

(Small Bowel Displacement System : SBDS)

Efficacy of Small Bowel Displacement System in Post-Operative Pelvic Radiation Therapy of Rectal Cancer

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Purpose : This study is to evaluate the efficacy of small bowel displacement system(SBDS) in post-operative pelvic radiation therapy(RT) of rectal cancer patients by measurement of small bowel volume included in the radiation fields receiving therapeutic dose.

Materials and Method : Ten consecutive new rectal cancer patients referred to the department of Radiation Oncology of Samsung Medical Center in May of 1997 were included in this study. All patients were asked to drink Gastrographin before simulation and were laid prone for conventional simulation and CT scans with and without SBDS. The volume of opacified small bowel on CT scans, which was to be included in the radiation fields receiving therapeutic dose, was measured using picture archiving and communication system(PACS).

Results : The average small bowel volumes with and without SBDS were 176.0ml(5.2-415.6ml) and 185.1ml(54.5-434.2ml), respectively. The changes of small bowel volume with SBDS compared to those without SBDS were more than 10% decrease in three, less than 10% decrease in two, less than 10% increase in three, and more than 10% increase in two patients.

Conclusion : No significant advantage of using SBDS in post-operative pelvic RT for rectal cancer patients has been shown by small bowel volume measurement using CT scan considering additional effort and time needed for simulation and treatment setup.

Key Words : Small bowel complication, Rectal cancer, Pelvic RT

1998 2 10 1998 3 3

: , 50

가 45Gy 6Gy 가 5.5 가

5 42 70

56.5 8

가 1-16) Astler-Coller B2, B3, C2, C3가 2, 2, 5 modified (Table 1).

가 17)

1995 17)

8 2 1:1

(small bowel displacement Gastrographin 200ml

system : SBDS)

17) 가

가

가 가

(Fig. 1).

(CT)

1997 5

10

(Table 1).

modified Astler-Coller

B2 4

2 (5-FU + Leucovorin) 5

6

3

3 2

2 5

4

(b)
Table 1. The Characteristics of the Patients (N=10)

Case	Age	Sex	Stage	Field sizes(cm ²)		
				PA	Lateral	
1	55	F	C2	LAR*	17 × 13	12 × 13
2	55	M	C3	LAR	17 × 14	12 × 14
3	57	M	B3	LAR	15 × 13	12 × 13
4	56	M	C2	APR [†]	16 × 22	12 × 22
5	42	F	C2	APR	17 × 20	12 × 20
6	49	F	B2	LAR	16 × 14	11 × 14
7	52	F	C2	LAR	16 × 11	11 × 11
8	70	M	C2	LAR	17 × 12	11 × 12
9	67	M	B3	LAR	15 × 15	N/A [‡]
10	65	F	B2	LAR	17 × 12	11 × 12

* LAR : low anterior resection
[†] APR : abdomino-perineal resection
[‡] N/A : not available

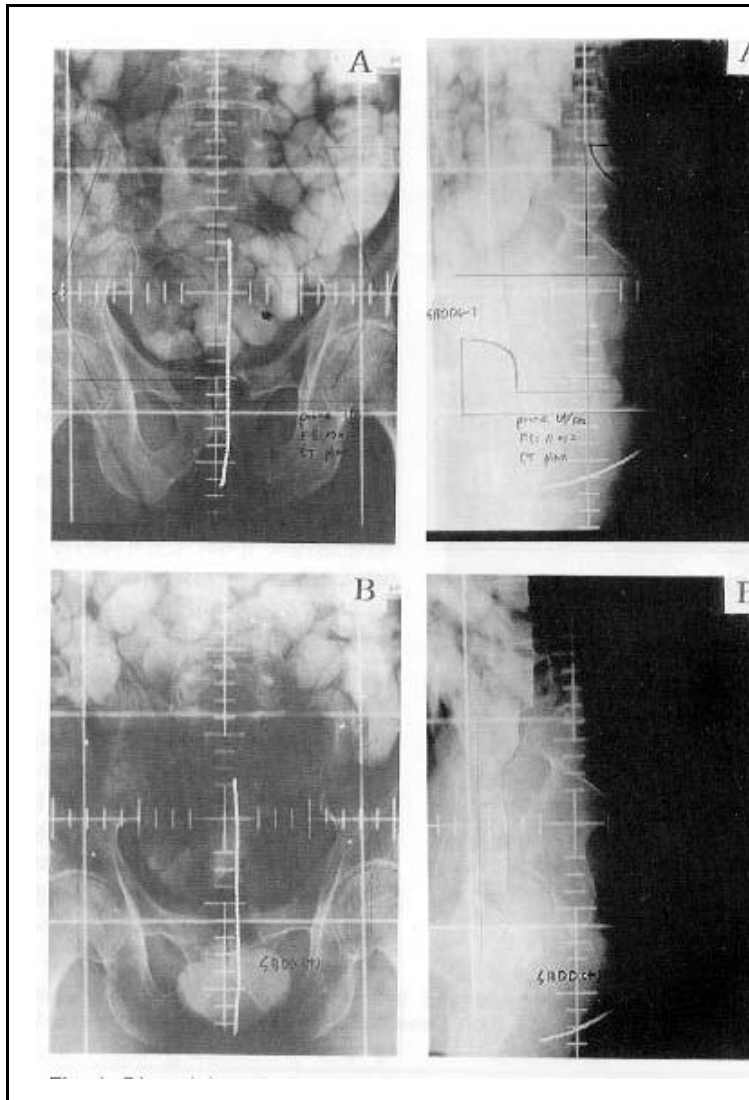


Fig. 1. PA and Lateral simulation films after small bowel opacification with Gastrographin without SBDS (A) and with SBDS (B).

lateral) (PA) 3 20cm 22cm
 가 CT (PACS)
 CT
 가 15cm 17cm, CT
 11cm 12cm, 11cm 15cm, CT (Fig. 2).

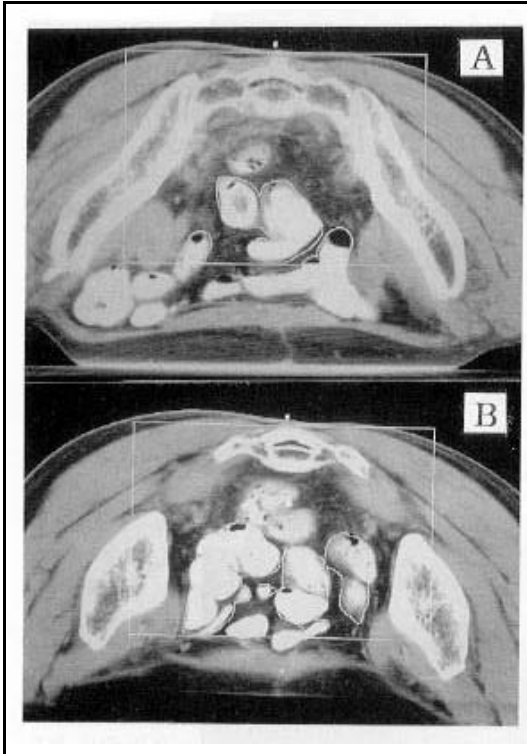


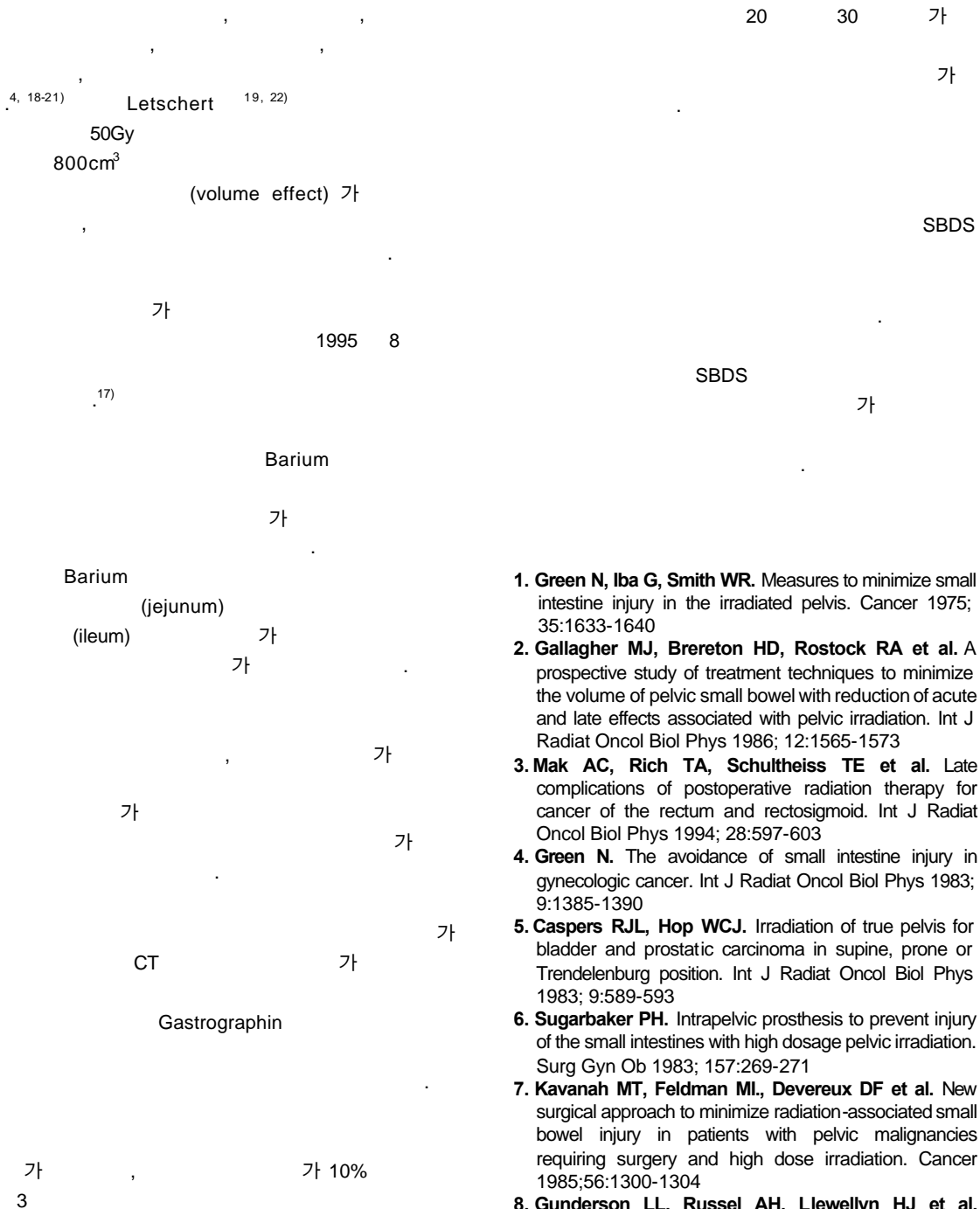
Fig. 2. Measurement of the small bowel volume included in the high dose radiation portals of therapeutic dose without SBDS (A) and with SBDS (B) using RT planning CT via PACS.

가
9 가
0.56cm(
3.28cm(
:-2.5 - 2.5cm),
:-2.5 - 9.5cm) (Table 2).
185.1cm³(:
176.0
54.5cm³- 434.2cm³)
cm³(: 5.2cm³-415.6cm³)
(Table 2).
가
5 가
10% 가 3 , 10% 가 2 ,
10% 가가 3 , 10% 가가 2

Table 2. Distances from Pubic Symphysis and the Most Distal Small Bowel and Small Bowel Volumes to be Included in the High Dose Radiation Fields of Therapeutic Dose Measured Using PACS

Case	Distance from pubis (cm)		Small bowel volume (cm ³)		Volume ratio
	(-)SBDS	(+)SBDS	(-)SBDS	(+)SBDS	(-)/(+)SBDS
1	2.5	9.5	54.45	5.20	0.096
2	4	9	98.56	41.71	0.423
3	1	5	119.19	103.55	0.869
4	-1	0	311.53	294.68	0.946
5	0	1	434.20	415.60	0.957
6	0.5	2	186.63	189.58	1.016
7	0.5	4.5	179.88	186.08	1.034
8	0	1	231.11	246.86	1.068
9	-2.5	-2.5	169.88	194.59	1.145
10	N/A	N/A	65.65	82.18	1.252
Average	0.56	3.28	185.11	176.00	—

* N/A : not available



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Gastrographin

X-ray

(PACS)

185.1ml(54.5-

434.2ml)

176.0ml (5.2-415.6ml)

10%

가 3 , 10%

가 2 , 10%

가가 3 , 10%

가가 2

:

가