

Palliative Radiotherapy for Brain Metastases

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Purpose : Radiotherapy has been the mainstay of the treatment of brain metastases. We evaluated the response rate, survival and prognostic factors of patients with brain metastases treated with radiotherapy for palliative purpose.

Materials and Methods : From January 1994 through April 1997, in all 42 patients, a retrospective analysis was undertaken. Of these, 33 patients received whole brain irradiation with 30Gy in 10 daily fractions with or without a boost of 10Gy in 5 daily fractions to the site of solitary lesion. Nine patients failed to complete the planned treatment.

Results : Of 33 patients who finished radiotherapy, complete and partial response were observed in 4(12%) patients and 22(67%) ones, respectively. Overall response rate was 79% and median survival was 4 months. In univariate analysis, prognostic factors affecting survival were initial neurologic function class($p=0.0136$), extracranial tumor activity($p=0.042$), and response after radiotherapy($p=0.001$).

Conclusion : We confirmed that whole brain irradiation is the effective means for treating the patient with brain metastases. Initial neurologic function class, extracranial tumor activity, and response after radiotherapy were identified as prognostic factors affecting survival.

Key Words : Brain metastases, Radiotherapy, Prognostic factor

가
가 가
18% 가 ,¹⁾ CT, MR 2-5) RTOG 50
1997
1998 3 5
1998 3 31 : ,
62

1994 1 1997 4 3 4
 42 28 CT가, 12 MRI가
 2 19 23 4 1
 28 (67%) 10 10 7
 1 3 3
 20 (3) (17)
) , 22 18 (86%)
 가 22 (52%) 가
 6 가
 25 (60%)
 (performance status)
 Order 10) 4 (Table 1)
 class 가 16 (38%) class , 가
 10 (24%) (Table 2).
 64%, 36%
 (Table 3).
 6MV 가

Table 3. Neurologic Symptoms of Brain Metastases in 42 Patients

Symptoms	No. (%)
Headache	27 (64)
Focal weakness	15 (36)
Behavioral and mental change	7 (17)
Dysarthria	7 (17)
Sensory disturbance	6 (14)
Gait ataxia	5 (12)
Visual disturbance	4 (10)
Seizures	2 (5)

. 2 10 30Gy
 가 1 5
 10Gy 가 6-48
 Dexamethasone 150-200mg/2-3 Dexamethasone
 42 33 가
 9Gy 33
 4 (12%), 22 (67%), 7
 (21%) 79%
 Chi-square
 Kaplan-Meier
 log-rank
 Table 4. Response in Complete RT Group(n= 33)

Response	No. of patient (%)
CR	4 (12)
PR	22 (67)
NR	7 (21)

Table 5. Specific Neurologic Symptom Relief in 33 Patients

Symptoms	No. (%)	Complete response No. (%)	Overall response No. (%)
Headache	20 (61)	9 (45)	17 (85)
Focal weakness	11 (33)	3 (27)	8 (73)
Behavioral and mental change	5 (15)	1 (20)	3 (60)
Dysarthria	5 (15)	1 (20)	3 (60)
Sensory disturbance	4 (12)	1 (25)	2 (50)
Gait ataxia	5 (15)	1 (20)	3 (60)
Visual disturbance	2 (6)	0 (0)	1 (50)
Seizures	1 (3)	0 (0)	1 (100)

Table 6. Prognostic Factors of Radiation Response(n=33)

	No.	Response No. (%)	p-value
Age(yrs)			0.393
60	13	9 (69)	
> 60	20	17 (85)	0.646
Sex			0.397
Male	23	19 (83)	
Female	10	7 (70)	
Neurologic function class			1.000
>	10	9 (90)	
>	23	17 (74)	
Primary tumor			1.000
Lung	24	19 (79)	
Non-Lung	9	7 (78)	
Location of brain metastases			1.000
Supratentorial	27	21 (78)	
Infratentorial	6	5 (83)	
Number of brain metastatic lesion			0.688
Single	16	12 (75)	
Multiple	17	14 (82)	
Interval from primary diagnosis to brain metastases(mos)			0.422
< 6	19	16 (84)	
6	14	10 (71)	

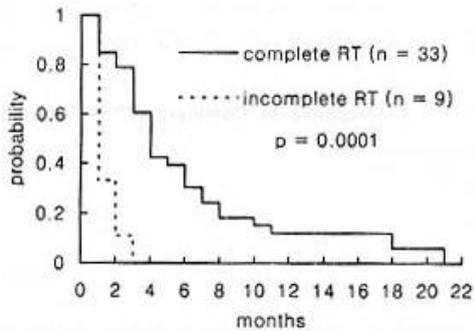


Fig. 1. Actuarial overall survival according to completeness of radiotherapy.

(Table 4).

85% 73%

(Table 5).

(Table 6). 33

Table 7. Prognostic Factors Influencing Actuarial Survival(n=33)

	No.	Median survival(mos)	p-value
Age(yrs)			0.8868
60	13	3	
> 60	20	4	0.8724
Sex			0.0136
Male	23	4	
Female	10	4	
Neurologic function class			0.3497
>	10	7	
>	23	4	
Primary tumor			0.0420
Lung	24	4	
Non-Lung	9	4	
Extracranial tumor activity			0.9750
Absent or Stable	18	5.5	
Progressive	15	3	
Location of brain metastases			0.8790
Supratentorial	27	4	
Infratentorial	6	4.5	
Number of brain metastatic lesion			0.5376
Single	16	4	
Multiple	17	4	
Interval from primary diagnosis to brain metastases(mos)			0.0010
< 6	19	4	
6	14	4	
RT response			
CR or PR	26	5.5	
NR	7	2	

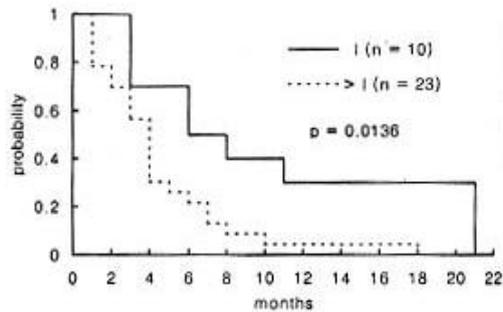


Fig. 2. Actuarial overall survival according to initial neurologic function class.

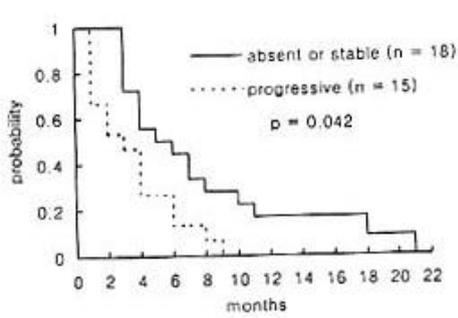


Fig. 3. Actuarial overall survival according to extracranial tumor activity.

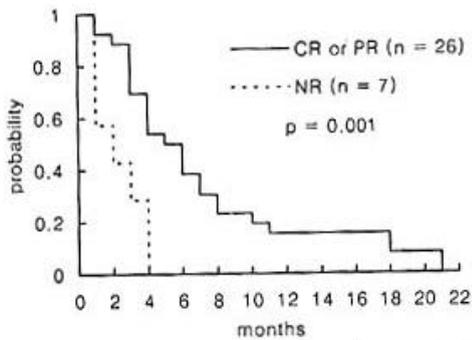


Fig. 4. Actuarial overall survival according to radiotherapy response.

($p=0.0001$), 4, 1
 11%, 2, 33, 0% (Fig. 1).
 33
 ($p=0.0136$), ($p=0.042$),
 ($p=0.001$) (Fig.
 2-4), (boost), 6

(Table 7).

9-45%,
 가, 20%

가
 , Cox¹²⁾
 23%
 (25-31% vs.
 14%).
 가
 11)

28
 6.1 가
 40-50% Size⁹⁾ 가 1, 13, 14,
 1/3-1/4 MR
 CT MR MR 가

가 가
 RTOG 20
 Gy/1, 30Gy/2, 30Gy/3, 40Gy/3, 40Gy/4
 (palliative index;
 가)
 class 가
 50Gy/4 30Gy/2

3)
 10Gy/1fx 12Gy/2fx
 (ultrapid fractionation)
 30-40Gy/2-4 20Gy/5fx
 4)
 1.6Gy 2 가 1 (accelerated
 hyperfractionation) RTOG 85-28

54.4 Gy, 48Gy, 60, 52% 200
($p=0.05$), 가, 47가, 3, 47가
가⁵⁾ 33% 200, 1.8
20Gy/1, 30Gy/2
30Gy/2 가
가 (boost) 가
, Hoskins¹⁵⁾ 가 2 가
가 30Gy/20fx, 20Gy/10fx, 1, 3, 2
가 Kurup
1970¹⁹⁾ 75% 3.5
Cooper²⁰⁾ 42% 5
1, 2, 가
3-6, 1, 16)¹⁾ 4, 가
15% 1, 5-10% 2, 가
¹⁵⁾ RTOG 70-85%
²⁾ 가
70-93%, 2, 15, 17)²⁾ 가
가
^{2, 17)} 1, 79%
11% 1, 4, 6, 7)²⁾ RTOG
가
RTOG 가
1994 1, 1997 4
42
33, 79%
4, 11% 1, 8)²⁾
Diener-West¹⁸⁾ RTOG 7916 가
가
Karnofsky performance status 70,

0.001)가
 (p=0.042),
 (p=0.0136),
 (p=

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