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ENDOSCOPIC STUDIES ON THE SUPERFICIAL SPREADING TYPE OF EARLY GASTRIC CANCER

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SYNOPSIS

Twenty eight cases out of 230 cases of early gastric cancer showed the superficial spreading type of early gastric cancer. Seventeen stomachs (60.7%) were compatible to the endoscopic finding of spreading cancerous regions, even to macroscopic and microscopic ones. Other 11 cases were not corresponded clinico-pathologically to the infiltrated lesions. These 11 cases were studied on the superficial spreading lesions respectively. They were divided into three groups and compared each other micro- and macro-scopically and endoscopically. Group I contained 6 cases, compatible to micro- and macro-scopic findings but not to endoscopic ones. Endoscopic overdiagnosis may be redness and overflow of white fur and underestimate by a few cancer cells

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superficially in the mucosae, slight difference in height at the margin of II c and cancer without exposure. Group II was similar microscopic and endoscopic findings but not compatible macroscopically. Both cases in group II were overestimated macroscopically at the infiltrated edge because of color change in mucosae but endoscopically diagnosed by changes of color and gastric area. Group III contained 3 cases of microscopic characteristics and not compatible to macroscopic and endoscopic ones. Endoscopic underdiagnosis may be based on a few cancer cells superficially in normal mucosae and on less depressed lesions. These clinicopathological studies might be worthy to clarify the endoscopic and pathologic discrepancies of infiltrating areas by early gastric cancer, and might improve endoscopic techniques of the gastric mucosal observation.

INTRODUCTION

It has become to be known with the development of new diagnostic methods of gastric disease that gastric cancer grows in various forms. According to Yasui,[11] the criteria of superficial spreading type of early gastric cancer were defined as the lesion larger than 5 x 5 cm^2 and submucosal infiltration. It is necessary for surgeons to understand correctly the superficial spreading lesions of gastric cancer before surgical operation. Gastroendoscopical examination is effective to know the infiltrating area of gastric cancer, but the endoscopical examination causes sometimes over- or under-estimation of the infiltrating area. Early gastric cancers with the less depressed surface are hard to diagnose endoscopically the spreading cancer lesion.[10] It is worthy to study and clarify the background of endoscopic and pathologic discrepancies in early gastric cancer.

CASES AND METHODS

Seven hundred and ninety-three patients suffering from gastric cancer had been gastrectomized totally in Hyogo Medical Center for Adults from 1977 to 1987. Early gastric cancer is found in 230 patients among them. Only 28 cases showed the superficial spreading of early gastric cancer, which were composed of 13 males

and 15 females ranging from 27 to 74 years and 55.5 years in average. Macroscopically, there were a case of II a cluster, 2 cases of II b, 1 case of II c + I + II a, 5 cases of II c + II a, 1 case of II c + II b, 16 cases of II c, and 2 cases of II c + III, 28 cases in total (Table 1). Histologically, cancer of 12 cases developed to m and 16 cases to sm. Histological types were divided to type I: papillary adenocarcinoma and tubular adenocarcinoma, and to type II: poorly differentiated adenocarcinoma and signet-ring cell carcinoma. Type I comprised of 13 cases and type II of 15 cases. Their gastroendoscopical and clinicopathological findings were compared each other. The resected stomachs were opened at the greater curvature. Macroscopic observation and measurement of cancer regions were carried out at the clearest range as observable grossly as possible at the fresh, half-fixed or fixed stomachs in 10% formalin solution. Fixed stomachs were cut at 5 mm intervals parallel to the long axis of the stomach serially. These specimens were dehydrated in graded concentration of ethanol, and embedded in paraffin, and cut in 4 micra thickness. They were stained by hemotoxylin and eosin and used for light microscopic observation. Another study was made microscopically to those which were confirmed endoscopically and macroscopically.

Table 1 Superficial spreading type of gastric cancer, macroscopically obeserved, in Hyogo Medical Center for Adults (1977-1987)

Cluster of IIa	1 case
IIb	2 cases
IIc + I + IIa	1 case
IIc + IIa	5 cases
IIc + IIb	1 case
IIc	16 cases
IIc + III	2 cases
	28 cases

Gastrectomied cancer in total	793 cases
Early carcinoma of the stomach	230 cases
Superficial spreading type of early gastric cancer of the stomach	28 cases (28/230=12.2%)

RESULTS

In 17 cases out of 28 (60.7%), the microscopic findings on spreading cancerous region corresponded to those macroscopic and endoscopic findings. Then, clinicopathologically retograde studies were done on the superficial lesions in 11 cases, which were composed of 2 cases of II b, 2 cases of II c + II a, 1 case of II c + II b, 5 cases of II c and 1 case of II c + III (Table 2). They were divided to three groups as shown in Table 3. Group I showed same micro- and macroscopic findings but different endoscopic ones. Group II was same microscopic and endoscopical but not compatible to macroscopic findings. Group III showed microscopic characteristics not compatible to macroscopic and endoscopic ones. Group I contained 4 cases of II c and 2 of II c + II a at the macroscopic examination. Cancer location was 3 cases at MA, 2 at M and 1 at A. Depth of cancer lesion was m in 5 cases, 1 to sm. Histological types were 4 cases of type I, and 2 of type II. Group II had 2 cases of II c + II b and of II b. The cancer location was MC and M. They showed sm in depth, and histological types were type I and type II. Group III contained 3 cases of II b, II c + III and II c. They showed M, MA and MC at location, infiltrated to m in two cases and to sm in one, and were composed of two cases of type II and 1 of type I histologically.

Spreading cancerous regions were shown at the left, and reasons of clinicopathological discrepancies at the right side of Table 4 and 5. These lesions were underestimated endoscopically in

Table 2 Microscopic findings corresponding to and not corresponding to macroscopic and endoscopic findings

Corresponding		Not corresponding	
Cluster of IIa	1 case	IIb	2 cases
IIc + I + IIa	1 case	IIc + IIa	2 cases
IIc + IIa	3 cases	IIc + IIb	1 case
IIc	11 cases	IIc	5 cases
IIc + III	1 case	IIc + III	1 case
	17 cases (60.7%)		11 cases (39.3%)

Table 3 Microscopic findings not compatible to endoscopic and/or macroscopic findings

		Microscopic findings	Macroscopic findings	Endoscopic findings	Location	Depth of lesion	Histological types
Group I	No.1	IIc+IIa	IIc+IIa	IIb+IIa	MA	m	I
	2	IIb	IIc	IIc	A	m	II
	3	IIc	IIc	IIb	MA	m	I
	4	IIc	IIc	IIb	M	sm	II
	5	IIc	IIc	IIc+IIb	M	m	I
	6	IIc+IIa	IIc+IIa	IIc+IIa	MA	m	I
Group II	7	IIc+IIb	IIc+IIb	IIc+IIb	MC	sm	I
	8	IIb	IIb	IIb	M	sm	II
Group III	9	IIb	IIb	IIb	M	sm	II
	10	IIc+III	IIc+III	III	MA	m	II
	11	IIb+IIc	IIc	IIc+IIb	MC	m	I

Group I : Microscopic = Macroscopic, Microscopic × Endoscopic Group II : Microscopic = Endoscopic, Microscopic × Macroscopic Group III : Microscopic × Macroscopic and Endoscopic

Histological types I : Papillary adenocarcinoma, Tubular adenocarcinoma
II : Poorly differentiated adenocarcinoma, Signet-ring cell carcinoma

4 and overestimated in 2 cases of group I. The case 1 showed almost intact height at the margin of II c. Histologically, intestinal metaplasia was marked at the margin of the cancerous lesions. Case 2 showed a few cancer cells superficially in the mucosa. Case 3 showed the cancerous region intermingled with intact mucosae. Case 4 showed slight difference in the height at the margin of II c suggesting mucosal atrophy, subsequently underestimated endoscopically. Case 5 was overestimated the red margin of II c to be II b endoscopically. Case 6 was also overestimated endoscopically, in which the surface layer with secretion was II c. In group II, case 7 was overestimated macroscopically, because of the color change in fresh and fixed specimens. Similar findings were found in case 8, but both were feasible in color endoscopically. In group III, case 9 was underestimated by a few cancer cells, which were exposed superficially in normal mucosae and existed continuously from the primary lesion. Case 10 showed same histological findings as case 9, but mucosal color changed macroscopically from the fresh to the fixed stomach. Its marginal height was partly depressed.

Table 4 Endoscopic findings not compatible to microscopic and macroscopic findings (group I)

	Shematic chart for a spread of the cancerous region	Reasons of clinicopathological discrepancies
No. 1	Microscopic (IIc+IIa) Macroscopic (IIc+IIa) [Endoscopic (IIb+IIa)]	Marked intestinal metaplasia; Slight difference in height at the margin of IIc
No. 2	Microscopic (IIb) Macroscopic (IIc) [Endoscopic (IIc)]	Unreadable because of a few cancer cells exposed superficially in mucosae
No. 3	Microscopic (IIc) Macroscopic (IIc) [Endoscopic (IIb)]	Cancer scattered in the mucosae, a few under the mucosae; Slight difference in height at the margin of IIc
No. 4	Microscopic (IIc) Macroscopic (IIc) [Endoscopic (IIb)]	Slight difference in height at the margin of IIc; Read as atrophy
No. 5	Microscopic (IIc) Macroscopic (IIc) [Endoscopic (IIc+IIb)]	Redness read as IIb
No. 6	Microscopic (IIc+IIa) Macroscopic (IIc+IIa) [Endoscopic (IIc+IIa)]	Overflow of white fur

[ ]: Findings not compatible

Case 11 was underestimated since a few cancer cells infiltrated superficially in the mucosa.

DISCUSSION

Stout[7] reported the superficial spreading type of gastric cancer in 15 cases, emphasizing the favourable prognosis in spite of their extending range of cancer infiltration. Somewhat different definitions are noted by other reporters as to the superficial spreading type of gastric cancer,[4,5,11] whereas the authors defined them according to Yasui's one. These lesions are found more in rather depressed area than in elevated. According to our study, 25 cases out of 28 (89.3%) were noted to be the

Table 5 Microscopic findings compatible to endoscopic findings but not compatible to macroscopic findings (group II), and microscopic findings not compatible to macroscopic and endoscopic findings (group III)

	Shematic chart for a spread of the cancerous region	Reasons of clinicopathological discrepancies
No. 7	Microscopic (Ⅱc+Ⅱb) Macroscopic (Ⅱc+Ⅱb) Endoscopic (Ⅱc+Ⅱb)	Changes of color in the fresh and fixed specimens, Readable endoscopically redness
No. 8	Microscopic (Ⅱb) Macroscopic (Ⅱb) Endoscopic (Ⅱb)	Changes of color in the fresh and fixed specimens; Readable endoscopically due to changes of color and gastric mucosae
No. 9	Microscopic (Ⅱb) Macroscopic (Ⅱb) Endoscopic (Ⅱb)	Changes of color in the fresh and fixed specimens; Partly unreadable the margin where a few cancer cells were exposed superficially in normal mucosae
No. 10	Microscopic (Ⅱc+Ⅲ) Macroscopic (Ⅱc+Ⅲ) Endoscopic (Ⅲ)	Unreadable cancer lesion containing a few cancer cells superficially in normal mucosae; Slight difference in height of Ⅱc
No. 11	Microscopic (Ⅱb+Ⅱc) Macroscopic (Ⅱc) Endoscopic (Ⅱc+Ⅱb)	Readable cancer lesion of Ⅱb being continuous; Unreadable a few cancer cells superficially in normal mucosae

: Findings not compatible

superficial spreading type of early gastric cancer mainly composed of depression, too. In 16 cases out of 25 (64%) the endoscopical findings were compatible to the microscopical ones, however, in 9 cases (36%) the spreading focus was unreadable. Concerning to extending range of cancer infiltration, Yao et al.[10] divided 2 groups and investigated the degree of difficulty in endoscopical diagnosis. One was the lesion where the infiltrated area of gastric cancer formed dpressed region, and the other was the lesion formed mostly the changes of gastric area with less depressed region. It had been reported that the lesions showing less change as seen in this study was hardly diagnosable. Those less depressed lesions were noted to be hard in reading spreading

cancerous region. In case 1, it was hardly readable because of slight difference in height at the margin of II c, and of mucosae of the normal region itself showing intestinal metaplasia and multiple erosions. Four cases of II b or II c were unreadable because of the presence of cancerous area intermingled with normal mucosae. Their histological finding was different endoscopically, in which comprised of 1 case of the type I and 3 cases of the type II histologically. On the other hand, they state that color change of mucosae closely correlated to the nature and the histological type of cancer itself, that is, undifferentiated type cancer likes to show discoloration, but differentiated type cancer shows redness.[10] Takekoshi et al.[9] reported effectiveness for the identification of the infiltrated area of gastric cancer by the making method at biopsy. As to color change of gastric area in comparison to the histological findings, mucosal redness and irregular granularity are noted in more than a half of the differentiated type cancer, then followed by discolored granularity, while undifferentiated type cancer revealed flatness and discoloration at a high frequency of 46%, and 17% of them showed discolored granularity and discolored gastric area remaining unchanged. In authors' study, 3 cases with type II and 1 case type I histologically, but on account of the normal mucosa intermingled with cancerous lesion less changes in color was noted from normal mucosae. Nishizawa et al.[6] classified also early gastric cancer as II b alone and accompanied II b by the infiltrated form of mucosae under the endoscope, and stated that the endoscopical diagnosis is hardly feasible if cancer is not exposed on the surface. Hashimoto et al.[1] state, based on their study of the endoscopical findings according to the pigment spray method of II b, that the lesion of differentiated type cancer exposed on the surface of mucosa indicates redness, while undifferentiated type cancer without exposure on mucosa is mainly discolored change showing flat granularity with smooth surface. In No. 3, being the type I histologically, color and surface changes were not observed grossly. On the other hand, two cases showed type I and type II histologically, in which any spreads of the focus were not measurable macroscopically but endoscopically positive. It was readable from changes of color and surface, since cancer was exactly exposed on the surface. Endoscopically one case

was diagnosed as II b due to its redness in margin of II c, and due to surface secretory materials. It may be considered to be originated in the insufficient observation for the margin of II c, and it may be prevented by sufficient pretreatment of white fur. Nowadays, various ways and means have been tried to diagnose a focus in the depressed superficial spreading types of early gastric cancer endoscopically. Hayakawa et al.[2] had tried to make a microstructure of the margin of II c using a magnifying endoscope which increase the endoscopic diagnostic capacity in differential diagnosis of diseases. Ida et al.[3] report that the abnormal gastric area can be illustrated at a high efficiency by the contrast method for cancer exposed on the surface and by the methylene blue staining for unexposed. However, another report is available that a spreading is diagnosable not by the pigment endoscopy but also by the step biopsy.[8] When cancer is exposed to the normal mucosa as reported in this paper, it is necessary to study how to diagnose efficiently in combination with microcarcinoma observation of the spread, pigment method, step biopsy, electron endoscopy upon image processing by magnification, laser endoscopy using fluoroscopic antibody, etc.

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