

*, †, ‡

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_____ : 가

_____ : 1997 1 2000 12 41

(2) . 가 가 1 11 (50%) 2 7 (36.8%) 가

10MV X-ray 45 ~ 54 Gy (: 50.4 Gy)

_____ : 1 가 12 (54.5%) 2 3 (15.8%)

(p=0.010), 1 12 7 가 2

. 1 2 3 가 38.3%, 38.9% 3 18.8% 26.3%

(p=0.06) 3 3 24.2% 36.4%

(p=0.04).

_____ :

: Bile duct cancer, Operation, Radiation therapy

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1998 1.7% 가 3 1

1) hilar resection en block

20 ~ 50% 2 ~ 4) 1

5 10 ~ 20% (pancreaticoduodenectomy)

18 ~ 24 4,5) 3 1 major bile duct

25 ~ 40% excision 가

1999 (fozen section)

2003 3 17 2003 4 28 5-FU

(carcinoma in situ)

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가 (Table 1). 10 MV X-ray AP, both lateral 3 45 ~ 54 Gy (: 50.4 Gy) 1.8 Gy 5 5FU+cisplatin (FP) 5FU+Leucovorine (LF) regimen 3 1 3 (13.6%) 가 2 17 (89.5%) 가 . 19) , 2 3 ~ 54 (24) . 2

1997 1 2000 12 41 22 19 (1), 2 가 , 1 2 가 . Kaplan - Meier Log - Rank Wilcoxon Chi - square

segmental resection 1 2 4 , 7 , whipple's pylorus preserving pancreaticoduodenectomy (PPPD)가 16 , 10 , 가 1 11 (50%), 2 7 (36.8%)

Table1. Patients Characteristics

Characteristics	OP (%) (n=22)	OP+RT (%) (n=19)	p - value
Male : Female	14 : 8	15 : 4	0.283
Age (median)		38 ~ 85 (66)	36 ~ 76 (58)
Location	Proximal 2 (9.0) Mid 1 (4.5) Distal 19 (86.4)	5 (26.3) 3 (15.8) 11 (57.9)	0.121
Resection	Complete 11 (50.0) Incomplete 11 (50.0)	7 (36.8) 12 (63.2)	0.397
Stage	I 9 (40.9) II 8 (36.4) III 5 (22.7)	8 (42.1) 7 (36.8) 4 (21.1)	0.991
Pathology	Adeno 20 (90.0) Adenosquamous 2 (9.1)	18 (94.7) 1 (5.3)	0.639
Differentiation	Well 10 (45.5) Mod 9 (40.9) Poor 3 (13.6)	9 (47.4) 9 (47.4) 1 (5.3)	0.658
Perineural invasion	Yes 14 (63.6) No 8 (36.4)	14 (73.7) 5 (26.3)	0.491
Lympho - vascular invasion	Yes 7 (31.8) No 15 (68.2)	9 (47.4) 10 (52.6)	0.309

가 2

1 2 . 1

Table 2. Pattern of Failure

	OP (n=22)			OP+RT (n=19)		
	Complete (n=11)	Incomplete (n=11)	Total (%)	Complete (n=7)	Incomplete (n=12)	Total (%)
Local	2	4	6 (27.3)	-	2	2 (10.5)
Distant	1	1	2 (9.1)	5	6	11 (57.9)
Local+Distant	3	3	6 (27.3)	-	1	1 (5.3)
Local component	5	7	12 (54.5)	-	3	3 (15.8)
Distant component	4	4	8 (36.4)	5	7	12 (63.2)

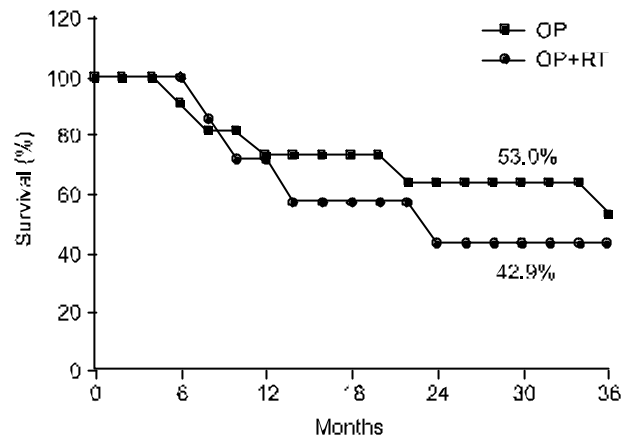
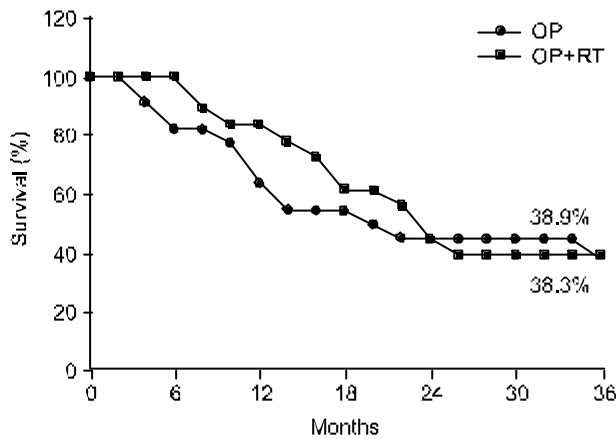


Fig. 3. 3-year overall survival rate in the complete resection group.

Fig. 1. 3-year overall survival rate.

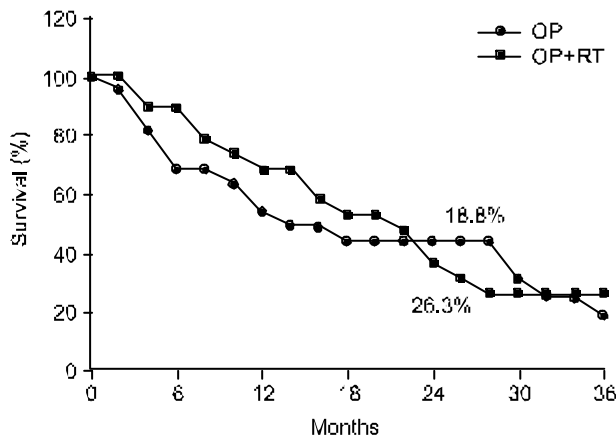


Fig. 2. 3-year disease free survival rate.

(15.8%)

가 12 (54.5%) 2 3
 (p=0.010), 1 12 7
 2 3

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8

(36.4%), 2 12 (63.2%) 2
 (p=0.087)(Table 2).
 가 4 가 3 ,
 가 1 2 가 5 , 가 1 ,
 가 2 , 가 1 , 가 1 ,
 가 1 , 가 1 .
 1 2 3 38.3%, 38.9%
 3 18.8% 26.3%
 (Fig. 1, 2). 1 2

42.9%

(Fig. 3),

36.4%

3

53.0%

3

25.0% 18.2%

(p=0.04)(Fig. 5).

3

24.2%

6 : Postoperative Radiotherapy in Bile Duct Cancer

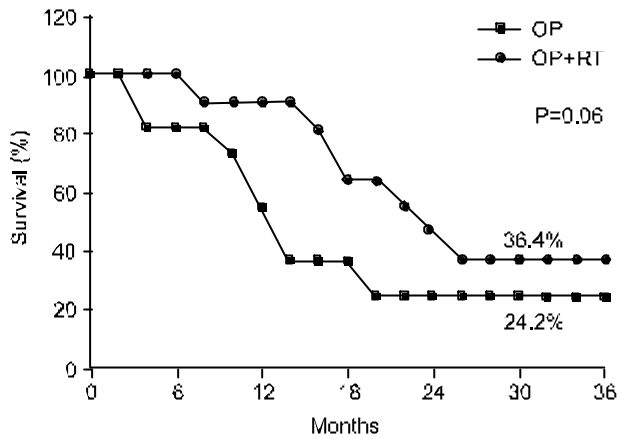


Fig. 4. 3-year overall survival rate in the incomplete resection group.

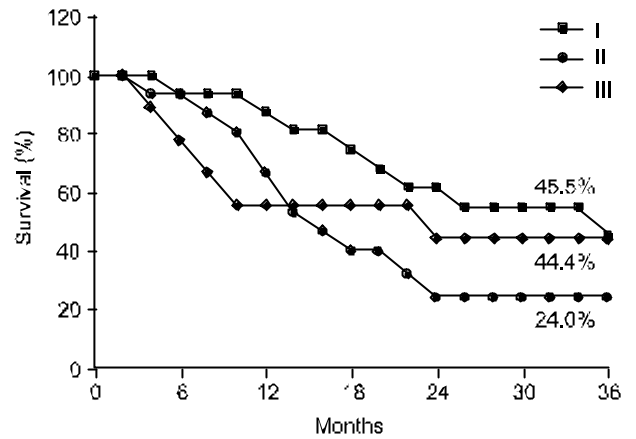


Fig. 6. 3-year overall survival rate according to the stage.

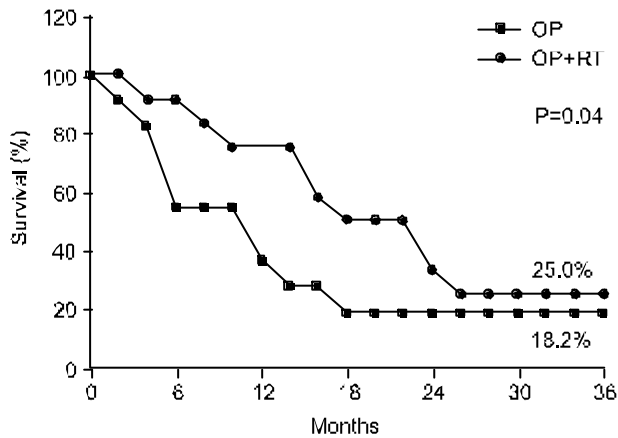


Fig. 5. 3-year disease free survival rate in the incomplete resection group.

Table 3. Prognostic Factors

Factors		3-yr overall survival rate		
		OP (n=22)	OP+RT (n=19)	p-value
Age	> 60	26.0	50.0	0.518
	60	33.3	30.0	0.955
Sex	M	31.2	21.4	0.233
	F	25.0	66.7	0.029
Location	Proximal	50.0	20.0	0.429
	Distal	29.5	25.0	0.689
Resection	Complete	53.0	42.9	0.686
	Incomplete	24.2	36.4	0.153
Stage	I	38.9	57.1	0.612
	II	37.5	14.3	0.812
	III	40.0	50.0	0.579
Differentiation	Well	32.0	28.6	0.929
	Mod	44.4	62.5	0.591
Perineural invasion	Yes	42.9	30.8	0.852
	No	37.5	60.0	0.514
Lymphovascular invasion	Yes	42.9	33.3	0.981
	No	45.0	44.4	0.513

가 가 (Table 3).

I II (p=0.04)(Fig 6).

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RTOG grade 1 9 grade 2가 6 , grade 1 4 , grade 2가 7 grade 3 2

6~8) 가

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Table 4. Results of Adjuvant Radiotherapy for Extrahepatic Cholangiocarcinoma

Author	Treatment	No. of patients	EBRT (Gy)	ILRT (Gy)	Median survival (Mo)	3YSR (%)	Comment
Todoroki, 2000	S (micro+)	19			10	13.4*	p=0.014
	S (micro+)+RT	28	43.6 (21 [†])		32	33.9*	
Zlotecki, 1998	S (complete)	9			26.1	19*	p=0.07
	S (complete)+RT	8	30 ~ 60		43.4	35*	
Schoenthaler, 1994	S (micro+)	65			11		p=0.0109
	S (micro+)+RT	42	45.5 ~ 65		21.5		
Mahe, 1991	S (micro+)+particle	22			61		p=0.045
	S (micro+)+RT	14	45	10 ~ 15	27.5	55.0	
Veeze - Kuijpers, 1990	S (gross+)+RT	12	45	10 ~ 15	13	10	p=0.06
	S (micro+)+RT	11	30 ~ 40	15	15	36.0	
	RT alone	31	40	25	8	6.0	

*: 5 - year survival rate, †: dose of IORT. EBRT: External Beam Radiation Therapy, ILRT: Intraluminal Radiation Therapy, 3YSR: 3 - Year Survival Rate, S: Surgery, RT: Radiation Therapy, micro+: microscopic residual tumor, gross+: gross residual tumor

9 ~ 11)

Table 4 . Todoroki 가

12) Schoenthaler 13) 가

Zlotecki 14) 가 Alden 18) 55Gy 48%

Mahe 15) 55 Gy 0%

Kuijpers 16) , Veeze - 가 , Gonzalez 17) 40 Gy , 40 ~ 50 Gy, 50 Gy 9.02 , 18.86 , 15.96

17 38 40 Gy 50Gy 8.3 19 가

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3 1 가 mycine C 가 5 - FU, mito- 10% , 19,20) 30% 가 21) 가 가 가 5 - FU가

- intravenous fluorouracil and subcutaneous interferon alpha-2b for biliary tract cancer. *J Clin Oncol* 1996;14:2311 - 2315
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The Role of Postoperative Radiation Therapy in Extrahepatic Bile Duct Cancers

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Purpose: The goal of this study was to determine the role of postoperative radiation therapy in extrahepatic bile duct cancers.

Materials and Methods: Between 1997 and 2001, 41 patients with extrahepatic bile duct cancer having undergone surgical resection were retrospectively analyzed. Of the 41 patients, 22 were treated by surgery alone (Group I) with remaining 19 treated by surgery and postoperative radiation therapy (Group II). A gross total surgical resection with pathologically negative margins was performed in 11 of the patients (50%) in Group I, and in 7 of the patients (36.8%) in Group II. There were no significant differences in the disease stage, surgical procedure or pathological characteristics of the two groups. The patients in group II received 45 ~ 54 Gy (median: 50.4 Gy) of external beam radiation therapy to the tumor bed and draining nodal area.

Results: The local failure rate was significantly higher in group I (54.5%) than in group II (15.8%) ($p=0.010$). Of the 12 failed patients in Group I and the 3 failed patients in group II, 7 and 3 had a positive resection margin. The overall 3-year survival rates were 38.3 and 38.9% and the 3-year disease free survival rates were 18.8 and 26.3% in groups I and II, respectively. However, the patients with positive resection margins who received adjuvant radiation therapy had higher 3-year overall survival rates than those with surgery alone (36.4% vs. 24.2%, $p=0.06$), and 3-year disease free survival rate was significantly higher in the group II patients who had positive margins compared with those in group I (25.0% vs. 18.2%, $p=0.04$).

Conclusion: Postoperative adjuvant radiation therapy appeared to reduce the incidence of local failure in patients with extrahepatic bile duct cancer, and might improve the survival rate in the patients with positive resection margins.

Key Words: Bile duct cancer, Operation, Radiation therapy