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Clinical and Physiologic Anorectal Function after Low Anterior Resection in Patients with Rectal Cancer: A Prospective Randomized Comparison of Straight and Colonic J-Pouch Anastomoses

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Purpose: The aim of this prospective study was to analyze anorectal physiologic and clinical outcomes of the colonic J-pouch-anal anastomosis compared with the traditional straight colorectal anastomosis after ultra-low anterior resection in patients with rectal cancer, thus to define if this method of modified reconstruction has a functional superiority.

Methods: After total mesorectal excision for mid or low rectal cancers, patients were randomized to either a straight (n=23) or a colonic J-pouch anastomosis (n=24) to the lowermost rectum or anal canal. Functional outcomes were compared between two groups using an anorectal manometry performed before and 1 year after surgery and a bowel function questionnaire administered 6 months and 1 year postoperatively.

Results: Except the arithmetic level of anastomosis which was significantly higher in straight group than in pouch group (5.1±1.2 cm vs. 3.8±0.9 cm; P=0.0001), the two groups were well matched for demographic distribution, pathologic stage, colonic segment used for neorectum and use of adjuvant therapies. Patients with colonic J-pouch anastomosis showed functional superiority in terms of frequency of bowel movements, degree of urgency at 6 months (P<0.0001 and =0.03, respectively) and 1 year

postoperatively (P<0.0001 and <0.05, respectively). Functional parameters, including incontinence to liquid stool and impaired discrimination between gas and stool were more pronounced in straight group after 6 months (P=0.04, and <0.05, respectively), but the differences were not statistically significant after 1 year. Sensation of incomplete evacuation was not different statistically between groups at 6 months, but more common in J-pouch group at 1 year (39.1% vs. 8.3%; P=0.04). As well as the length of high pressure zone and presence of rectoanal inhibitory reflex, there was no difference in sphincter pressure parameters between groups either before or 1 year after surgery. Maximal tolerable volume of the neorectum in J-pouch group was 110.2±16.7 ml, which was significantly larger than that of 74.1±14.9 ml in straight group (P<0.0001), and the neorectum in J-pouch group was significantly more compliant than that in straight group (6.1±1.9 vs. 3.3±2.1; P<0.0001) in 1 year after surgery.

Conclusions: Construction of a colonic J-pouch as a substitute for the rectum restores neorectal volume and compliance. Clinically it offers patients superior anorectal function compared with straight anastomosis. To minimize evacuation difficulty associated with the pouch, optimal size of the pouch should be defined, thus to achieve an ideal balance between stool frequency/urgency and evacuation problems through larger prospective studies. **J Korean Soc Coloproctol 2003;19:101-107**

Key Words: Rectal cancer, Colonic J-pouch, Anorectal function, Evacuation difficulty

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(: 602-715)
Tel: 051-240-5146, Fax: 051-247-9316
E-mail: colonch@donga.ac.kr
2002

Parks¹가
(endoanal anastomosis)
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2001 ()

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24

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23 가

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(urgency)

2)

(tenesmus)

.⁴⁻⁶

(straight anasto-

mosis)

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Heald¹⁷

(reservoir function)

,^{5,6}

(total mesorectal excision)

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.^{7,8}

2 cm

(double stapling technique)¹⁸

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1986

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30 mm

,^{9,11-14}

J-

(Proximate[®] Linear Stapler; Ethicon Endosurgery, Inc., Cincinnati, OH, USA)

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(Premium Plus CEEA[®]; United States Surgical Corporation, Norwalk, CT, USA) J- -

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(Fig. 1).

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Hallböök¹³

(Fig. 2).

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59

48

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8-channel hydraulic capillary infusion system (Arndorfer, Inc., Greendale, WI, USA)

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station pull-through technique, Wexner¹⁹

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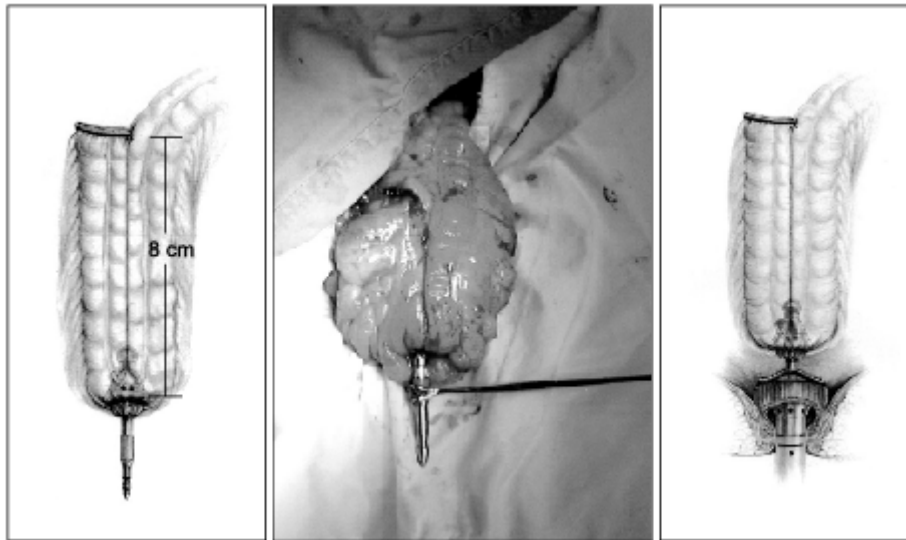


Fig. 1. Construction of colonic J-pouch using a linear stapler and colonic J-pouch-anal anastomosis by double stapling technique.

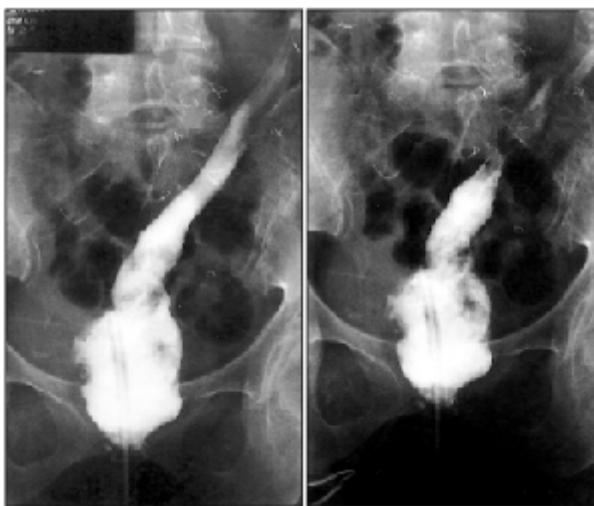


Fig. 2. Pouch-o-gram showing a intact neorectum of the colonic J-pouch.

(sodium phosphate) ([®]; ()
 ,)
 .
 (high pressure zone; HPZ)
 , (mean resting pressure; MRP) (maximal squeeze pressure; MxSP),
 inhibitory reflex: RAIR)
 threshold volume: STV) neorectum
 (maximal tolerable volume: ~80; 10 , 13), 2 (J-

MTV) (compliance; CL) .
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 6 12
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 4)

GraphPad InStat[®]
 Version 3.00 (GraphPad Software Inc, San Diego, CA, USA)
 Mann-Whitney test Fishers exact test
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 Fishers exact test, chi-square test Mann-Whitney test
 P
 < 0.05

Table 1 .
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 ~80; 10 , 13), 2 (J-

) 61 (, 36~75; 10 , 14)

가 . Astler-Coller

1 2 21 20 ,
2 4
1 5.1±1.2 cm, 2 3.8±0.9 cm
1 (P=0.0001).

Table 1. Clinical details of patients

	Straight	J-Pouch	P value
Median age (range, yr)	58 (41-48)	61 (36-75)	
Gender (male : female)	10 : 3	10 : 4	1.0
Stage (Astler-Coller)			0.83
A	1	1	
B1	2	1	
B2	11	13	
C1	1	0	
C2	9	9	
Level of anastomosis (cm)*	5.1±1.2	3.8±0.9	0.0001
Colon for reconstruction †	21 :	20 :	0.66

*arithmetic measurement from the anal verge; † sigmoid colon vs. descending colon.

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Table 2 . 6 2
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(2.3±0.5 vs. 3.0±0.5, P < 0.0001) (P<0.05)
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(39.1% vs. 8.3%, P=0.04).

Table 2. Postoperative functional outcome

	6 Months			12 Months		
	Straight*	J-Pouch †	P	Straight*	J-Pouch †	P
Bowel movements (/day)	5.4±0.5	4.0±1.0	<0.0001	3.0±0.5	2.3±0.5	<0.0001
Nocturnal bowel movement (%)	10 (44)	5 (24)	0.12	4 (17.4)	2 (8.3)	0.42
Ability to defer defecation > 5 min			0.03			<0.05
Always	3	11		4	13	
Often	8	9		10	8	
Sometimes	7	3		6	2	
Never	5	1		3	1	
Gas/stool discrimination	14	21	<0.05	18	22	0.25
Incontinence						
Gas						
Liquid	12	5	0.04	6		0.14
Solid	2	1	0.61	1	2	0.49
Incomplete evacuation	6	13	0.07	2	9	0.04
Pad necessary	10	4	0.06	5	2	0.25
Impaired social life	8	3	0.09	5	2	0.25

*n = 23; † n = 24.

Table 3. Preoperative and postoperative anorectal manometric data

	Preoperative			Postoperative (12 months)		
	Straight*	J-Pouch [†]	P	Straight*	J-Pouch [†]	P
MRP (mmHg)	85.1±15.9	82.0±12.0	0.62	60.8±10.1	59.7±10.8	0.78
MxSP (mmHg)	164.8±33.7	169.9±31.8	0.63	133.7±23.5	131.6±24.2	0.69
HPZ (cm)	2.7±0.9	2.7±0.7	0.84	1.6±0.5	1.6±0.7	0.9
STV (ml)	25.4±6.9	26.3±5.7	0.57	23.9±5.4	26.5±8.5	0.29
MTV (ml)	155.4±14.6	158.5±16.6	0.66	74.1±14.9	110.2±16.7	<0.0001
Compliance	9.8±2.9	10.8±4.6	0.75	3.3±2.1	6.1±1.9	<0.0001
RAIR (%)	100	100		78.3	70.8	0.72

MRP = mean resting pressure; MxSP = maximal squeeze pressure; HPZ = high pressure zone; STV = sensory threshold volume; MTV = maximal tolerable volume; RAIR = rectoanal inhibitory reflex; *n = 23; † n = 24.

(Table 3).
 MRP, MxSP HPZ, J-
 STV
 neorectum J-
 MTV CL J- 2 1
 RAIR 13,15,22,25
 1 2 가 Dehni 4 Lazorthes 23
 18 (78.3%) 17 (70.8%) 2 J-
 Barrier 26
 1 2 가가
 J- - J-
 neorectum 가
 가 J- 9,13,20-23
 1 13,23 가 neorectum
 Dennett 24 J- J-
 , 21~79% 10,16,20,22,25 J-
 가 39.1% 8.3%
 (perfect or normal continence) J- J-
 71% (257/361) 가 Hida 27 5 10 cm

J- , 5 cm J- , Lazorthes
²⁸ 10 cm J- 30% J- J-
 가 가 Hida ^{29,30}
 10 cm J- J-
 가 5 cm J-
 가 가 가 J-
 가 8 cm J-
 J- J-
 가 가 ^{11,22} Hallböök
¹⁶ J- 가 J-
 4~6 cm
 (taenia) 6~10 cm
 Heinecke-Mickulicz (coloplasty) 2000
 Fazio ³¹ , 2001
 Mantyh ³² J- -
 J- J-
 가 가
 J- 5 69~
 79%, 5 7~16%
^{12,27}

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