

두개강내 상의세포종 환자 30례에 있어서 재발에 영향을 주는 예후 인자

이해일 · 안재성 · 전상룡 · 김정훈 · 나영신 · 김창진 · 권병덕

= Abstract =

Prognostic Factors affecting Recurrence in 30 Patients with Intracranial Ependymomas

Hae Il Rhee, M.D., Jae Sung Ahn, M.D., Sang Ryong Jeon, M.D.,
Jeong Hoon Kim, M.D., Young Shin Rha, M.D.,
Chang Jin Kim, M.D., Byung Duk Kwun, M.D.

Department of Neurological Surgery, Asan Medical Center, College of Medicine, University of Ulsan, Seoul, Korea

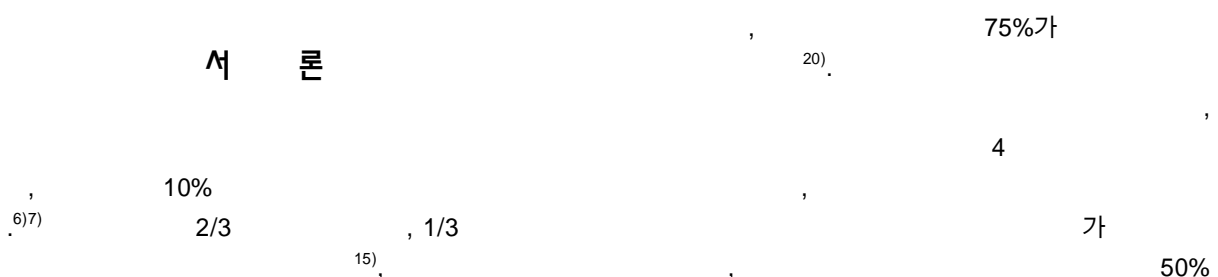
Objective : The goal of this study was to identify variables that were predictive of recurrence in primary intracranial ependymomas.

Methods : We analyzed variables affecting recurrence in 30 patients with primary intracranial ependymomas. Age, location, CSF cytology, seeding on neuroimaging study, tumor grade, extent of surgery, use of chemotherapy, chemotherapy regimen, use of radiotherapy, and radiotherapy field were entered to test their impacts on recurrence.

Results : Follow - up ranged from 2 to 110 months. Tumors were recurred at the primary tumor site only in 13 patients (43.3%). The overall average recurrence free period was 55 months, with overall recurrence free rates at 3 and 6 years of 61.0% and 20.9%, respectively. Extent of surgery was the strongest variable affecting recurrence. The median recurrence free period and 3 - year recurrence free rate were 72 months and 78.4% for patients having complete excision and 33 months and 0% for those having incomplete excision ($p=0.05$). Other prognostic variables like age, location, tumor grade, use of chemotherapy, and use of radiotherapy did not affect recurrence ($p=0.2848, 0.7899, 0.1714, 0.2157, 0.7076$, respectively).

Conclusions : Intracranial ependymomas have a propensity to recur after treatment, and recurrence at the primary site is still the main obstacle to cure. Among various variables, only extent of resection had the strongest impact on recurrence. Additional studies may still be needed to precisely define the prognostic variables on recurrence in intracranial ependymomas.

KEY WORDS : Intracranial ependymomas · Recurrence · Prognostic variables · Primary site.



5 (primary site)
2)7)18)21)

log - rank test
p<0.05

가

가

결 과

30

Table 1

13 (43.3%)

. Median recurrence

free period(MRFP) 55

3

6 recurrence free rate(RFR)

61% 20.

9%

(Table 2).

대상 및 방법

1990 1999

30

1993 WHO classification(several histological variables, pleomorphism, cellularity, numbers of mitotic figures, extent of necrosis)

low grade tumor anaplastic tumor 2)9).
2 118
28.5 37.9

(3, 4, 15, 16), (4cm)
4cm)

, neuroimaging

tumor anaplastic tumor) (low grade),
()

regimen,

()

ing neuroimaging
가 가

Kaplan - Meier method

1. 성별 및 연령

1 57
3 5, 4 15
11, 16 14
19 11
MRFP 23, 41 72 16
MRFP가 가, p - value 0.2848
가

2. 종양의 위치 및 크기

가 8, 가
가 22 가
3 RFR 71.4%, 61.8%
p - value 0.7899
가 22 4cm 가 8, 4cm
RFR 46.7%, 65.3% p - value 0.9840

3. 뇌척수액내의 전이 유무

가 가 3
, neuroimaging 가
6 가
MRFP 33, 55, p -
value 0.0953
가 . neuroimaging 가

Table 1. Characteristics of 30 patients with newly diagnosed intracranial ependymomas

Case no.	Age (yr)	Sex	Symptoms and signs	Site (1)	Site (2)	Size (cm)	CSF cytology	Seeding on N	Tumor grade	Extent of surgery	Cix regimen	RT field	Recurrence site	Time to recurrence	Survival	Time to survival	
1	1	F	Vomiting	Infratentorial	Floor of the fourth ventricle	1 x 1.5	-	-	Anaplastic	IE	+ 8 in a day	-	No	28	Alive	28	
2	1	F	Rt. Eyeball lateral side fixation	Supratentorial	3rd ventricle	4 x 6	+	+	Anaplastic	IE	+ POG 9233	+ WCSR	Yes	Primary site	5	Alive	9
3	1	M	Seizure	Infratentorial	Floor of the fourth ventricle	3 x 4	-	-	Low grade	IE	+ 8 in a day	-	Yes	Primary site	4	Alive	50
4	1	M	Rt. Facial palsy	Infratentorial	Floor of the fourth ventricle	3 x 3	-	-	Low grade	CE	+ 8 in a day	+ WCSR	Yes	Primary site	23	Alive	46
5	3	M	Headache, vomiting, gait disturbance	Infratentorial	Floor of the fourth ventricle	3 x 4	-	-	Anaplastic	CE	+ 8 in a day	+ WBR	No		42	Alive	42
6	4	F	Headache, vomiting	Infratentorial	Floor of the fourth ventricle	4 x 4	-	-	Anaplastic	IE	+ POG 9233	+ WBR	No		31	Alive	31
7	4	M	Vomiting	Infratentorial	Lateral recess	3 x 2	-	-	Anaplastic	IE	+ 8 in a day	+ WCSR	Yes	Primary site	17	Alive	51
8	5	F	Gait disturbance	Infratentorial	Floor of the fourth ventricle	4 x 3	-	-	Anaplastic	IE	+ POG 9233	+ WBR	No		19	Alive	19
9	5	M	Gait disturbance	Infratentorial	Floor of the fourth ventricle	4 x 4	+	+	Anaplastic	IE	-	+ WCSR	Yes	Primary site	33	Dead	29
10	5	M	Gait disturbance	Infratentorial	Floor of the fourth ventricle	4 x 3	-	-	Anaplastic	CE	+ 8 in a day	+ WCSR	Yes	Primary site	41	Alive	51
11	5	M	Headache, vomiting	Infratentorial	Floor of the fourth ventricle	2 x 2	-	-	Anaplastic	CE	-	+ WCSR	No		11	Alive	11
12	8	M	Headache, vomiting	Infratentorial	Floor of the fourth ventricle	4 x 3	-	-	Anaplastic	CE	-	+ WCSR	No		38	Alive	38
13	9	M	Dizziness	Infratentorial	Floor of the fourth ventricle	4 x 3	-	-	Low grade	CE	-	+ WCSR	Yes	Primary site	55	Alive	80
14	12	M	Headache, nausea, vomiting	Infratentorial	Floor of the fourth ventricle	5 x 4	-	-	Anaplastic	IE	+ POG 9233	+ WBR	Yes	Primary site	13	Alive	24
15	15	F	Headache	Infratentorial	Floor of the fourth ventricle	3 x 2	-	-	Low grade	CE	+ POG 9233	+ WCSR	Yes	Primary site	99	Alive	118
16	15	M	Headache, vomiting	Infratentorial	Floor of the fourth ventricle	4 x 4	-	-	Anaplastic	IE	+ POG 9233	+ WBR	Yes	Primary site	16	Alive	28
17	22	F	Headache	Supratentorial	Entirely intraparenchyma	6 x 7	-	-	Low grade	CE	-	+ WBR	No		56	Alive	56
18	28	M	Incidental detect	Infratentorial	Floor of the fourth ventricle	4 x 4	-	-	Low grade	CE	-	-	No		34	Alive	34
19	29	F	Dizziness, vomiting	Infratentorial	Floor of the fourth ventricle	3 x 4	-	-	Low grade	CE	-	-	No		27	Alive	27
20	34	F	Headache, visual disturbance	Supratentorial	3rd ventricle	5 x 6	-	-	Low grade	IE	-	+ WBR	No		2	Alive	2
21	34	M	Headache	Supratentorial	3rd ventricle	4 x 5	-	+	Anaplastic	CE	-	+ WCSR	No		12	Dead	12
22	38	F	Headache, diplopia	Infratentorial	Floor of the fourth ventricle	x 3	-	-	Low grade	IE	-	+ WBR	No		22	Alive	22
23	39	M	Headache	Infratentorial	Lateral recess	4 x 4	-	+	Low grade	CE	-	+ WCSR	Yes	Primary site	13	Alive	110
24	40	F	Headache, vomiting	Infratentorial	Lateral recess	4 x 5	-	-	Low grade	CE	-	+ WBR	No		68	Alive	68
25	42	M	Headache	Supratentorial	Entirely intraparenchyma	5 x 5	-	-	Anaplastic	IE	-	+ WCSR	No		27	Dead	27
26	48	M	Headache, vomiting	Infratentorial	Floor of the fourth ventricle	3 x 4	-	-	Low grade	CE	-	-	No		7	Alive	7
27	48	M	Dysarthria	Supratentorial	Entirely intraparenchyma	2 x 3	-	-	Anaplastic	CE	-	+ WBR	Yes	Primary site	4	Alive	14
28	52	M	Headache, dizziness	Infratentorial	Floor of the fourth ventricle	5 x 4	-	+	Low grade	CE	-	+ WCSR	Yes	Primary site	72	Alive	88
29	55	M	Headache, nausea, vomiting	Supratentorial	Rt. frontal		+	+	Anaplastic	IE	-	+ WCSR	No		7	Dead	7
30	57	F	Headache	Supratentorial	Entirely intraparenchyma	5 x 5	-	-	Low grade	CE	-	+ WBR	No		7	Alive	7

* : M : male F : female
 Time to follow up : time to last follow up
 NI : neuroimaging study
 CE : complete excision
 IE : incomplete excision
 Cix : chemotherapy
 WCSR : whole craniospinal radiation
 WBR : whole brain radiation
 Time to recurrence : time to recurrence
 WBR : whole brain radiation

Table 2. Univariate analyses(log-rank test) for continuous variables predicting recurrence in 30 patients with primary intracranial ependymomas

Variables	No. of patients	Median recurrence free period(mos.)	Recurrence free rate at 36 mos.	p-value
Age(year)				
3	5	23	40.00	0.2848
4 - 15	11	41	56.00	
16	14	72	80.77	
Location				
supratentorial	8	23	71.43	0.7899
infratentorial	22	55	61.83	
Size				
40mm>	8	23	46.67	0.9840
40mm≤	22	55	65.34	
CSF cytology				
(+)	3	33	0	0.0953
(-)	27	55	68.57	
Seeding on neuroimaging study				
(+)	6	33	27.78	0.1991
(-)	24	55	70.23	
Tumor grade				
low grade	14	72	72.69	0.1714
anaplastic	16	33	47.73	
Extent of surgery				
CE	17	72	78.43	0.0500
IE	13	33	0	
Radiotherapy				
(+)	25	41	58.09	0.7076
(-)	5			
Radiotherapy field				
WCSR	14	41	54.17	0.5029
WBR	11		67.50	
Chemotherapy				
(+)	12	23	48.61	0.2157
(-)	18	72	73.34	
Chemotherapy regimen				
8 in a day	6	32	50.00	0.9805
POG 9233	6	57.5	50.00	

* : mos, months
 WBR : whole brain radiation
 CE : complete excision
 RT : radiotherapy
 IE : incomplete excision
 CTx : chemotherapy
 WCSR : whole craniospinal radiation

MRFP 33 , 가 33 , () p - value
 55 , p - value 0. 0.1714
 1991

5. 수술소견

4. 병리학적 소견

low grade tumor 14 17 ,
 , anaplastic tumor 16 . low grade tumor ,
 MRFP 72 , anaplastic tumor MRFP

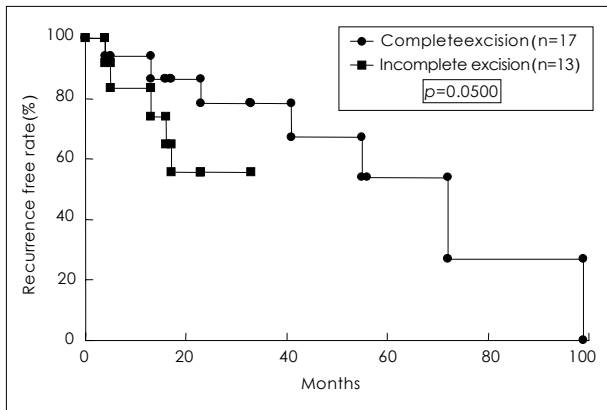


Fig. 1. Graphs showing recurrence free rate according to extent of surgery.

MRFP
72
33
p - value 0.050
(Fig. 1).

6. 수술 후 항암 치료 유무와 항암 치료제에 따른 소견
30
12 (anaplastic tumor), 18
regimen 8 in a day (methylprednisolone, vincristine, lomustine(CCNU), procarbazine, hydroxy-urea, cisplatin(CDDP), cyclophosphamide, imidazole carboximide(DTIC)) 가 6 , POG 9233(cyclophosphamide, vincristine/cisplatin, VP - 16) 6
MRFP 가 23
가 72 p - value 0.2175
MRFP 8 in a day MRFP
32 , POG 9233 57 , p - value 0.9805

7. 방사선 치료 유무와 방사선 조사 부위에 따른 소견
25
5 (3
low grade tumor 가)

14 , 11
p - value 0.7076
p - value 0.5029
가
고 찰
2~6%
9),
5). 5 34
6~12% peak가
20)
40%, 60%가
75%가
(
28.6 , 18.7
가 19 ,
22
30 8 (26%)
16.7
36.6
6).
20).
(가 가
) , 가
가
가
1. 나이 및 성별
가
가
11)¹⁵, Sal-
azar¹⁸ 12 가

Evans³⁾, Vanuytsel²¹⁾
가 가
Foreman⁴⁾, Shaw¹⁹⁾, Zorlu²³⁾

2. 종양의 위치 및 크기

Foreman⁴⁾
가
Needle¹²⁾ 가
Needle¹²⁾
9 high grade tumor

가
가
Salazar¹⁷⁾, Vanuytsel²¹⁾

3. 뇌척수액 전이 유무

20)
Pollack¹⁵⁾
가
가
가
가

4. 종양의 병리학적 소견

9)20)
high grade
low grade
7)22)

가

5. 수술의 제거범위

Italian Pediatric Neurooncology Group¹⁴⁾ 92
가 가
2)7)9)20)22)

가
가
13
가
가

6. 수술 후 항암 치료

가
1), Needle¹²⁾ 1997
가
가 Kuhl⁸⁾ anapla-
stic ependymoma 55%
가

7. 수술 후 방사선 치료

20~
60% 2)13) anaplastic ependymoma
가
10)18)
5)17)

결론

가
가

가

- : 2001 8 29
 - : 2001 11 9
 - :
- 138 - 736 388 - 1
- : 02) 2224 - 3550, 3559,
: 02) 476 - 6738
E - mail : jhkim1@amc.seoul.kr

References

- 1) Duffner PK, Horowitz ME, Krischer JP, Friedmann S, Burger PC, Cohen ME, et al : *Postoperative chemotherapy and delayed radiation in children less than three years of age with malignant brain tumors. N Engl J Med* 328 : 1725-1731, 1993
- 2) Ernestus R-, Schroder H, Stutzer H, Klug N : *The clinical and prognostic relevance of grading in intracranial ependymomas. Brit J Neurosurg* 11 : 421-428, 1997
- 3) Evans A, Anderson J, Lefkowitz-Boudreaux IB, Finlay JL : *Adjuvant chemotherapy of childhood posterior fossa ependymoma : cranio-spinal irradiation with or without adjuvant CCNU, vincristine and prednisone : A Children's Cancer Group study. Med Pediatr Oncol* 27 : 8-14, 1996
- 4) Foreman NK, Love S, Thorne R : *Intracranial ependymomas : Analysis of prognostic factors in a population-based series. Pediatr Neurosurg* 24 : 119-125, 1996
- 5) Goldwein JW, Corn BW, Finlay JL, Packer RJ, Rorke LB, Schut L : *Is craniospinal irradiation required to cure children with malignant (anaplastic) intracranial ependymomas? Cancer* 67 : 2766-2771, 1991
- 6) Kaatsch P, Kaletsch U, Michaelis J : *Jahresbericht 1996 des Deutschen Kerkrebsregisters ; Technischer Bericht des Institutes fur Medizinische Statistik und Dokumentation. Mainz, Germany : University Mainz, 1997*
- 7) Kim DG, Cho BK, Yang HJ, Chi JG, Jung HW, Kim HJ, et al : *Intracranial ependymoma : clinicopathologic features and prognostic factors. J Korean Neurosurg Soc* 20 : 893-899, 1991
- 8) Kuhl J, Hermann LM, Berthold F, Kortmann RD, Deinlein F, Maass E, et al : *Preradiation chemotherapy of children and young adults with malignant brain tumors : results of the german pilot trial HIT 88/89. Klin Padiatr* 210 : 227-233, 1998
- 9) Lee HC, Kim DW, Kwon KY, Lee JC, Son EI, Yim MB, et al : *The Correlation between the clinical and pathological findings of the intracranial ependymomas. J Korean Neurosurg Soc* 23 : 1047-1054, 1994
- 10) Leibel SA, Sheline GE : *Radiation therapy for neoplasm of the brain. J Neurosurg* 66 : 1-22, 1987
- 11) Nazar GB, Hoffinan HJ, Becker LE, Jenkin D, Humphreys RP, Hendrick EB : *Infratentorial ependymomas in childhood : prognostic factors and treatment. J Neurosurg* 72 : 408-417, 1990
- 12) Needle MN, Goldwein JW, Grass J, Cnaan A, Bergman I, Molloy P, et al : *Adjuvant chemotherapy for the treatment of intracranial ependymoma of childhood. Cancer* 80 : 341-347, 1997
- 13) Marks JE, Adler SJ : *Acomparative study of ependymomas by site of origin. Int J Radiat Oncol Biol Phys* 8 : 37-43, 1982
- 14) Perilongo G, Massimino M, Sotti G, Belfontali T, Masiero L, Rigobello L, et al : *Analyses of prognostic factors in a retrospective review of 92 children with ependymoma : Italian Pediatric Neuro-oncology group. Med Pediatr Oncol* 29 : 79-85, 1997
- 15) Pollack IF, Gerszten PC, Martinez AJ, Lo KH, Shultz B, Albright AL, et al : *Intracranial ependymomas of childhood : long-term outcome and prognostic factors. Neurosurgery* 37 : 655-666, 1992
- 16) Read G : *The treatment of ependymoma of the brain or spinal canal by radiotherapy : A report of 79 cases. Clin Radiol* 35 : 163-166, 1984
- 17) Salazar OM : *A better understanding of CNS seeding and a brighter outlook for postoperatively irradiated patients with ependymomas. Int J Radiat Oncol Biol Phys* 9 : 1231-1234, 1983
- 18) Salazar OM, Castro-Vita H, VanHoutte P, Rubin P, Aygun C : *Improved survival in cases of intracranial ependymoma after radiation therapy. Late report and recommendations. J Neurosurg* 59 : 652-659, 1983
- 19) Shaw EG, Evans RG, Scheithauer BW, Ilstrup DM, Earle JD : *Postoperative radiotherapy of intracranial ependymoma in pediatric and adult patients. Int J Radiat Oncol Biol Phys* 13 : 1457-1462, 1987
- 20) Timmermann B, Kortmann RD, Kuhl J, Meisner C, Slave I, Pietsch T, et al : *Combined Postoperative irradiation and chemotherapy for anaplastitc ependymomas in childhood : Results of the german prospective trials HIT 88/89 and HIT 91. Int J Radiat Oncol Biol Phys* 46 : 287-295, 2000
- 21) Vanuytsel LJ, Bessell EM, Ashley SE, Bloom HJ, Brada M : *Intracranial ependymoma : long-term results of a policy of surgery and radiotherapy. Int J Radiat Oncol Biol Phys* 23 : 313-319, 1992
- 22) Vigliani MC, Schiffer D : *Prognosis and treatment of anaplastic ependymomas. Crit Rev Neurosurg* 2 : 34-43, 1992
- 23) Zorlu AF, Atahan IL, Akyol FH, Gurkaynak M, Ozyar E : *Intracranial ependymomas : treatment results and prognostic factors. Radiat Med* 12 : 269-272, 1994