrent glioblastoma and anaplastic astrocytoma. Neurosurgery 21 : 615-621, 1987*
- 11) Hirakawa K, Suzuki k, Ueda S, Nakagawa Y, Yoshino E, Ibayashi N, et al : *Multivariate analysis of factors affecting postoperative survival in malignant astrocytoma. J Neurooncol 2 : 331-340, 1984*
- 12) Imperato JP, Paleologos NA, Vick NA : *Effect of treatment on long-term survivors with malignant astrocytomas. Ann Neurol 28 : 818-822, 1990*
- 13) Jeremic B, Grujicic D, Antunovic V, Djuric L, Stojanovic M, Shibamoto Y : *Influence of extent of surgery and tumor location on treatment outcome of patients with glioblastoma*

- multiforme treated with combined modality approach. J Neurooncol 21 : 177-185, 1994*
- 14) Lieberman AN, Foo SH, Ransohoff J, Gordon W, Walker R, Wise A, et al : *Long term survival among patients with malignant brain tumors. Neurosurgery 10 : 450-453, 1982*
  - 15) Netsky MG, August B, Fowler W : *The longevity of patients with glioblastoma multiforme. J Neurosurg 7 : 261-269, 1950*
  - 16) Onoyama Y, Abe M, Yabumoto E, Sakamoto T, Nishidai T, Suyama S : *Radiation therapy in the treatment of glioblastoma. Am J Roentgenol 126 : 481-492, 1976*
  - 17) Peterdorf SH, Livingstone RB : *High dose chemotherapy for the treatment of malignant brain tumours. J Neurooncol 20 : 155-163, 1994*
  - 18) Pool JL : *The management of current glioma. Clin Neurosurg 15 : 265-287, 1969*
  - 19) Ramsey RG, Brand WN : *Radiotherapy of glioblastoma multiforme. J Neurosurg 39 : 197-202, 1973*
  - 20) Rutz HP, de Tribolet N, Calmes JM, Chapuis G : *Long-term survival of a patient with glioblastoma and Turcot's syndrome. Case of report. J Neurosurg 74 : 813-815, 1991*
  - 21) Salcman M, Kaplan RS, Ducker TB, Abdo H, Montgomery E : *Effect of age and reoperation on survival in the combined modality of malignant astrocytoma. Neurosurgery 10 : 454-463, 1982*
  - 22) Salcman M, Scholtz H, Kaplan RS, Kulik S : *Long-term survival in patients with malignant astrocytoma. Neurosurgery 34 : 213-220, 1994*
  - 23) Salford LG, Brun A, Nirfalk S : *Ten-year survival among patients with supratentorial astrocytomas grade III and IV. J Neurosurg 69 : 506-509, 1988*
  - 24) Schwartz RB, Horman BL, Polak JF, Garada BM, Schwartz MS, Folkerth R, et al : *Dual-isotope single-photon emission computerized tomography scanning in patients with glioblastoma multiforme : association with patient survival and histopathological characteristics of tumor after high-dose radiotherapy. J Neurosurg 89 : 60-68, 1998*
  - 25) Stage WS, Stein J : *Treatment of malignant astrocytomas. AJR 120 : 7-18, 1974*
  - 26) Takeuchi K, Hosbino K : *Statistical analysis of factors affecting survival after glioblastoma multiforme. Acta Neurochi (wien) 37 : 57-73, 1977*
  - 27) Young B, Oldfield EH, Markesbery WR, Haack D, Tibbs PA, McCombs P, et al : *Reoperation for glioblastoma. J Neurosurg 55 : 917-921, 1981*
  - 28) Whittle IR : *Management of primary malignant brain tumor. J Neuronal Neurosurg Psychiatry 60 : 2-5, 1996*