

*
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_____ : 가

_____ :1971 1 1992 12
 106 35
 71 가 1 가 8 , 2 가 18 ,
 3 가 9 10 MV X-ray 2 Gy 40 64 Gy (48
 Gy)가 radium Henshke applicator point
 A 22 59 Gy (43 Gy)가 1 가 16 , 2 가 38 ,
 3 가 17 40 61 Gy (45 Gy) 1.8 2.0
 Gy Co-60 RALS (remote afterloading system) 3
 Gy 3 30 57 Gy (39 Gy)가
 _____ : 5 1, 2, 3 72.9, 61.9, 45.0%
 87.1, 58.3, 41.2% ($p>0.05$). 5
 가 11.4% grade I 26.8%
 가

_____ : 5
 3 가 2

:Adenocarcinoma, Uterine cervix, High dose-rate, Low dose-rate

1997
 1999 12 30 2000 3 2
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 E-mail:cheol@dragon.inha.ac.kr
 2000;18(1):32 39

.4 10)

가

가

가

가

6 12%

.11 15)

3

가

.16,17)

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.1 3)

가

가
12 14,18,19)

11,20)

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가

Nakano 21)
가

1980 71

가 Co-60

Table 1. Patients Characteristics in Adenocarcinoma of the Uterine Cervix

Characteristics	LDR (%) (n=35)	HDR (%) (n=71)	p-value
Age			
range	26 66	32 79	
Mean	48	51	
Stage			
I	8 (22.9)	16 (22.5)	0.975
II	18 (51.4)	38 (53.5)	
III	9 (25.7)	17 (24.0)	
Pathology			
Ebdcervucal	31 (88.6)	54 (76.1)	0.405
Endometrioid	1 (2.9)	2 (2.8)	
Clear cell	-	2 (2.8)	
Adenosquamous	3 (8.6)	13 (18.3)	
Differentiation			
Well	11 (31.4)	19 (26.8)	0.819
Moderate	5 (14.3)	12 (16.9)	
Poor	3 (8.6)	10 (14.1)	
Unknown	16 (45.7)	30 (42.2)	
Tumor size			
4 cm	14 (40.0)	39 (54.9)	0.001
> 4 cm	4 (11.4)	25 (35.2)	
unknown	17 (48.6)	7 (9.9)	
External RT dose			
45 Gy	13 (37.1)	46 (64.8)	0.007
> 45 Gy	22 (62.9)	25 (35.2)	

Table 1

FIGO

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Year	1971	1980	1992
Number of patients	4	4	106
Age (Mean)	48	48	51
Stage	I: 8 (22.9)	I: 16 (22.5)	I: 16 (22.5)
II: 18 (51.4)	II: 38 (53.5)	II: 38 (53.5)	
III: 9 (25.7)	III: 17 (24.0)	III: 17 (24.0)	
Pathology	Ebdcervucal: 31 (88.6)	Ebdcervucal: 54 (76.1)	Ebdcervucal: 54 (76.1)
Endometrioid: 1 (2.9)	Endometrioid: 2 (2.8)	Endometrioid: 2 (2.8)	
Clear cell: -	Clear cell: 2 (2.8)	Clear cell: 2 (2.8)	
Adenosquamous: 3 (8.6)	Adenosquamous: 13 (18.3)	Adenosquamous: 13 (18.3)	
Differentiation	Well: 11 (31.4)	Well: 19 (26.8)	Well: 19 (26.8)
Moderate: 5 (14.3)	Moderate: 12 (16.9)	Moderate: 12 (16.9)	
Poor: 3 (8.6)	Poor: 10 (14.1)	Poor: 10 (14.1)	
Unknown: 16 (45.7)	Unknown: 30 (42.2)	Unknown: 30 (42.2)	
Tumor size	4 cm: 14 (40.0)	4 cm: 39 (54.9)	4 cm: 39 (54.9)
> 4 cm: 4 (11.4)	> 4 cm: 25 (35.2)	> 4 cm: 25 (35.2)	
unknown: 17 (48.6)	unknown: 7 (9.9)	unknown: 7 (9.9)	
External RT dose	45 Gy: 13 (37.1)	45 Gy: 46 (64.8)	45 Gy: 46 (64.8)
> 45 Gy: 22 (62.9)	> 45 Gy: 25 (35.2)	> 45 Gy: 25 (35.2)	

Year	1971	1980	1992
Number of patients	4	4	106
Age (Mean)	48	48	51
Stage	I: 8 (22.9)	I: 16 (22.5)	I: 16 (22.5)
II: 18 (51.4)	II: 38 (53.5)	II: 38 (53.5)	
III: 9 (25.7)	III: 17 (24.0)	III: 17 (24.0)	
Pathology	Ebdcervucal: 31 (88.6)	Ebdcervucal: 54 (76.1)	Ebdcervucal: 54 (76.1)
Endometrioid: 1 (2.9)	Endometrioid: 2 (2.8)	Endometrioid: 2 (2.8)	
Clear cell: -	Clear cell: 2 (2.8)	Clear cell: 2 (2.8)	
Adenosquamous: 3 (8.6)	Adenosquamous: 13 (18.3)	Adenosquamous: 13 (18.3)	
Differentiation	Well: 11 (31.4)	Well: 19 (26.8)	Well: 19 (26.8)
Moderate: 5 (14.3)	Moderate: 12 (16.9)	Moderate: 12 (16.9)	
Poor: 3 (8.6)	Poor: 10 (14.1)	Poor: 10 (14.1)	
Unknown: 16 (45.7)	Unknown: 30 (42.2)	Unknown: 30 (42.2)	
Tumor size	4 cm: 14 (40.0)	4 cm: 39 (54.9)	4 cm: 39 (54.9)
> 4 cm: 4 (11.4)	> 4 cm: 25 (35.2)	> 4 cm: 25 (35.2)	
unknown: 17 (48.6)	unknown: 7 (9.9)	unknown: 7 (9.9)	
External RT dose	45 Gy: 13 (37.1)	45 Gy: 46 (64.8)	45 Gy: 46 (64.8)
> 45 Gy: 22 (62.9)	> 45 Gy: 25 (35.2)	> 45 Gy: 25 (35.2)	

1. 1971 1992
148
가
18
Iridium-192
4 4
6 106
1980 가
35
radium

Table 1
FIGO
가
가
가
2.
10 MV X-ray
AP/ PA 4
5 1.8 2 Gy
43 Gy
40 61 Gy (45 Gy)
40 64 Gy (48 Gy)
Henshke applicator
65 80 mg radium
point A 22 59 Gy
(43 Gy) 1 2
Modified Manchester
Applicator Co-60
3 3 Gy
Gy (39 Gy) point A 30 57
22)
3.
2 3
6
central failure
가
106 102 가 5
41 system23) Kottmeier grading
Kaplan-Meier chi-square test , log rank test

12.5, 12.5% 0,

6.3%

가

(Table 2).

1.

1

Table 2. Patterns of Failure According to Stage after HDR and LDR Intracavitary Radiation Therapy in the Patients with Adenocarcinoma of the Uterine Cervix

Stage	LDR* (n=35)			HDR § (n=71)		
	LF † (%)	DF ‡ (%)	LF + DF (%)	LF (%)	DF (%)	LF + DF (%)
I	1/8 (12.5)	1/8 (12.5)	1/8 (12.5)	-	1/16 (6.3)	-
II	3/18 (16.7)	2/18 (11.1)	1/18 (5.6)	8/38 (21.1)	4/38 (10.5)	1/38 (2.6)
III	2/9 (22.2)	-	-	4/17 (23.5)	1/17 (5.9)	1/71 (5.9)
Total	6/35 (17.1)	3/35 (8.6)	2/35 (5.7)	12/71 (16.9)	6/71 (8.5)	2/71 (2.8)

*High Dose Rate, † Local Failure, ‡ Distant Failure, § Low Dose Rate

Table 3. Prognostic Factors in Adenocarcinoma of the Uterine Cervix

Factors	5-year survival rates (%)		p value
	LDR	HDR	
Age			
50	57.1	66.6	0.7186
> 50	55.6	55.3	0.4476
Differentiation			
Well	56.2	83.1	0.0594
Moderate	33.3	74.1	0.3299
Poor	0	60	0.1796
Tumor size			
4 cm	68.1	71.0	0.8217
> 4 cm	66.7	57.1	0.6412
Stage			
I	72.9	87.1	0.4569
II	61.9	58.3	0.8813
III	45.0	41.2	0.8830

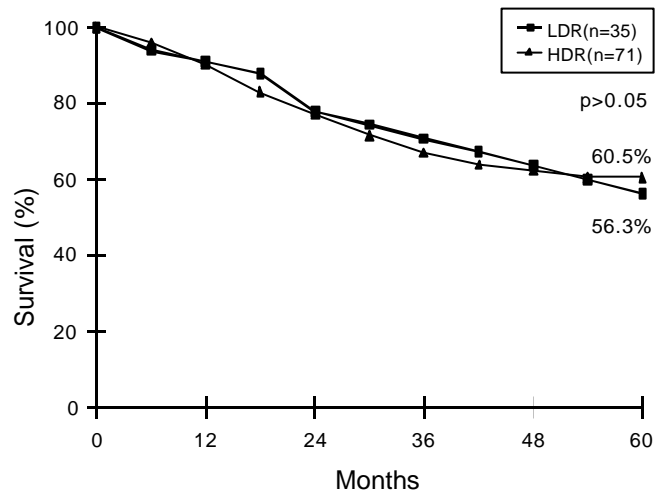


Fig. 1. 5-year overall survival rates after HDR and LDR intracavitary radiation therapy in the patients with adenocarcinoma of the uterine cervix.

2.

(Table 3).

3.

5

Fig. 1, 2

56.3%

60.5%

1 가 87.1%, 5

2 가 58.3% 3 가 41.2%

1 가 72.9%, 2 가 61.9%, 3 가 45%

Table 4
가

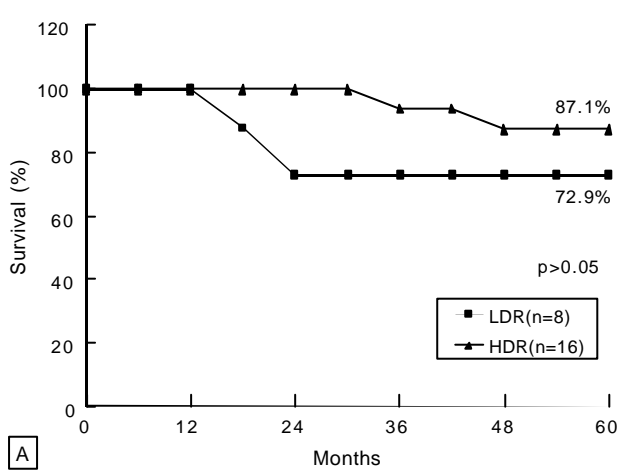
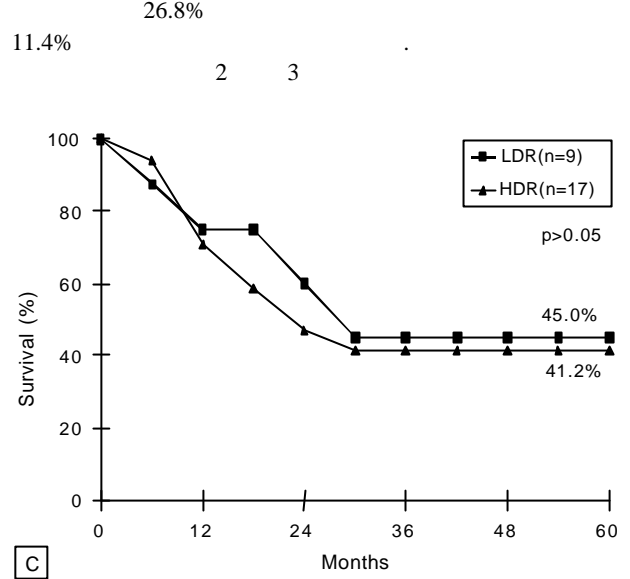
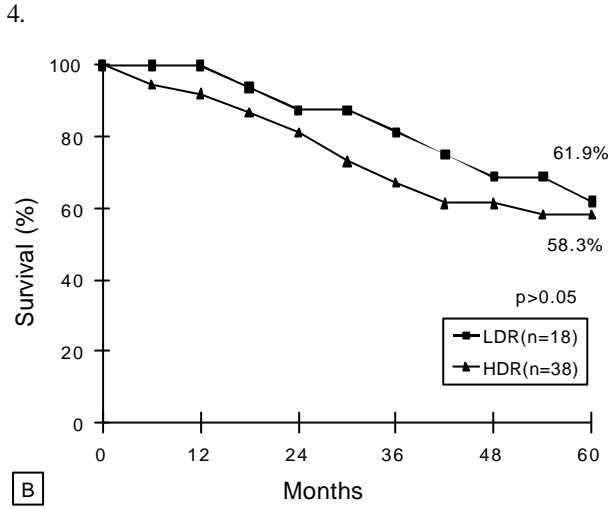


Table 5
grade I
grade II, III
grade II, III
가
4.2%, 1.4%

Table 4. Late Complication Rates after HDR and LDR Intracavitary Radiation Therapy in the Patients with Adenocarcinoma of the Uterine Cervix

Stage	Complication rates(%)		p-value
	LDR(n=35)	HDR(n=71)	
I	0/ 8 (0)	1/16 (6.3)	0.47
II	3/18 (16.7)	12/38 (31.6)	0.239
III	1/ 9 (11.1)	6/17 (35.3)	0.186
Total	4/35 (11.4)	19/71 (26.8)	0.072

Table 5. Grade and Site of the Late Complication after HDR and LDR Intracavitary Radiation Therapy in the Patients with Adenocarcinoma of the Uterine Cervix

	LDR (n=35)			HDR (n=71)		
	GI	GII	GIII	GI	GII	GIII
Rectum	1/35	-	-	10/71	3/72	-
Bladder	2/35	-	-	4/71		
Combined	1/35	-	-	1/71		1/71
Total	4/35 (11.4)	-	-	15/71 (21.1)	3/71 (4.2)	1/71 (1.4)

Grade I:mild subjective symptoms

Grade II:moderately severe objective changes such as necrosis, ulcer, stenosis

Grade III:fistula or severe rectal stenosis requiring surgery

Nakano 21)

가 .11,13) 5 가

가

가 Nakano 1, 2, 3 mixed dose 50, 100, rate 62.5%

Nakano mixed dose rate 60, 40, 41.7%

가 3,34) Teshima 3)

가

.24,25)

가 vaginal

.12 14,26 30) packing

point dose

가 가 point dose

3 11%

.4 8) 가

.31 33)

point A .35 39) Koga 10) 3
 Gy 5 6 Gy 3 , Ogino
 40) 5 6 Gy
 5 6 Brenner
 38) 75% 가
 5 Orton
 35)
 Arai 41) 28±3 Gy 4 5 , 34±4 Gy
 8 10 , 40±5 Gy 12 14 가
 51±5 Gy 3 4
 1 2 point A 43 Gy
 13 39 Gy
 Orton 39) 가
 가 point
 A 3 39 Gy
 가 가
 가 가
 가 가
 가 가

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High versus Low Dose-Rate Intracavitary Irradiation for Adenocarcinoma of the Uterine Cervix

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Purpose: The incidence of adenocarcinoma of the uterine cervix is low. Traditionally, Low Dose Rate (LDR) brachytherapy has been used as a standard modality in the treatment for patients with carcinoma of the uterine cervix. The purpose of this report is to evaluate the effects of the High dose rate (HDR) brachytherapy in the patients with adenocarcinoma of the uterine cervix compared with the LDR.

Materials and Methods: From January 1971 to December 1992, 106 patients of adenocarcinoma of uterine cervix were treated with radiation therapy in the Department of Radiation Oncology, Yonsei University with curative intent. LDR brachytherapy was carried out on 35 patients and 71 patients were treated with HDR brachytherapy. In LDR Group, 8 patients were in stage I, 18 in stage II and 9 in stage III. External radiation therapy was delivered with 10 MV X-ray, daily 2 Gy fractionation, total dose 40–46 Gy (median 48 Gy). And LDR Radium intracavitary irradiation was performed with Henschke applicator, 22–59 Gy to point A (median 43 Gy). In HDR Group, there were 16 patients in stage I, 38 in stage II and 17 in stage III. The total dose of external radiation was 40–61 Gy (median 45 Gy), daily 1.8–2.0 Gy. HDR Co-60 intracavitary irradiation was performed with RALS (Remote Afterloading System), 30–57 Gy (median 39 Gy) to point A, 3 times a week, 3 Gy per fraction.

Results: The 5-year overall survival rate in LDR Group was 72.9%, 61.9%, 45.0% in stage I, II, III, respectively and corresponding figures for HDR were 87.1%, 58.3%, 41.2%, respectively ($p > 0.05$). There was no statistical difference in terms of the 5-year overall survival rate between HDR Group and LDR Group in adenocarcinoma of the uterine cervix. There was 11% of late complication rates in LDR Group and 27% in HDR Group. There were no prognostic factors compared HDR with LDR group. The incidence of the late complication rate in HDR Group stage II, III was higher than that in LDR Group (16.7% vs. 31.6% in stage II, 11.1% vs. 35.3% in stage III, $p > 0.05$). Although the incidence of radiation induced late complication rate was higher in HDR Group stage II and III patients than that in the LDR Group, statistical significance was not detected and within acceptable level.

Conclusion: There was no difference in terms of 5-year survival rate and failure pattern in the patients with adenocarcinoma of the uterine cervix treated with HDR and LDR brachytherapy. Even late complication rates were higher in the HDR group it was an acceptable range. This retrospective study suggests that HDR brachytherapy seems to replace the LDR brachytherapy in the adenocarcinoma of the uterine cervix. However, further studies will be required to refine the dose rate effects.

Key Words: Adenocarcinoma, Uterine cervix, High dose-rate, Low dose-rate