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Luis Fernando Moreira\*

Hiroimi Iwagaki†

Kazuhito Inoguchi‡

Akio Hizuta\*\*

Keinichi Sakagami††

Kunzo Orita‡‡

\*Okayama University,

†Okayama University,

‡Okayama University,

\*\*Okayama University,

††Okayama University,

‡‡Okayama University,

# Assessment of lymph node metastasis and vessel invasion in early rectal cancer.\*

Luis Fernando Moreira, Hiromi Iwagaki, Kazuhito Inoguchi, Akio Hizuta, Keinichi Sakagami, and Kunzo Orita

## Abstract

Thirteen patients with rectal carcinoma seen between December 1980 and December 1990 have been reviewed to determine the risk of lymph node metastasis and its implication for subsequent treatment. The mean age was 64 years (from 38 to 79; 9 males, 4 females). The site of the tumor was predominantly in the lower rectum (53.8 percent). The polypoid (I) and flat-elevated ulcerated (IIa + IIc) subtypes were detected in seven and six lesions, respectively. Sphincter-saving techniques were carried out in eight cases, and five cases required Miles' operation. Neither post-operative complications nor deaths were noted. The mean follow-up period was 57 months (6 to 133 months). No recurrence or distant metastasis was found during this follow-up. IIa + IIc subtype lesions with deep submucosal invasion at or beyond Smlc level were closely related with lymphatic and vascular invasion. Although this association was not necessarily accompanied by an increased number of involved lymph nodes, major surgical resection is suggested in such IIa + IIc cases due to an increased possibility for lymph node metastasis.

**KEYWORDS:** early rectal carcinoma, invasive carcinoma, submucosal invasion, surgical treatment, metastasis, survival

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## Assessment of Lymph Node Metastasis and Vessel Invasion in Early Rectal Cancer

Luis Fernando Moreira\*, Hiromi Iwagaki, Kazuhito Inoguchi, Akio Hizuta, Kenichi Sakagami and Kunzo Orita

*First Department of Surgery, Okayama University Medical School Okayama 700, Japan*

Thirteen patients with rectal carcinoma seen between December 1980 and December 1990 have been reviewed to determine the risk of lymph node metastasis and its implication for subsequent treatment. The mean age was 64 years (from 38 to 79; 9 males, 4 females). The site of the tumor was predominantly in the lower rectum (53.8 per cent). The polypoid (I) and flat-elevated ulcerated (IIa + IIc) subtypes were detected in seven and six lesions, respectively. Sphincter-saving techniques were carried out in eight cases, and five cases required Miles' operation. Neither postoperative complications nor deaths were noted. The mean follow-up period was 57 months (6 to 133 months). No recurrence or distant metastasis was found during this follow-up. IIa + IIc subtype lesions with deep submucosal invasion at or beyond Smlc level were closely related with lymphatic and vascular invasion. Although this association was not necessarily accompanied by an increased number of involved lymph nodes, major surgical resection is suggested in such IIa + IIc cases due to an increased possibility for lymph node metastasis.

**Key words :** early rectal carcinoma, invasive carcinoma, submucosal invasion, surgical treatment, metastasis, survival

Recently, with the widespread use of endoscopy and the availability of better tests used in mass screening (1, 2) the detection rate for early colorectal cancer has been increasing (3), leading most surgeons to adopt a more conservative attitude towards low-lying rectal cancers with removal of most lesions endoscopically or by local excision (4, 5). However, controversy exists regarding patient selection and the need for subsequent major resection or adjuvant therapy (6-8). The aim of this study has been to determine the

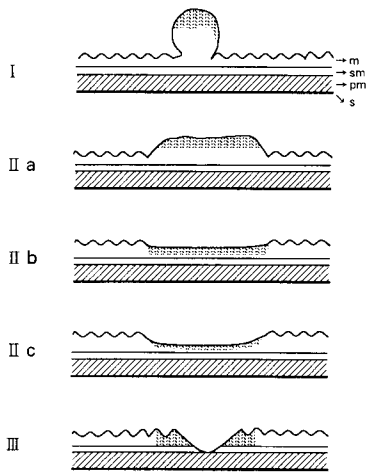
risk of lymph node metastasis in these early rectal cancers referred for treatment at First Department of Surgery, Okayama University Medical School.

### Subjects and Methods

Between 1980 and 1990, 186 patients with rectal carcinoma were treated in our department. Of these, 13 (7 per cent) patients had early rectal carcinoma. Mean age was 64 years, ranging from 38 to 79 years (9 male, 4 female). Preoperative assessment was done by serum

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\* To whom correspondence should be addressed.

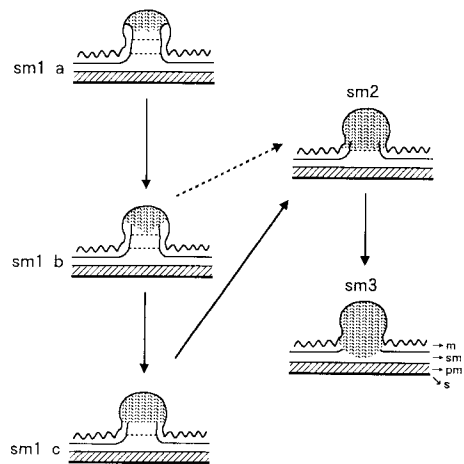


**Fig. 1** The Japanese endoscopic classification for the early colorectal cancer. m: mucosa; sm: submucosa; pm: proper muscle; and s: serosa.

level of carcinoembryonic antigen (CEA), flexible fibero-scopy, barium enema, and computed tomography (CT) scan or magnetic resonance image (MRI). Two pathologists confirmed the rectal carcinomas in all cases using preoperative biopsies and surgical specimens. Immediately after operation the specimens and lymph nodes were fixed in formalin and then cut into parallel 2-mm thick sections. At least three level sections per lymph node were examined, and lymph node clearance technique (9) was performed in order to increase the detection of involved lymph nodes. Early rectal cancers were endoscopically classified according to the Japanese Research Society for Colon, Rectum and Anus (Fig. 1) (10, 11), and submucosal invasion was assessed according to the criteria defined by Kudo *et al.* (12) with three main levels of invasion (Fig. 2). The presence of invasion into lymphatic or vascular channels was also evaluated. Patients who underwent endoscopic treatment alone and those with multiple polyposis or inflammatory bowel disease were excluded from this study.

## Results

The most frequent finding was anal bleeding seen in 9 (69.2 per cent) patients, and four were symptom-free. In all cases serum CEA level was



**Fig. 2** The histological classification of depth of invasion into the submucosa. m: mucosa; sm: submucosa; pm: proper muscle; and s: serosa.

within normal limit, and none of them had evidence of regional spread or distant metastasis either by CT scan or MRI. Tumor site was predominantly in lower rectum accounting for seven out of 13 cases (Table 1). The mean diameter of the lesions was 22 mm; less than 15 mm occurred in three cases, in six was between 15 and 25 mm (46.1 per cent), and in four cases was more than 25 mm (30.8 per cent). The polypoid type (including pedunculated and sessile polyps) was predominant, followed by the IIa + IIc subtype, which accounted for 7 (54 per cent) and 6 (46 per cent) lesions, respectively (Table

**Table 1** Site and type of early rectal cancers

Site	Type		Total
	I <sup>a</sup>	IIa + IIc	
Upper	1 (0/1) <sup>b</sup>	1 (0/1)	2
Middle	2 (1/1)	2 (0/2)	4
Lower	4 (2/2)	3 (1/2)	7
Total	7	6	13

a: including pedunculated and sessile lesions.

b: depth of invasion (mucosa/submucosa).

**Table 2** Lymphatic or vascular invasion of early rectal cancer with submucosal invasion

Depth of invasion	No vessel invasion	Lymphatic invasion	Lymphatic and vascular invasion	Total
Sm1b	1 (1 <sup>a</sup> /0 <sup>b</sup> )	0 (0/0)	0 (0/0)	1
Sm1c	0 (0/0)	1 (0/1 <sup>c</sup> )	0 (0/0)	1
Sm2	2 (2/0)	1 (0/1)	1 (0/1)	4
Sm3	0 (0/0)	0 (0/0)	3 (1/2 <sup>c</sup> )	3
Total	3 (0/0)	2 (0/2)	4 (1/3)	9

a: Type I lesions including pedunculate and sessile polyps.

b: Type IIa + IIc Lesions.

c: Patients with positive paracolic lymph nodes.

1). Neither early rectal tumors type II or III alone nor synchronous lesions were detected in this series. The four mucosal cancers were operated on because of the difficulty for endoscopic polypectomy; one was a large sessile polyp, another was a IIa + IIc type, and the other two cases had polypectomy margins involved by neoplastic cells. They underwent low anterior resection. Three patients had undergone local excision; two due to advanced age and another one due to severe heart disease. Miles' operation was carried out in five cases considering the tumor size and the proximity to the anal verge. No postoperative complications or deaths were noted.

Histologically, all four mucosal and six submucosal cases were well-differentiated adenocarcinomas. The remaining three submucosal cases were moderately differentiated adenocarcinomas. Nine of 13 patients had tumor invasion into the submucosa, and lymphatic or vascular invasion was identified in six patients, as demonstrated in Table 2. Among them, all five cases of IIa + IIc type had either lymphatic or venous invasion, including two patients with positive paracolic lymph nodes. These lesions were more than 25 mm sized or demonstrated second or third degree of submucosal invasion. In contrast, only one of all four type I cases had lymphovascular invasion with tumor as deep as Sm 3 level. Three patients died of causes unrelated to the cancer. Neither recurrence nor distant metastasis was detected during follow-up that ranged from 6 to 133

months with a mean of 57 months.

## Discussion

The management of polypoid lesions containing a focus of invasive carcinoma (type I) or tumors presenting as a superficial lesions (type II) in the rectum is still controversial (5-7). Some authors consider local excision or endoscopical treatment being enough for cure (4, 5, 13), while others favor towards resection regarding the high risk for lymph node metastasis and presence of neoplastic cells in the polypectomy margins (6, 14). Kudoh *et al.* (1984) (12) and later, Haggitt *et al.* (1985) (15) have addressed the depth of submucosal invasion as a risk factor for lymph node metastasis. Recently, Nivatvongs *et al.* (8) using the classification proposed by Haggitt *et al.* (15) have demonstrated that deep submucosal invasion (level 4) was responsible for 27 per cent of lymph node metastasis, and suggested as a significant factor for lymph node metastasis. However, in a total of 113 polyps with level 4 invasion only 13 (11.5per cent) had lymph node metastasis. In our series, two of Sm 2 and all three cases of Sm 3 level had lymphatic and/or vascular invasion. Concerning the type of lesion, vessel invasion was also noted in all five IIa + IIc cases, including two patients who had positive lymph nodes (22.2 per cent of all submucosal lesions). Matsuda *et al.* (1990) (16) demonstrated only one case (6.7 per cent) with lymph node

involvement in a series of 15 patients, where 13 of them had massive submucosal invasion. In addition, an increased incidence for lymphatic and vascular invasion has been demonstrated in IIa + IIc lesions (5, 16), but the vessel invasion was not accompanied by an increased incidence of lymph node involvement (5-7). The number of cases in this study is small to draw some firm conclusion. However, it seems that the association of submucosal invasion at or beyond Sm 1c level with IIa + IIc lesions plays an important role in the mechanism of dissemination immediately leading to lymphatic and vascular invasion. Further investigation is needed to assess the true risk for lymph node metastasis.

In conclusion, we suggest that segmental bowel resection containing the regional lymph nodes should be carried out in these IIa + IIc cases considering an increased possibility for lymph node metastasis that could be missed during limited treatment.

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