Endoscopic evaluation for radiation proctitis in the patients with postoperative radiotherapy for rectal cancer

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Endoscopic evaluation for radiation proctitis in the patients with postoperative radiotherapy for rectal cancer

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ABSTRACT

Thesis title Endoscopic evaluation for radiation proctitis in the patients with postoperative radiotherapy for rectal cancer

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Background: The relationship between high radiation doses and chronic radiation proctitis (RP) after pelvic radiotherapy (RT) is well understand, but its effect in intermediate doses is not. We aimed to assess the incidence of late clinical RP and to investigate the significance of early endoscopic abnormality related to development of late clinical RP among patients with rectal cancer receiving postoperative RT with intermediate dose.

Methods: We retrospectively reviewed 153 patients with rectal cancer between 2005 and 2009, who received postoperative RT with median dose of 54 Gy and underwent endoscopic examination within 12 months after RT. Rectal mucosal alteration evaluated by endoscopy was graded using the Vienna rectoscopy score (VRS) to detect endoscopic RP. Late clinical RP based on EORTC/RTOG grade were evaluated and assessed the correlation with the endoscopic RP including VRS.

Results: All patients underwent endoscopic examination with median period of 9 months after postoperative pelvic RT. Endoscopic RP was detected in 45 patients (29.4%), showing dominant patterns of telangiectasia and congested mucosa. With a median follow up period of 88 months, 29 patients (19.0%) experienced late clinical RP, including Grade 3 or more in only 3 patients (2.0%). VRS was a predictive factor

related to both developments of late clinical RP and cumulative incidence of late clinical RP ($p < 0.001$). In particular, endoscopic sign of telangiectasia had a significant association on development of late clinical RP ($p < 0.001$).

Conclusion: Early endoscopic findings using VRS were useful as a predictor of the possibility of late clinical RP, although the incidence of severe clinical RP was low. Patients with endoscopic abnormality should be followed closely due to the vulnerability of clinical RP.

Key words : radiation proctitis, radiotherapy, endoscopy, rectal cancer

Endoscopic evaluation for radiation proctitis in the patients with postoperative radiotherapy for rectal cancer

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I. INTRODUCTION

Late radiation proctitis (RP) is one of the common adverse effects after pelvic radiotherapy (RT) for a variety of malignancies, most often in prostate cancer and gynecologic tumors[1-3]. In particular, RP is paramount issue for patient with localized prostate cancer received high dose RT because of there have been demonstrations of dose escalation associated with improved disease control from several trial[2,4-7]. Previous studies reported that rectal volume receiving doses 60 Gy (V60) or more is consistently associated with the risk of Grade 2 or more late rectal toxicity or rectal bleeding[1,6]. On the contrary, the potential for increased risk of RP is being interested less in case administered intermediate dose pelvic RT. Also, there are few data on the late RP for rectal irradiation of below 60 Gy. However, we need to carefully estimate risk related to late rectal morbidity for the patients with intermediate dose RT, including patients with rectal cancer treated with postoperative RT of 45~60Gy, since some studies suggested that

V30~50 was significant factor related to late RP, contributed to morbidity and poor quality of life[6,8].

Endoscopic approach can provide an accurate status of rectal mucosal damages. Therefore, endoscopy is widely used for the evaluation and diagnosis of RP [9,10]. In particular, Wachter et al. proposed the Vienna rectoscopy score (VRS) as scoring systems, according to intensity of five findings such as congested mucosa, telangiectasia, ulceration, stricture, and necrosis[10].

Here, we hypothesized that the detection of endoscopic mucosal changes may be assumed late rectal toxicity over time in patients received pelvic RT, as reported in previous studies[11-14]. In this study, we aimed to investigate the clinical significance of early endoscopic evaluation to predict the incidence of late clinical RP among patients with rectal cancer receiving postoperative RT with intermediate dose.

II. MATERIALS AND METHODS

1. Patients eligibility

The medical chart review was performed retrospectively on 176 consecutive patients with rectal cancer underwent postoperative RT between January 2005 and December 2009 at our institution. The inclusion criteria consisted of age with 18 years or more, histological diagnosis of rectal cancer, treatment with surgery followed by postoperative RT with/without chemotherapy, and administration of colonoscopy within 12 months after RT. The exclusion criteria were subjects with incompletion of postoperative RT (n=1), application of

previous pelvic RT (n=14), surgery with abdominoperineal resection (n=8), and existence of inflammatory bowel disease, hemorrhoids, or diverticulosis (n=0). One hundred and fifty-three patients were extracted for this study

2. Radiotherapy

Contrast-enhanced computed tomography (CT) with slices of 5-mm-thickness was performed for scanning planning CT. The patient was educated to maintain a full bladder in the prone position using a belly board with bladder compression device during the patient took the planning CT scan[15]. The CT scan was imported to the Pinnacle planning system version 9.4 (Philips Medical Systems, Cleveland, OH), and the clinical target volume (CTV) and critical adjacent organs, including the bladder and small bowel, was delineated on each of the axial CT images by an experienced attending radiation oncologist. The CTV was defined the postoperative tumor bed, pre-sacral space, as well as the pelvic lymph nodes areas such as perirectal, internal iliac, and obturator lymph node for traditional whole pelvis. Postoperative RT was delivered with 3-demensional conformal RT to the traditional whole pelvis with median dose of RT of 54 Gy (range, 50.4-59.4 Gy). In specific, a median dose of 45 Gy (range, 41.4-45 Gy) was given to whole pelvis followed by boost with a median dose of 9 Gy (range, 5.4-14.4 Gy) to the operative tumor bed, including anastomotic site, rectum, and perirectal tissue. Therefore, our cohorts could be considered to have undergone postoperative RT with an intermediate dose of 50.4-59.4 Gy in the postoperative residual neo-rectum. Concurrent chemotherapy of 5-fluorouracil (425 mg/m2)

Table 1. Baseline characteristics (n=153)

Variables		n	%
Age, years	Median (range)	59 (26-80)	
Sex	Male	96	62.7
	Female	57	37.3
Pathological stage	II	54	35.5
	III	95	62.5
	IV	3	2
Presence of DM	No	141	92.2
	Yes	12	7.8
Interval between surgery and RT, weeks	Median (range)	12 (4-34)	
RT scheme	Total dose, Gy, median (range)	54 (50.4-59.4)	
	Fractional dose, Gy	1.8	
	Administration of concurrent CTx	119	77.8

DM, diabetes mellitus; RT, radiotherapy; Gy, Gray; CTx, chemotherapy

and leucovorin (20 mg/m2) was administered for 78% of patients. Patients characteristics and RT characteristics are shown in Table 1.

3. Evaluation of early endoscopic radiation proctitis based on endoscopic findings

Endoscopic RP were assessed by endoscopic findings throughout colonoscopy. In our institution, endoscopy was performed by trained digestive endoscopists with/without supervision by a senior endoscopist. In addition, at the point of study, the retrospective review of endoscopic findings was assigned by an experienced digestive endoscopist (SJ Park) who blinded to any other clinical information of

patients. Description of endoscopic findings were focused on five criteria of VRS including congested mucosa, telangiectasia, ulceration, stricture, and necrosis, and the final description was scored according to six-scaled VRS with from 0 to 5. The pathologic findings were summarized according to the VRS (score range 0–5; Table 2)[10]. In the current study, endoscopic RP is defined as rectal mucosal changes with VRS 1 or more.

4. Evaluation of late clinical radiation proctitis

Late clinical RP were assessed as grade using the Radiation Therapy Oncology Group and the European Organization for Research and Treatment of Cancer (RTOG/EORTC) criteria[16,17]. In this toxicity scoring system, compliance-related symptoms (such as stool frequency) and proctitis-related symptoms (such as rectal bleeding) are combined to one overall score. The incidence of late clinical RP included all rectal toxicity with grade 1 or more. Patients were evaluated at every 3-month for the first year after RT, every 6-month for the next 2 years, and annually thereafter.

Table 2. Vienna Rectoscopy Score (VRS) published by Wachter *et al.* [10]

VRS	Congested mucosa	Telangiectasia	Ulceration	Stricture	Necrosis
0	Grade 1	None	None	None	None
1	Grade 2	Grade 1	None	None	None
2	Grade 3	Grade 2	None	None	None
3	Any	Grade 3	Grade 1	None	None
4	Any	Any	Grade 2	Grade 1	None
5	Any	Any	Grade≥3	Grade≥2	None

5. Statistical Analysis

Incidence of late clinical RP according to all variables was compared using the Chi-Square test or Fisher exact test. Binary logistic regression analysis was performed to define potential factor on incidence of late clinical RP among endoscopic findings. The correlation between VRS of the endoscopic RP and grade of late clinical RP were assessed by Spearman correlation analysis. Cumulative incidence of developing late clinical RP after completion of postoperative RT was estimated by the Kaplan-Meier method. Univariate analysis of each variable including endoscopic findings was performed by comparing the cumulative incidence of late clinical RP using the log-rank test. Multivariable analysis was performed using the Cox regression models with a backward stepwise method to identify prognostic factors that were identified as significant factors in univariate analysis. Significance was set at a p value of < 0.05. All analyses were carried out using IBM SPSS version 24.0 (SPSS, Chicago, IL).

III. RESULTS

1. Incidence of endoscopic RP and late clinical RP

All patients underwent endoscopic examination with median period of 9 months (range, 5-12 months) after RT. Of 153 patients, early endoscopic RP with VRS $\geqq 1$ was detected in 45 patients (29.4%). Regarding specific criteria of VRS, congested mucosa was detected in 31

(20.2%) patients (grade 1 in 8 patients, grade 2 in 12, and grade 3 in 11). Forty-two (27.5%) patients showed telangiectasia (grade 1 in 11 patients,

Table 3. Distribution of endoscopic findings according to criteria of Vienna Rectoscopy Score (n=153)

Endoscopic Finding	Grade or Score	N	%
Congested mucosa	0	122	79.7
	1	8	5.2
	2	12	7.8
	3	11	7.2
Telangiectasia	0	111	72.5
	1	11	7.2
	2	22	14.4
	3	9	5.9
Ulceration	0	141	92.2
	1	1	0.7
	2	4	2.6
	3	3	2
	4	4	2.6
Stricture	0	142	92.8
	1	5	3.3
	2	0	0.0
	3	6	3.9
Necrosis	0	149	97.4
	1	4	2.6
Vienna Rectoscopy Score	0	108	70.6
	1	8	5.2
	2	17	11.1
	3	4	2.6
	4	7	4.6
	5	9	5.9

grade 2 in 22, and grade 3 in 9). Ulcerations were observed in 12 (7.9%) patients (grade 1 in 1 patient, grade 2 in 4, grade 3 in 3, and grade 4 in 4). Four patients (2.6%) experienced necrosis on rectal wall. In summary based on criteria of VRS[10], 1,2,3,4 and 5 VRS were recorded in 8 (5.2%), 17 (11.1%), 4 (4.6%), 7 (4.6%), and 9 (5.9%) patients, respectively. All detailed distributions of VRS and its endoscopic findings are shown in Table 3.

The median follow-up was 88 months (range, 87-142 months). Twenty-eight patients had died. The 5-year and 10-year overall survivals from diagnosis were 90.1% and 76.1%, respectively. Among all patients, late clinical RP assessed by RTOG/EORTC grade was detected in 29 patients (19.0%). Grade 1 observed in 10 patients, grade 2 in 16. And grade 3 or more were recorded only 3 (2.0%) patients (rectal bleeding in 2 patients and rectal obstruction in one). Seven (4.5%) patients experienced rectal bleeding, consisted of 2 patients who required transfusion and argon plasma coagulation, and 5 patients who had manageable rectal bleeding with medical and conservative approach.

2. Impact of endoscopic abnormality on incidence of late clinical RP

During period of follow up, of patients who showed VRS 0, 1, 2, 3, 4, and 5, clinical RP found in 3.7% (4/108), 12.5% (1/8), 47.1% (5/17), 50.0% (0/4), 71.4 % (4/7), and 100% (5/9), respectively ($p < 0.001$). The development of clinical RP was significantly higher in patients with endoscopic RP presenting endoscopic abnormality (58.1%) than in those without endoscopic RP (3.7%) ($p < 0.001$). Additionally, clinical RP was developed in median was developed in median period of 19 months (range, 6-61) after RT in patients with endoscopic RP, whereas 80 months

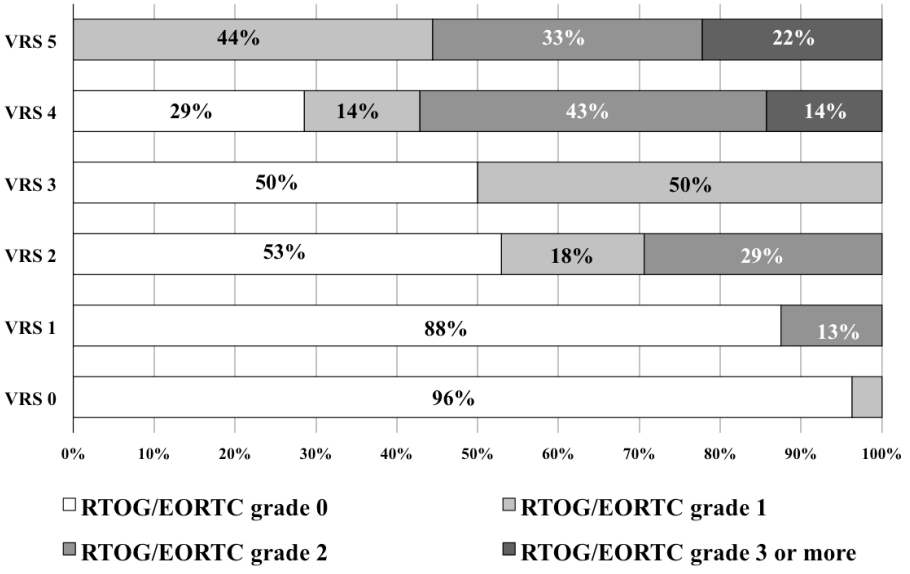


Figure 1. Distribution of RTOG/EORTC grade of late clinical radiation proctitis according to VRS

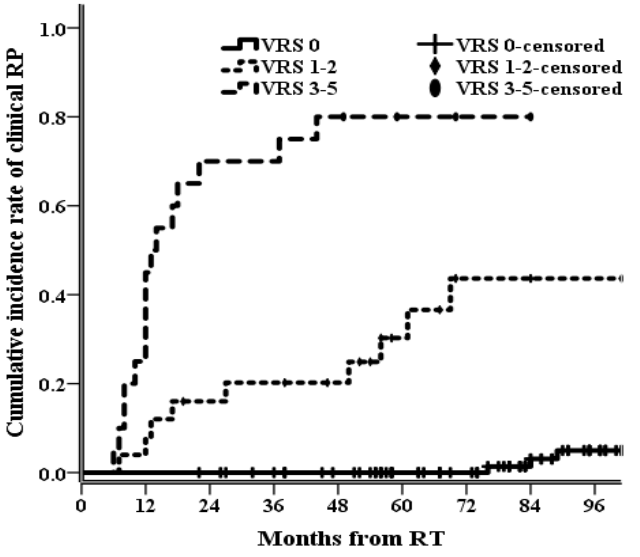
Table 4. Analysis of parameters associated with incidence of late clinical radiation proctitis (n=153)

Variables		Incidence of RP	Odd ratio	95% CI	p
Age, years	<60	13/77 (14.6%)	ref		0.542
	≥60	16/76 (14.4%)	1.131	0.583-2.958	
Presence of DM	No	27/141 (19.1%)	ref		> 0.999
	Yes	2/12 (16.7%)	0.844	0.175-4.080	
Total dose of RT, Gy	<54	1/17 (5.9%)	ref		0.198
	≥54	28/136 (20.6%)	4.148	0.527-32.631	
Concurrent CTx	No	9/34 (26.5)	ref		0.220
	Yes	20/119 (16.8%)	0.561	0.228-1.381	
VRS	0	4/108 (3.7%)	ref		< 0.001
	1~2	9/25 (36.0%)	14.625	4.026-53.132	
	3~5	16/20 (80.0%)	104	23.616-458.002	

RP, radiation proctitis; CI, confidence interval; ref, reference; DM, diabetes mellitus; RT, radiotherapy; Gy, Gray; CTx, chemotherapy; VRS, Vienna Rectoscopy Score

(range, 50-116) in those without endoscopic RP. Furthermore, a significant correlation with between VRS of endoscopic RP and grade of clinical RP was observed with Spearman correlation coefficient of 0.763 ($p < 0.001$, Fig 1).

With respect to specific VRS, the development of clinical RP in patients with VRS 1-2 was higher than that with VRS 0 [Odd ratio (OR) 14.625, 95% confidence interval (CI) 4.026-53.132, $p < 0.001$, Table 4]. Also, the occurrence of clinical RP in cases with VRS 3-5 was higher than that with VRS 0 (OR 104.000, 95% CI 23.616-458.002, $p < 0.001$, Table 4). In a further analysis, which was conducted to define the impact of each endoscopic finding of VRS on clinical late RP, clinical late rectal



toxicity

Figure 2. Cumulative incidence of late clinical Radiation proctitis according to Vienna Rectoscopy Score

was higher in patients with higher grade of all endoscopic alterations than those with lower grade (Table 5). Among these endoscopic findings, the telangiectasia had a significant effect on development of clinical RP (OR 14.667, 95% CI 4.790-44.912, p < 0.001, Table 5)

Table 5. Impact of endoscopic findings of Vienna rectoscopy score on incidence of clinical late radiation proctitis (n=153)

Endoscopic Finding	Grade	UVA		MVA[§]	
		Incidence of late RP* according to endoscopic finding (%)	p	Odds ratio (95% CI)	p
Congested mucosa	< 2	9.2	< 0.001		
	≧2	73.9			
Telangiectasia	< 2	8.2	< 0.001	Ref	< 0.001
	≧2	58.1		14.667 (4.790 -44.912)	
Ulceration	< 2	12.7	< 0.001		
	≧2	100.0			
Stricture	< 2	15.6	< 0.001		
	≧2	100.0			
Necrosis	0	16.8	< 0.001		
	1	100.0			

RP, radiation proctitis; UVA, univariate analysis; MVA, multivariable analysis; Ref, reference; CI, confidential interval

*Late RP was defined as all late rectal toxicity with ≧ grade 1 according to RTOG/EORTC

[§]All variables were entered into the binary logistic regression model with a backward stepwise method if $p \leq 0.10$ and were removed at any point if $p > 0.10$.

Table 6. Impact of endoscopic findings according of Vienna rectoscopy score on cumulative late clinical radiation proctitis (n=153)

Endoscopic Finding	Grade	UVA		MVA§	
		5-year cumulative incidence rate of late clinical RP* (%)	p	Hazard ratio (95% CI)	p
Congested mucosa	< 2	4.9	<0.001	Ref	0.006
	≧2	73.9		5.251 (1.622-17.004)	
Telangiectasia	< 2	5.0	<0.001	Ref	0.001
	≧2	56.1		5.065 (1.959-13.097)	
Ulceration	< 2	8.8	<0.001	Ref	0.001
	≧2	100.0		7.178 (2.350-21.930)	
Stricture	< 2	11.9	<0.001		
	≧2	100.0			
Necrosis	0	3.1	<0.001		
	1	100.0			

RP, radiation proctitis; UVA, univariate analysis; MVA, multivariable analysis; CI, confidential interval; Ref, reference

*Late clinical RP was defined as all late rectal toxicity with ≧grade 1 according to RTOG/EORTC

§All variables were entered into the Cox regression model with a backward stepwise method if p≤0.10 and were removed at any point if p > 0.10.

3. Impact of endoscopic abnormality on cumulative incidence of late clinical RP

The 5-year cumulative incidence of late clinical RP was 15.3 %. Regarding to VRS, 5-year cumulative incidence of developing late clinical RP increased in patients with VRS 3-5, compared to those with VRS 1-2 or VRS 0 (80.0% vs. 30.3% vs. 0%, p < 0.001, Fig 2). In univariate analysis focused on impact of each endoscopic abnormality of

VRS on cumulative incidence of late clinical RP, we found that patients with grade ≧2 or ≧1 mucosal abnormality had a greater occurrence of clinical rectal toxicity than patient who were not (all Ps < 0.001, Table 6). In addition, of these endoscopic findings, presence of telangiectasia (p = 0.001), congested mucosa (p = 0.006), and ulceration (p = 0.001) were revealed as risk factors associated with increased cumulative incidence of late clinical RP in multivariable analysis (Table 6).

IV. DISCUSSION

In this study, we identified the early mucosal abnormality of 29% in rectum using colonoscopy in patients with rectal cancer receiving postoperative RT with intermediate dose. Next, during a median follow-up period of 88 months, we observed that incidences of late clinical RP grade 1 or more and grade 3 or more were 19% and 2%, respectively. Lastly, we found that the close correlation between early endoscopic RP based on VRS and late clinical RP based on EORTC/RTOG grade, although the incidence of endoscopic RP by VRS was significantly more frequent than that of late clinical RP by EORTC/RTOG grade.

Generally, late RP was diagnosed clinical symptoms such as rectal pain, diarrhea, urgency, fecal incontinence, and rectal bleeding, and was graded according to the EORTC/RTOG score[16].Late RP is the result of pathological cause, including obliterative endarteritis, abnormal new blood vessel formation, submucosal fibrosis, and ischemia[17]. Therefore, reasonably, these clinical late RP should be associated with

morphologically mucosal changes in the rectum, such as mucosal atrophy, mucosal friability, capillary dilatation, ulceration, and necrosis whether it is later symptoms or simultaneous symptoms. Endoscopy might be offered the potential signs of mucosal dysfunction below the level of clinical symptoms. In previous studies, the VRS has been confirmed as an effective predictive factor to classify radiation-induced mucosal changes[9,11-13]. Report of 166 patients with prostate cancer undergoing RT showed that VRS had a high coherence with the RTOG/EORTC score, correlating clinical rectal complications with endoscopic mucosal alterations[9].Similarly, Series of 35 cervix cancer patients evaluated the correlation of endoscopic changes with clinical symptoms, showing a positive correlation between grade of late rectal toxicity and score of VRS[13]. In our study, we showed that, with respect to patients treated with pelvic RT with intermediate dose, the risk of late RP is increased if early endoscopic abnormal findings were existed. Also, noted that the higher the score of the endoscopic abnormality, the higher the development risk of late RP gets. Focusing on impact of each endoscopic finding on clinical RP, Ippolito et al. reported that, peculiarly, mucosal telangiectasia among five criteria of VRS identified as a significant factor related to occurrence of clinical RP in prostate cancer patients administered high dose RT[14]. Current research has shown consistent results with this study as follows: (1) Overall VRS was a strong predictor for developing clinical RP, showing the contribution of all endoscopic findings on clinical RP in univariate analysis; (2) In multivariable analysis on focusing on each endoscopic finding of VRS, we found that telangiectasia had a strong significance on development of clinical RP and cumulative incidence of clinical RP. In addition, both congested

mucosa and ulceration had effect on cumulative incidence of clinical RP.

In current study, we found the difference of incidence between endoscopic RP and clinical late RP. Commonly, endoscopy can assess rectal mucosa status, although late RP was consisted of both mucosal neovascularization and submucosal fibrosis[18,19]. Thus, endoscopic approach can miss the changes in submucosal and muscularis propria layers, which may also play an important role in generating the RP. Studies suggested that the evolution of clinically visible injury is orchestrated by inflammatory responses not only in superficial mucosal tissue but also in supportive submucosal and muscular tissues[18-20]. In this sense, Cao et al. reported the value of endorectal ultrasound on clinical RP, as endorectal ultrasound can clearly visualize the morphologic changes in submucosal, muscularis propria and perirectal tissues of rectum [21].In specific, there may be a difference of time point over periods depending on phase in process of late radiation induced toxicity, called radiation fibrogenesis process[18] or radiation-induced fibroatrophic process[20]. Preclinical mucosal change showed in reactive tissue during the initial pre-fibrotic phase that showed damage of endothelial cell by perpetual cytokine or chemokine cascades. Thereafter, of these reactive inflammatory tissues, late clinical RP developed in unrestored tissue that has been experienced remodeling throughout both loss of natural endothelial cell barrier and fibrotic activation in the constitutive organised phase or fibroatrophic phase. In other words, in our cohorts, a reduction in the incidence of clinical RP compared with that of endoscopic RP was attributed to recovery of pre-fibrotic tissue owing to the homeostatic feedback of tissue repair against overcomeable damage by intermediate dose radiation. It should always be borne in mind that

radiotherapeutic injury has a complex process that occurred in organised tissues with mounting reparative responses to injury[18-20,22].

Chronic RP has no definite standard management. Since chronic RP produces a range of clinical symptoms, evaluation was taken at onset time of symptom, and treatment approach was administered according to symptom and its intensity. Typically, for patients with severe symptoms, therapeutic approach should be administered. Results from many studies including our study suggested that the dominant mucosal changes of RP were telangiectasia or congested mucosa[10,11]. And our cohort showed that only 3 patients (2.0%) experienced late clinical RP of Grade 3 after postoperative RT with intermediate dose. Of these patients, two cases developed rectal bleeding, required both argon plasma coagulation and transfusion, and the remained one suffered rectal obstruction, received transverse loop colostomy. Pragmatic options of late RP include oral drug, rectal instillation, thermal therapy such as argon plasma coagulation, heater probe or laser, hyperbaric oxygen, and surgical approach[3,17,23,24]. In addition, we observed the silent interval between preclinical sign and clinical symptom of late rectal damage after pelvis RT.Our findings implied that early late subclinical damage in rectal mucosa that fails to repair may predispose to later problem such as late clinical RP. Therefore, the early approach for conversion of the preclinical vasculogenesis or fibrogenes is into the normal healing process could be contributed to low incidence of late toxicity, for example, by administration of antioxidant therapies[20] or normal-tissue response modifiers[18,25], because this early process is still reversible according to recently celluar and molecular radiobiology[18]. In the present study, it is necessary to undertake appropriate examination on patients presenting with symptom of possible

RP for early diagnosis and treatment. In the future, the preventive approach of late RP should be determined through clinical trials and the resulting data can be collected to assess efficacy to intervention[3].

In the absence of clinical study for late RP in patients received pelvic RT with intermediate dose, our study showed the predictive significance of early endoscopy associated with late rectal toxicity in these patients. Additionally, the strength of this study is related to the homogeneity of the study population, who included patients with rectal cancer administered pelvic RT with postoperative aim, similar treatment volumes with whole pelvis followed by boost to operative tumor bed, and relatively similar total doses of median 54 Gy [54 Gy for 127 patients (83%), and 50.4 Gy for 17 (11%), and 59.4 Gy for 9 (6%)]. An important weakness is the limited information due to the lack of serial VRS of rectal mucosal change[26], including a baseline before RT and at development of clinical late RP during follow up. Lastly, we should not overlook the fact that the incidence of proctitis related to radiation might be overestimated because proctitis associated with a process of vascular damage following surgery, an influence of chemotherapy, or effects other causes could not be excluded.

V. CONCLUSION

Endoscopic findings using VRS were useful as a predictor regarding the likelihood of late clinical RP in patients received pelvic RT with intermediate dose, although incidence of severe late clinical RP was low. Careful follow-up might be needed that patients who showed early

endoscopic abnormality were judged to have a possibility of clinical RP.

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ABSTRACT (IN KOREAN)

수술 후 방사선 치료를 받은 직장암 환자의 방사선 직장염에 대한 내시경적 평가

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배경 : 현재 고선량의 골반 방사선 치료 와 만성 방사선 직장염의 상관 관계는 잘 알려져 있으나 중간선량의 방사선 치료에 대한 연구는 충분히 이루어지지 않았다. 본 연구는 수술 후 중간 선량의 방사선치료를 받은 환자에서 초기의 내시경적 이상소견과 만성 임상적 방사선 직장염의 상관관계를 알아보고자 하였다.

방법 : 본 연구는 2005년에서 2009년까지 수술 후 중간값 54 Gy의 방사선치료를 받고, 방사선치료 후 12개월 이내에 내시경 검사를 받은 153명의 환자를 후향적으로 평가했다. 내시경상의 방사선 직장염을 확인하기 위해 Vienna rectoscopy score (VRS)를 이용하여 직장 점막의 변화를 측정하였으며 이를 토대로 EORTC/RTOG 체계를 기반으로 한 만성 임상적 방사선 직장염과 내시경상의 방사선 직장염과의 상관관계를 평가하였다.

결과 : 모든 환자들은 수술 후 방사선치료 종료 후 평균 9개월 후에 내시경적 평가를 시행했다. 내시경상의 방사선 직장염은 45명 (29.4%)의 환자에서 확인되었고, 모세혈관 확장증과 점막 충혈이 대부분이었다. 평균 88개월간의 추적 관찰 중, 29명 (19.0%)의 환자에서 만성 임상적 방사선 직장염이 나타났으며 Grade 3 이상은 3명 (2.0%) 에서 나타났다. VRS는 만성 임상적 방사선 직장염의 발생 및 누적 발생률의 유의한 예측인자이며 ($p<0.001$), 특히 모세혈관 확장증의 소견은 만성 임상적 방사선 직장염의 발생과 유의한 연관이 있음이 확인되었다 ($p<0.001$).

결론 : 심각한 임상 방사선 직장염의 발생률이 낮지만, VRS를 이용한 초기의 내시경적 소견은 만성 임상 방사선 직장염의 발생에 관한 유용한 예측 인자로 생각된다. 또한 초기에 내시경적 이상소견을 보이는 환자는 임상적 방사선 직장염에 취약할 가능성이 높으므로 좀 더 세심한 추적관찰이 필요할 것으로 보인다.

핵심되는 말 : 방사선 직장염, 방사선치료, 내시경, 직장암