

Detection of Early Gastric Cancer

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The incidence of gastric cancer is high in Japan and in the past the majority of cases under treatment were advanced cancer with a poor prognosis.

Recently, however, the diagnosis of gastric cancer has been improved by the introduction of the double contrast method of x-ray examination of the stomach, as well as the development of the gastroendoscope. Therefore, the detection of early gastric cancer in patients has been increasing. The purpose of this paper is to look at some important diagnostic procedures leading to the detection of early gastric cancer.

CLINICAL MATERIALS

Between 1968 and 1977, 127 patients with gastric cancer underwent surgery at Nagato Central Hospital. In 94 of them, radical gastrectomy was performed while in the remainder only palliative procedures were done because of the advanced stage of the cancer. The incidence of early gastric cancer was 36% (5/14) and 43% (10/23) in 1976 and 1977, respectively (Table 1).

The ten cases in 1977, diagnosed by gastroendoscopic examination as early gastric cancer, were analyzed.

RESULTS

The ratio of male to female was 9:1; the age range was 27 to 72 with an average age of 55. The chief complaints in the ten cases were slight epigastralgia in seven, nausea in one and no distress in two who were referred to our clinic for detailed examination after abnormalities had been found on mass survey x-rays of the stomach. Cancer was detected by x-ray examination in four cases and by endoscopy in the remainder (Table 2).

Table 1 Incidence of Gastric Cancer

	Operable	(Early)	Inoperable	Total
1968	5		4	9
1969	3			3
1970	1			1
1971	1		3	4
1972			1	1
1973	13	(5)	7	20
1974	17	(2)	4	21
1975	25	(2)	6	31
1976	11	(5)	3	14
1977	18	(10)	5	23
Total	94	(24)	33	127

Table 2 Cases with Endoscopic Diagnosis of Early Gastric Cancer

Case NO.	Sex	Age	Chief complaint	Method of detection	Extent of infiltration
1	Male	73	None	X-ray	mucosa
2*	Male	72	Epigastralgia	X-ray	proper muscular layer
3	Male	63	Epigastralgia	X-ray	mucosa
4	Male	73	None	X-ray	submucosa
5	Male	27	Epigastralgia	Endoscopy	submucosa
6	Male	43	Epigastralgia	Endoscopy	mucosa
7	Male	50	Epigastralgia	Endoscopy	mucosa
8	Male	50	Nausea	Endoscopy	mucosa
9	Male	46	Epigastralgia	Endoscopy	mucosa
10	Female	56	Epigastralgia	Endoscopy	mucosa

*Advanced cancer was found on postoperative histological examination

Case 1. A 73-year-old male

Supine double contrast roentgenogram revealed an irregularly-shaped rough depression, and converging folds with abrupt interruption and slight clubbing, in the posterior wall of the antrum (Fig. 1). These findings suggested depressed early cancer. On histological examination, signet ring cell carcinoma, limited to the mucosa, was found.

Case 2. A 72-year-old male

Supine double contrast roentgenogram showed a marked fold convergency around an irregular depression in the posterior wall of the mid-gastric body near the lesser curvature. These mucosal folds were

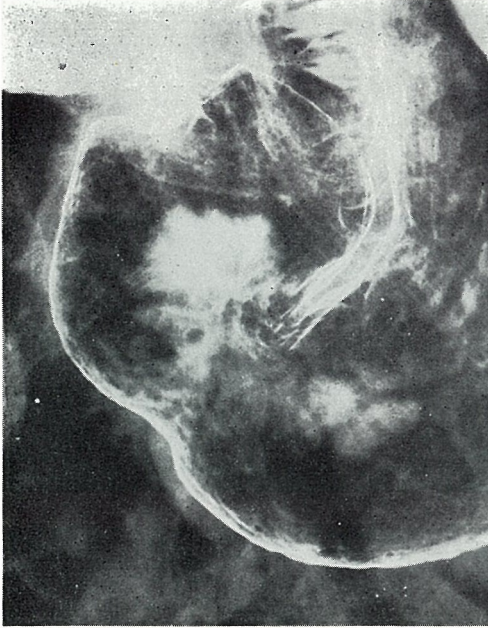


Fig. 1



Fig. 2



Fig. 3

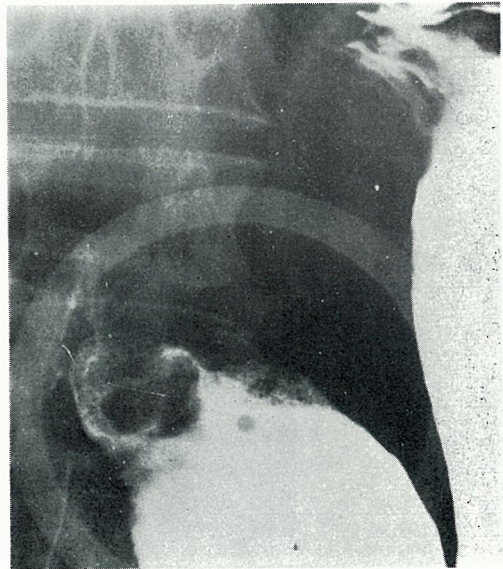


Fig. 4

- Fig. 1 Supine double contrast x-ray of case 1.
An irregularly-shaped rough depression, and converging folds with abrupt interruption and slight clubbing are seen in the posterior wall of the antrum.
- Fig. 2 Supine double contrast x-ray of case 2.
A marked fold convergency around an irregular depression is seen in the posterior wall of the mid-gastric body near the lesser curvature. These mucosal folds are smooth and do not indicate malignancy.
- Fig. 3 A resected specimen of case 2.
The anterior wall of the depression is sharply defined with interrupted ends and clubbing of the converging folds, easily diagnosable as malignancy.
- Fig. 4 Compression x-ray of case 3.
An irregularly indented polypoid lesion is seen in the prepyloric region of the antrum.

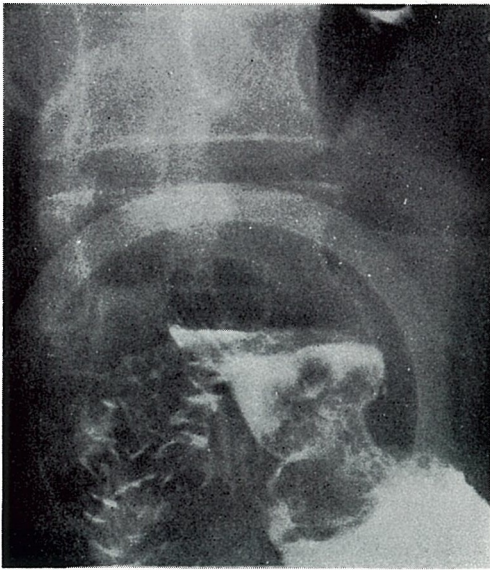


Fig. 5

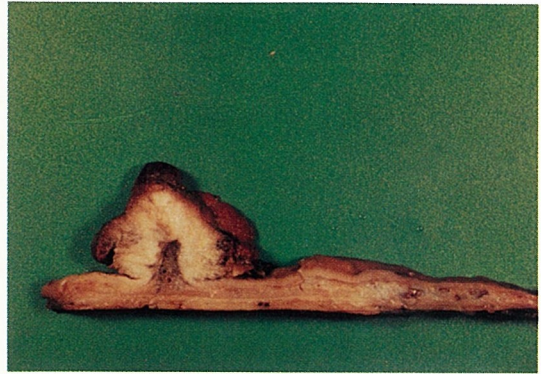


Fig. 6

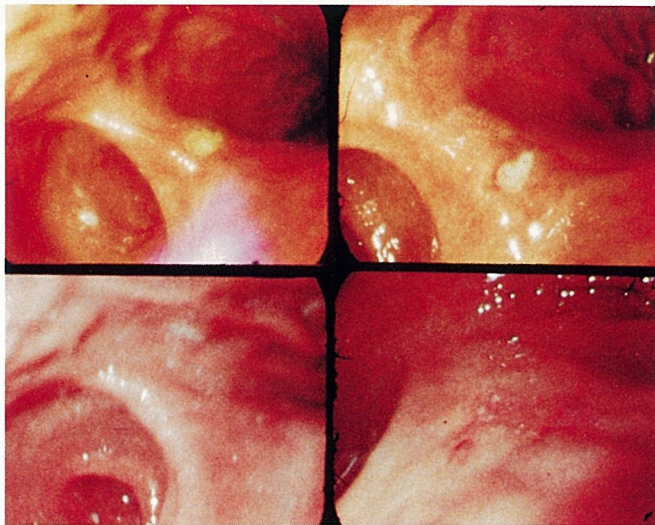


Fig. 7

- Fig. 5 Compression x-ray of case 3.
The same lesion is moved into the duodenal bulb, which suggests a pedunculated lesion.
- Fig. 6 A resected specimen of case 4.
An irregularly uneven tumor with a clearly notched base. The muscularis mucosae is raised in the tumor, which suggests an early cancer.
- Fig. 7 Endoscopic pictures of case 5.
An open ulcer above the gastric angle is shown in the upper right picture. The same lesion taken about one month later is shown in the upper left picture. The two lower pictures taken about three months later show a shallow depression with a reddish, rough, granulated lesion which suggests malignancy.

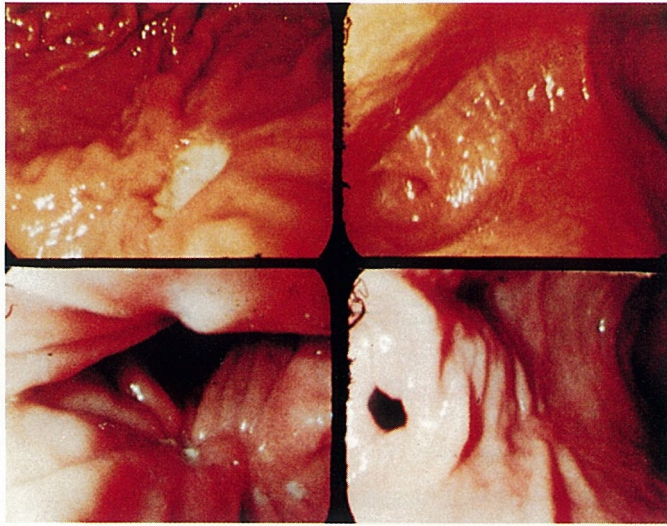


Fig. 8

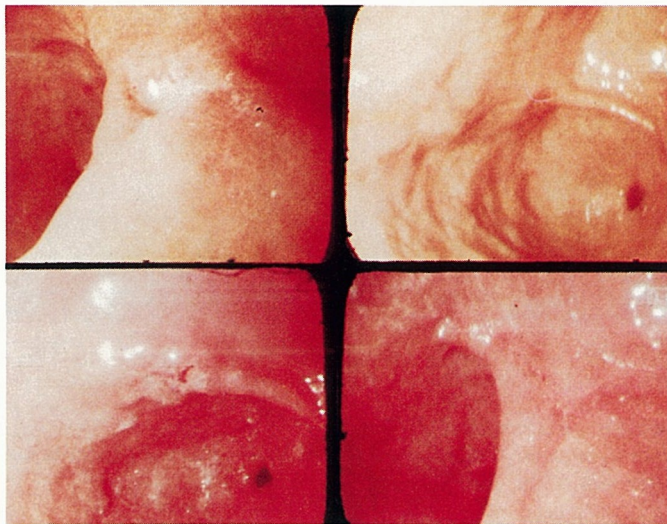


Fig. 9

- Fig. 8 Endoscopic pictures of case 6.
 A white-coated open ulcer in the upper gastric body is shown in the two left hand pictures. An abnormal interruption of the mucosal folds around a shallow depression in the antrum is shown in the two right hand pictures.
- Fig. 9 Endoscopic pictures of case 7.
 A white-coated open ulcer above the gastric angle is shown in the upper left picture. Healed scar of this ulcer is shown in the lower right picture. An irregularly-shaped small depression and converging folds with abrupt interruption are shown in the upper right and lower left pictures.

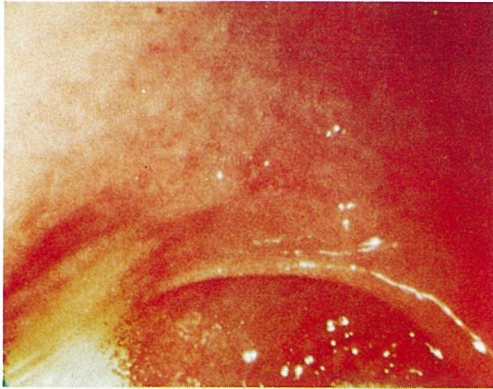


Fig. 10

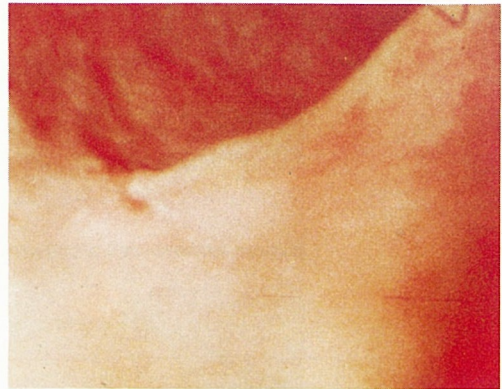


Fig. 11



Fig. 12



Fig. 13

Fig. 10 Endoscopic picture of case 8.

A small depression with no characteristic findings of malignancy is seen on the anterior wall of the gastric angle.

Fig. 11 Endoscopic picture of case 9.

A small depression with no characteristic findings of malignancy is seen on the posterior wall of the gastric angle.

Fig. 12 Endoscopic picture of case 10.

Both white-coated and reddish, shallow depression with converging folds is seen in the anterior wall near the greater curvature of the antrum.

Fig. 13 Prone barium filled x-ray of case 10.

Rigidity and irregularity of the wall of the greater curvature of the antrum is shown.

smooth and did not indicate malignancy (Fig. 2), but the findings of the endoscopic examination suggested a malignancy. In the resected specimen, the anterior wall of the depression was sharply delineated with interrupted ends and clubbing of the converging folds, easily diagnosable as malignancy. Because the boundary of the depression was rather obscured in the posterior wall (Fig. 3), the double contrast roentgenogram had not revealed the malignant mucosal folds. Histologically, the lesion was signet ring cell carcinoma, partly invading the proper muscular layer. Therefore, advanced cancer was found in this case only by postoperative histological analysis, though endoscopic findings had suggested early cancer.

Case 3. A 63-year-old male

Compression x-ray of the antrum showed an irregularly indented polypoid lesion, which moved from prepylorus into duodenal bulb, suggesting a pedunculated tumor (Fig. 4, 5).

Case 4. A 73-year-old male

The patient, who underwent partial gastrectomy 6 years ago under the diagnosis of benign polyp, was referred to our clinic for detailed examination of the residual stomach. A walnut-sized tumor was seen below the esophagogastric junction on x-ray examination. Endoscopy revealed the irregularly uneven tumor with a clearly notched base which suggested an early cancer. The resected specimen showed the muscularis mucosae was raised in the tumor (Fig. 6). The cancer was papillary adenocarcinoma, limited to the mucosa.

Case 5. A 27-year-old male

The patient had taken medication for a gastric ulcer. Three months later, the open ulcer located above the gastric angle had turned into a shallow depression with a reddish, rough, granulated lesion which suggested malignancy (Fig. 7). Gastric biopsy disclosed signet ring cell carcinoma.

The cancer was limited to the mucosa and submucosa. This case seemed to be an example of the "malignant cycle" phenomenon.

Case 6. A 43-year-old male

A malignant lesion was detected in another area during a follow-up endoscopic examination of a benign ulcer. A white-coated open ulcer was seen in the upper gastric body, and an abnormal interruption of the mucosal folds around a shallow depression in the antrum was also seen (Fig. 8)

Early gastric cancer was diagnosed by this characteristic feature.

Histologically, the lesion was well differentiated adenocarcinoma limited to the mucosa.

Case 7. A 50-year-old male

Malignant lesion was found in another area during a treatment of a benign ulcer. A white-coated open ulcer located above the gastric angle showed the complete healing. However, an irregularly-shaped small depression and converging folds with abrupt interruption in the anterior wall of the antrum was also seen (Fig. 9). On histological examination, moderately differentiated adenocarcinoma, limited to the mucosa, was found.

The lesions of patients No. 8 and 9 were found, fortunately, by endoscopy, because the cancer was too small to be detected by x-ray examination of the stomach.

Case 8. A 50-year-old male

The patient, who had liver cirrhosis, complained of nausea. A small depression was found on the anterior wall of the gastric angle, but it did not look characteristic of early cancer (Fig. 10). Gastric biopsy, however, disclosed signet ring cell carcinoma. The cancerous lesion was limited to the mucosa and was approximately 5 mm in diameter.

Case 9. A 46-year-old male

The patient, who had slight epigastralgia, was examined by endoscopy. A small depression with no characteristic findings of malignancy was detected on the posterior wall of the gastric angle (Fig. 11). Gastric biopsy, however, disclosed well differentiated adenocarcinoma. The cancer was limited to the mucosa.

Case 10. A 56-year-old female

On a previous x-ray examination of the stomach, abnormalities, such as gastric cancer, had not been found. However, on endoscopic examination, both white-coated and reddish, shallow depression with converging folds was seen in the anterior wall near the greater curvature of the antrum (Fig. 12). On retrospective investigation, a prone, barium-filled x-ray showed rigidity and irregularity of the wall of the greater curvature of the antrum (Fig. 13). Histological diagnosis was signet ring cell, i.e. mucosal carcinoma.

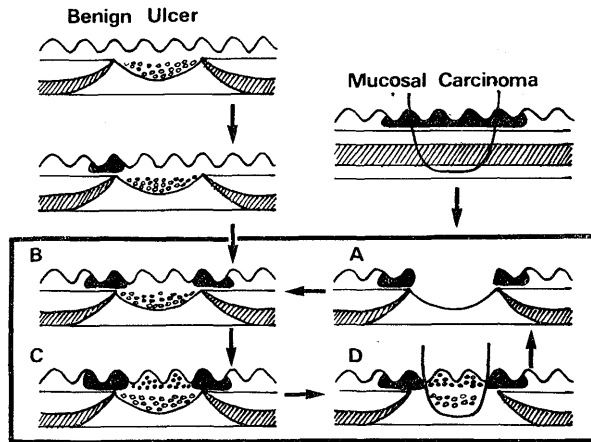
DISCUSSION

The number of patients with gastric cancer as well as the number of operable gastric cancer have increased in the past five years at Nagato Central Hospital. This phenomenon may be related to the follow-

ing: x-ray examinations have been performed on almost all patients with gastrointestinal distress; endoscopic examination of the stomach has been performed on as many patients as possible, both with and without abnormal x-ray finding. From January, 1977 through December, 1977, x-ray examinations were given to 1620 patients with gastrointestinal distress; 687 of them were examined by endoscopy. Gastric biopsy was performed on 35% of the patients who had an endoscopic examination.

In ten patients with a diagnosis of early cancer, four were detected by x-ray and six by endoscopy. Two of the four cancer found by x-ray were the depressed type and showed a clear fold convergency; the remainder were the elevated type. The elevated type was clearly demonstrated by x-ray. Yamada et al¹⁾. classified elevated lesions into four types in terms of the mode of elevation or the macroscopic profile at the base of the lesion and developed criteria for the differentiation between malignancy and benignancy, analyzing 217 patients with elevated lesions. By using their criteria the patients with an elevated lesion found in our clinic were easily diagnosed as malignancy. Since our diagnostic techniques for revealing depressed lesions are not well developed, it is important to direct our efforts toward detecting minute lesions by considering some important factors, such as quality of contrast medium and/or amount of air in the stomach.

For a long time it has been quite controversial whether or not a chronic gastric ulcer has the possibility of changing into a malignancy. At present, in Japan, research findings support the theory that canceration of ulcer is quite rare^{2),3)}. Nakamura et al⁴⁾., analyzing 285 intramucosal carcinoma lesions of more than 6 mm in diameter with regard to the relationship between size and incidence of an accompanying ulcer in the cancer nest, found that the rate of concomitant ulcer in the cancer nest increased as the cancer nest became larger. However there was a concomitant ulcer only in one lesion out of sixty-three when the lesion was less than 5 mm in diameter. They concluded that the majority of cancer nests accompanied by an ulcer should not be considered canceration of the ulcer but ulceration of the cancer. On the other hand, traditional teachings support the theory that benign ulcers of the stomach are expected to heal within reasonably short periods, while malignant ulcers rarely show significant healing. But many reports on the apparent healing of malignant ulcers seen on endoscopic follow-ups have been published in recent years⁵⁻⁷⁾. Sakita et al⁸⁾. observed significant healing in 51 (70.8%) of 71 malignant gastric ulcers found among 122 patients with early gastric cancer. Murakami et al⁹⁾. have confirmed the non-cancerous nature of the regenerated center in malignant ulcer craters. Sakita et al.



The black area indicates cancerous invasion.

(quoted from Sakita, T. et al.⁸³)

Fig. 14 Life cycle of malignant ulcer.

suggested that there is a life cycle of ulceration; healing and recurrent ulceration in malignant ulcers (Fig. 14). According to their theory, a malignant ulcer may begin as an ulceration in an area of mucosal cancer or as a malignant degeneration at the margin of a benign ulcer. A type III according to classification of early gastric cancer adopted by the Japanese Endoscopic Society is shown in Figure 14, A. Healing takes place from the margins as benign tissue grows (Fig. 14, B), giving the lesion a relatively benign appearance. In the next stage, malignant invasion occurs in this benign tissue (Fig. 14, C). Finally, fresh ulceration occurs again, completing the life cycle of the malignant ulcer (Fig. 14, D). Even if an endoscopic biopsy is performed during stage A, the cancerous epithelium around the open ulcer may be too small to be found. Therefore, when an open ulcer that seems benign is encountered, it is important to remember that it may be only a stage in the life cycle of a malignant ulcer. In case No. 5, though a benign gastric ulcer was diagnosed twice on endoscopic examination, malignant features appeared three months later. It seems impossible that this cancer grew from the regenerative epithelium of a benign ulcer during this period. However, a slightly irregular margin around the open ulcer, suggesting Fig. 14, A in the life cycle of a malignant ulcer, was retrospectively seen on the first endoscopic examination.

Recently there have been efforts to determine whether a given open gastric ulcer is benign or malignant by using close-up endoscopic

observations of the epithelial regeneration around an ulcer¹⁰⁾. This method was moderately useful in differentiating a type III early gastric cancer from a benign ulcer. However, it is not yet being used routinely.

Finally, it is most important not to misdiagnose a malignant ulcer as a benign ulcer. Therefore, when a depressed lesion is found, it is necessary to follow up adequately with x-ray and endoscopy to be sure if it is not a certain stage in the life cycle of a malignant ulcer.

CONCLUSION

The diagnosis by x-ray examination and endoscopy of nine cases of early gastric cancer and one of advanced cancer of the stomach were analyzed. The following conclusions were made:

1) An x-ray examination should be performed on all patients with gastrointestinal distress.

2) An endoscopic examination should be performed on as many patients as possible, even if x-ray examination reveals no abnormal findings.

3) Proper follow-up study by gastric biopsy is necessary, even if a lesion looks benign.

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