

두개강내 척삭종 및 연골육종 : 수술 및 방사선 치료의 효능

정영섭 · 곽호신 · 정희원 · 박홍준 · 백선하 · 김동규 · 김현집

= Abstract =

Intracranial Chordomas and Chondrosarcomas : The Effectiveness of Surgery and Radiation Therapy

Young-Seob Chung, M.D., Ho-Shin Gwak, M.D., Hee-Won Jung, M.D.,
Hong-Jun Park, M.D., Sun Ha Paek, M.D.,
Dong Gyu Kim, M.D., Hyun Jib Kim, M.D.,

Department of Neurosurgery, Seoul National University College of Medicine, Seoul, Korea

Introduction : The management of chordomas and chondrosarcomas in the skull base is difficult due to the critical location, locally aggressive nature, and high recurrence rate. The authors present the effectiveness of surgical removal and radiation therapy on survival and tumor recurrence.

Material and Methods : Thirty cranial base chordomas and chondrosarcomas from 23 patients(14 patients with chordomas and 9 patients with chondrosarcomas) were operated in our institution between 1985 and 1998. There were 15 men and 8 women, with a mean age of 40.7 years. The largest diameter of tumors ranged from 15 to 70mm (mean 41.5). The extent of surgical removal was subtotal or total in a half(15 operations). In nineteen operations, tumors were removed by conventional approaches and skull base approaches were applied in 11 operations. Postoperative radiation therapy was performed in 16(70%) patients. The mean duration of follow up is 50 months(1 - 156 months).

Results : The 3- and 5-year survival rates(YSR) of overall patient are 75% and 67%, respectively. The analysis showed that 1) skull base approach to chordomas and chondrosarcomas showed a tendency to remove more portion of the tumors($p=0.058$) but leave more frequent incidence of new deficits($p=0.047$) : 2) larger tumor diameter affected the extent of removal($p=0.028$) : 3) the extent of removal seemed to be the determining factor for overall survival and recurrence-free survival(the 5-YSR and RFSR of subtotal or total removal group are 92% and 80% vs. 40% of partial removal or biopsy group) : 4) conventional radiation therapy improved patient survival(5-YSR of patients who received RT is 76% whereas 5-YSR of those who didn't receive RT is 43%) but failed to prolong long-term recurrence-free survival.

Conclusion : The extent of removal and postoperative radiation therapy are determining factors of patients' survival in skull base chordomas and chondrosarcomas. However, none of these factors significantly influenced the survival in multivariate analysis. Aggressive surgical removal of more than subtotal resection combined with postoperative radiation therapy seems to be the choice of therapy in the management of these tumors.

KEY WORDS : Chordoma · Chondrosarcomas · Skull base · Extent of removal · Radiation.

서 론

가 가
가 .

가
 primitive notochord remnant
 0.1~0.2%
 primitive mesenchymal cell
 embryonal rest
 18)20)

3
 41mm(15~70mm)
 (Fig 1A), [V = 4/3 r1 x r2 x r3
 1/2 x d1 x d2 x d3]
 (d)
 23.3cm³(2~105cm³)
 (compartment) (clivus),
 (sella), (sphenoid), (CP angle),
 (middle fossa), (petrous bone), (for a-
 men magnum)
 2 가 47%, 3
 가 53% (Fig. 1B).

대상 및 방법

1. 대상 환자
 1985 1998
 23 (14 , 9)
 . 30 5
 . 2
 (stage operation) 15 : 8(
 10 : 4, 5 : 4)
 40.7 (42 , 39)
 (82%) (61%) 가

(Table 1).

2. 종양 인자

Table 1. Presenting symptoms and signs of patients with chordomas and chondrosarcomas(N = 23)

Symptoms and Signs	Number(%)
Headache	19 (82)
Diplopia	14 (61)
Visual loss/field defect	6 (26)
Weakness/sensory loss of limbs	5 (22)
Facial numbness/pain	3 (13)
Hearing loss/vertigo	2 (9)
Hoarseness/dysphagia	2 (9)

3. 치료 인자

(conventional approach) 19
 (skull base approach) 11
 30
 (transsphenoidal approach) 7 가
 (retromastoid approach) 5 ,
 (subtemporal approach) 4 ,
 (subfrontal approach) 1 , (fronto-
 temporal approach) 1 - (stereo - tactic
 biopsy) 1 -

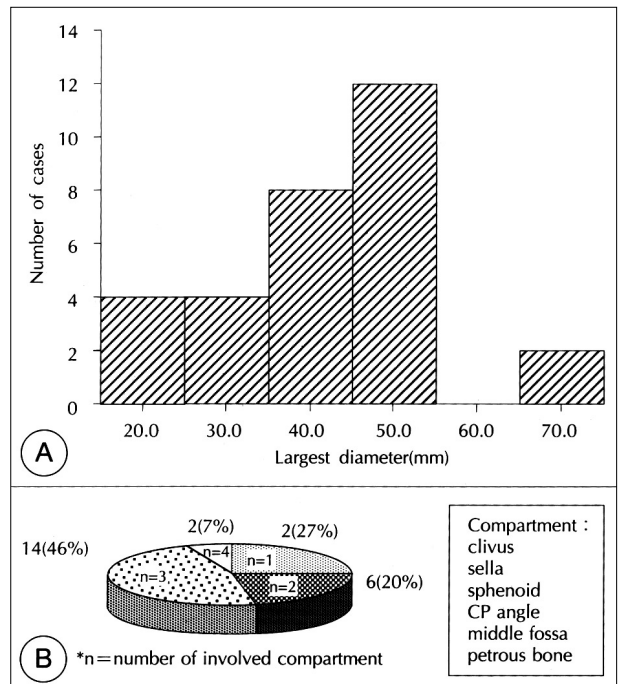


Fig. 1. The largest diameter (A) and number of involved compartment (B) of operated cases in chordomas and chondrosarcomas(N = 30).

(transpetrosal - transtentorial approach) 3
, (infratemporal fossa approach) 2 ,
(orbitozygomatic approach) 2 ,
(transoral approach) 2 , (transm -
axillary approach) 1 .
50% , 95%
50~95% 가
16 (70%)
5400~6480cGy

7 (30%)

4. 추적 조사 및 결과 분석

50 SP -
(1~156) Kaplan -
SS(ver 8.0) SAS(er 6.11) Meier
Wilcoxon - log rank test
Cox proportional
hazard model
Chi -
square test Independent t - test
95% (p value<0.05)

결 과

1. 수술적 제거정도 및 관련인자
30 (total resection)
7 , (subtotal resection) 8 , (pa -
rtial resection) 14 , (biopsy) 1 .
가 가 가
가 가 가
(78%), (22%)
(Table 2).
3 (16%), 4 (21%),
11 (58%), 1 (5%)가 ,
4 (36%), 4 (36%),
3 (27%)가 .

Table 2. The causes of incomplete removal in chordomas and chondrosarcomas(N = 23)

Cause of incomplete removal	No of cases (%)
Inadequate exposure	18 (78%)
Hard consistency	5 (22%)
Vessel encasement (profuse bleeding)	4 (17%)
Cavernous sinus invasion	2 (9%)
Cranial nerve adhesion	1 (4%)
Brainstem adhesion	1 (4%)

Table 3. The extent of tumor removal according to mode of approach in chordoma and chondrosarcoma(N = 30)

Extent of removal	Conventional (N = 19)	Skull base (N = 11)
	Total	3 (16%)
Subtotal	4 (21%)	4 (36%)
Partial	11 (58%)	3 (27%)
Biopsy	1 (5%)	

*P value denotes the statistical difference between total or subtotal and partial or biopsy according to mode of approach by Fisher's exact test.

Table 4. The extent of tumor removal according to tumor factors in chordoma and chondrosarcoma(N = 30)

Tumor factors	Extent of removal	
	STR or TR	PR or Bx
Largest diameter		
4cm	11	5
>4cm	4	10
Calculated tumor volume		
18cm ³	11	6
>18cm ³	4	9
Involved compartment		
2	9	5
3	6	10

TR = total removal, STR = subtotal removal
PR = partial removal, Bx = biopsy

(p=0.058, Table 3).

(4cm),
(18cm³),
(Table 4)
4cm
가 4 (29%),
가 10 (71%) , 4cm
가 11 (69%),
가 5 (31%)
(p=0.028).
18cm³ 가

2 (p=0.143)
 가 (p=0.065 p=
 0.143).

2. 수술 합병증
 ()
 2 (operative mortality) 6.7%
 13 (43%)
 2 ,
 (17%), (13%),
 (7%) (10%)
 (Table 5).

11 (37%)
 7
 (64%) , 4 (21%)
 .(p=0.047, Table 6)

3. 생존기간 및 재발까지의 기간
 6 (26%) 가
 (mean survival time) 113 3
 5 75%, 67% . 7
 (33%)
 40 3
 1
 (recurrence - free survival)
 75 3 84%, 5
 65% .

Table 5. Postoperative complications according to the mode of approaches in chordoma and chondrosarcoma (N = 30)

Complications	Conventional approach (N = 19)	Skull base approach (N = 11)	Total
Wound infection	0	2	2(7%)
Diplopia	1	4	5(17%)
Facial palsy	1	3	4(13%)
Lower cranial nerve palsy	1	1	2(7%)
Hemiparesis	2	1	3(10%)
Brainstem infarction	1	1	2(7%)

Table 6. The incidence of complication at different period according to mode of approach in chordoma and chondrosarcoma(N = 30)

	No of cases with complication(%)		p
	Conventional approach(N = 19)	Skull base approach(N = 11)	
Immediate postoperative period	5(26%)	8(73%)	p = 0.023
Permanent complication	4(21%)	7(64%)	p = 0.047

*P value denotes the statistical difference in occurrence of complications according to mode of approach by Fisher's exact test.

1) 수술적 제거 정도에 따른 생존 및 재발-회피 곡선

1
 가 (survival time)
 117 , 5 92% ,
 77 , 5 40%
 가
 (p=0.035, Fig. 2A).
 (recurrence - free survival)
 100 , 5 -
 80% , 60 , 40%

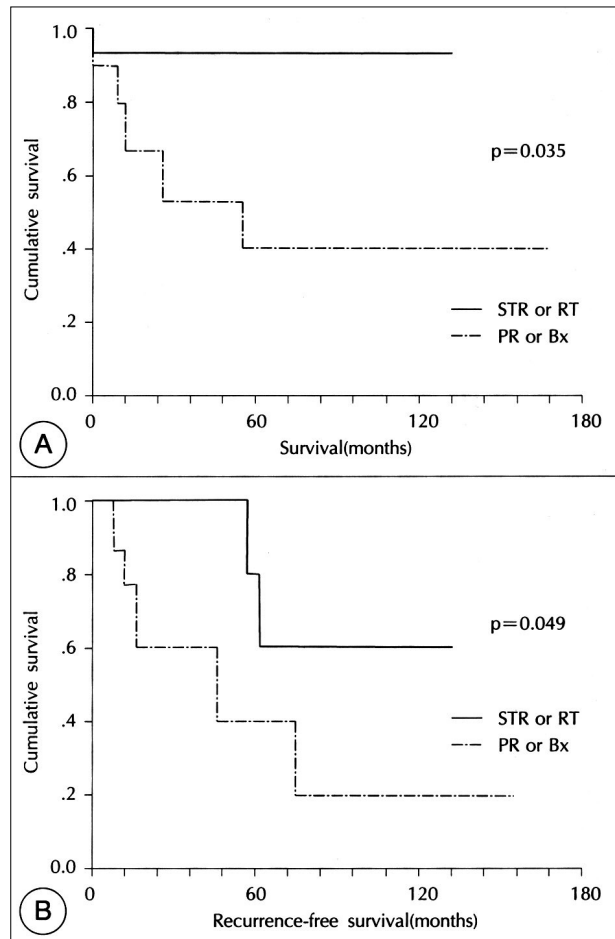


Fig. 2. Survival (A) and recurrence-free survival (B) curves according to extent of removal in patients with chordomas and chondrosarcomas.

(p=0.049, Fig. 2B).

2) 방사선 치료 여부에 따른 생존 및 재발 회피 곡선

가
129 , 5 76% , 50 , 5
43%
(p=0.028 Fig. 3A)
109 , 44
(p =
0.083, Fig. 3B). 47
7 3
가 16 3
4

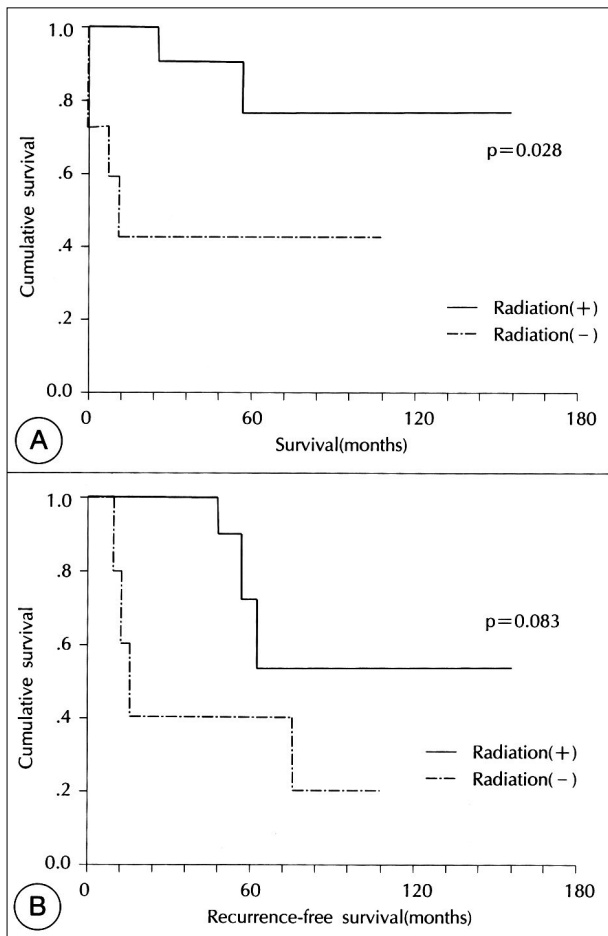


Fig. 3. Survival (A) and recurrence-free survival (B) curves according to postoperative radiation therapy in patients with chordomas and chondrosarcomas.

3) 수술적 제거 정도와 방사선 치료여부에 따른 교란 변수의 보정

11 (83%) ,
5 (50%) 가
(p=0.17).

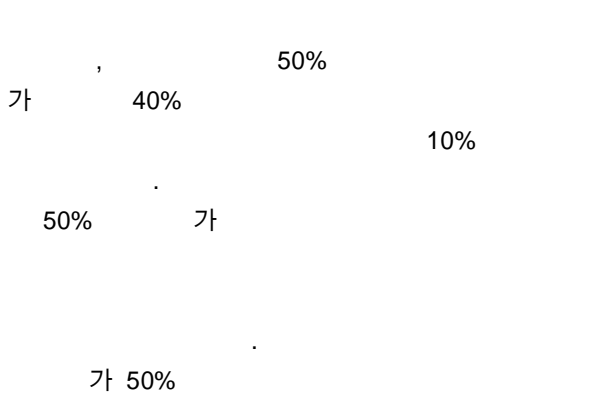
Cox proportional hazard model 가

고찰

1. 수술 접근법 및 합병증

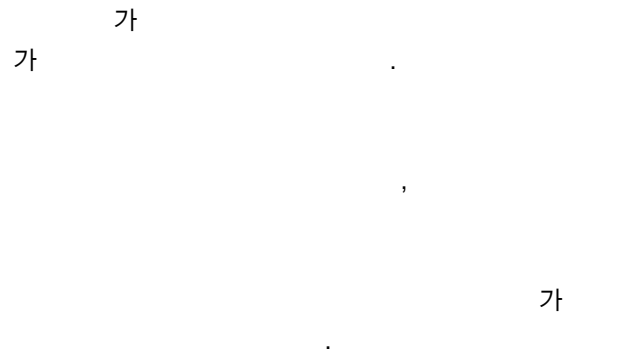
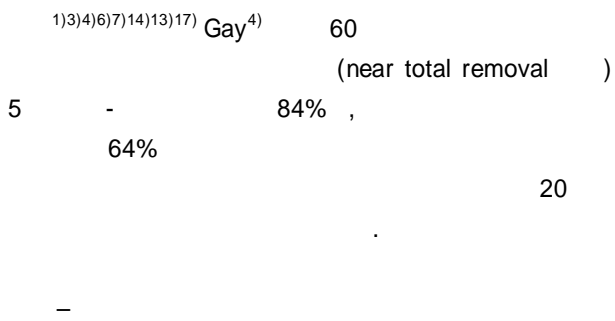
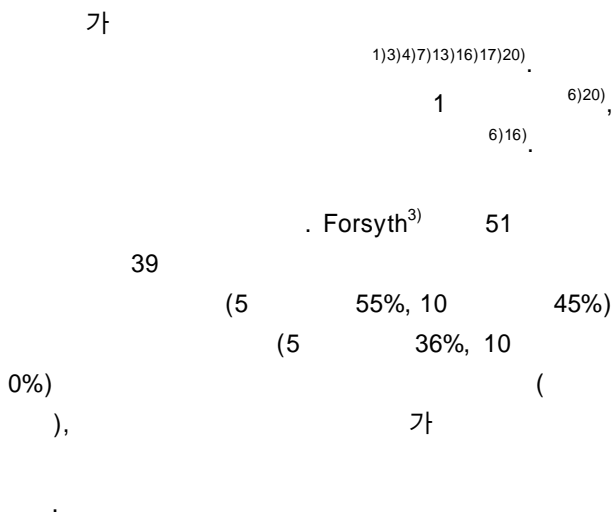
가
14)
(extradural)
14)13)17)
가 가 가
(perforating artery)
(frozen section)가 가 4)14)16)18)
Sen¹⁷⁾
53% 88%
Gay⁴⁾ 47%
5% 가 3
, 60%
40%
가

AI - Mefty¹⁾ (radical removal)

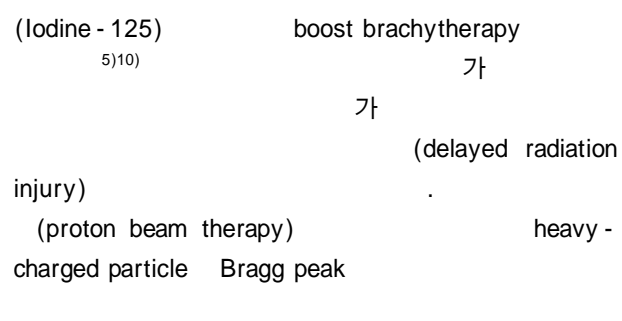
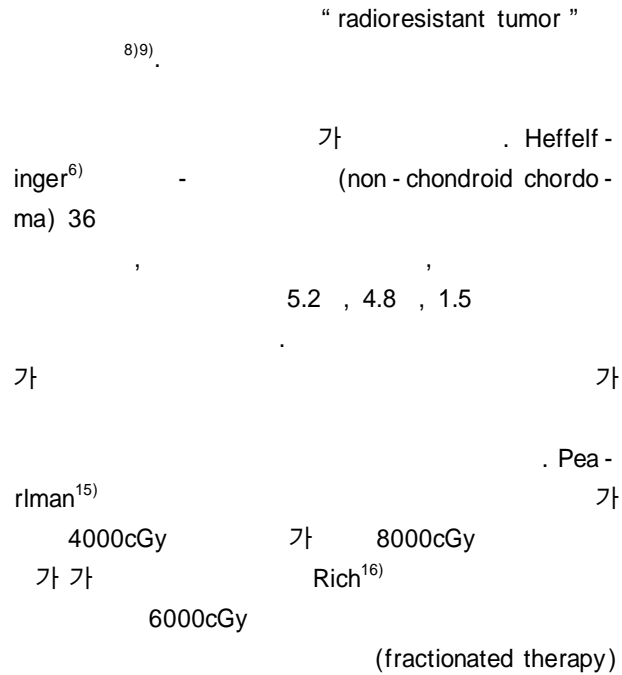


(p=0.058)

2. 수술적 제거정도와 생존



3. 방사선 치료의 역할



11 10 가 가

(local control) . Austin -

Seymour¹⁹⁾ 68

69Gy 5 가 3

(local control rate) 82% 가 3 1

marginal failure 가 (stable disease)

(13%) (4.5%) 2

가

(stereotactic

radiosurgery) Kondziolka⁸⁾ . Forsy -

(tumoricidal dose) th³⁾ 51

(40),

(mitotic index)

Muthukmar¹²⁾ 가 가

4 15 73% 2

4

(local failure)

가 (3cm) - 11 2

가

결 론

4. 이외 고려 사항들

(chondroid chordoma)

가 3)⁶⁾²⁰⁾

14 3

Matsuno¹¹⁾ MIB - 110 - 744 28

1 가 가

: 02) 760 - 2355, : 02) 744 - 2339

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