

## Pure Signet Ring Cell Type Early Gastric Carcinoma with Extensive Lymph Node Metastases

—A Case Report—

Seung Kew Yoon, M.D., Sang Wook Choi, M.D., Chang Don Lee, M.D.  
Hee Sik Sun, M.D., Doo Ho Park, M.D. and Boo Sung Kim, M.D.

*Department of Internal Medicine, Catholic University, Medical College, Seoul, Korea*

Mi Kyung Jee, M.D., Seok Jin Gang, M.D. and Sun Moo Kim, M.D.

*Department of Clinical Pathology*

A 42-year old man was admitted with indigestion and left upper quadrant pain. A gastrofiberscopic examination revealed a depressed, discolored lesion (1.5×1.5 cm) with converging irregular radiating folds in the antral portion, suggestive of early gastric cancer (type IIc). Histologically, signet ring cell carcinoma was seen. A subtotal gastrectomy was performed and the operative findings showed a shallow depression in the anterior wall of the greater curvature side in the antrum and multiple perigastric lymph node enlargement.

On microscopic examination, the authors observed pure signet ring cell carcinoma confined to the mucosa but with widespread lymph node metastases.

---

**Key Words:** Pure signet ring cell type carcinoma. Early gastric carcinoma.

### INTRODUCTION

Gastric carcinomas arise from the mucus secreting cells of gastric crypts or from areas of intestinal metaplasia<sup>1)</sup>.

Histologically, almost all gastric carcinomas are adenocarcinomas, but adenosquamous and squamous varieties comprise a very small portion (less than 1%)<sup>2)</sup>.

Adenocarcinomas can be classified into four histologic types<sup>3,4)</sup>: the diffuse type (synonymous with mucous or signet ring cell type), the intestinal type, the mixed type and the pylorocardiac gland cell type. Among the subtypes, pure signet ring cell type is very rare and has a poor prognosis<sup>2)</sup>. In this type, numerous mucin vacuoles distend the cells

and press the nucleus flat against the plasma membrane, resulting in the typical signet ring appearance.

Herein is presented a case of pure signet ring type early gastric carcinoma with extensive lymph node metastases.

### REPORT OF A CASE

A 42-year old man was admitted to Kang Nam St. Mary's Hospital with indigestion and left upper quadrant pain. He was well until four months prior to admission, when he began to experience indigestion and left upper quadrant pain. An UGIS was performed, revealing a round 1.5×1.3 cm depression, suggestive of a chronic gastric ulcer or early gastric cancer (Fig. 1).

On gastrofiberscopic examination, a depressed, discolored lesion with converging irregular radiating folds in the antral portion like that seen in early gastric cancer (type IIc), was found and microscopic examination revealed signet ring cell carcinoma (Fig. 2,5,6).

---

Address reprint requests: Boo Sung Kim, M.D., Department of Internal Medicine, Catholic University Medical College, #505, Banpo-Dong, Kang Nam Ku, Seoul, 135, Korea  
This work was supported in part by Catholic Medical Center Clinical Research Funds, Seoul, Korea

The patient was admitted for further evaluation and treatment, on admission his vital signs were temperature 36.4°C, pulse 75, respiration 20 and blood pressure 110/80 mmHg.

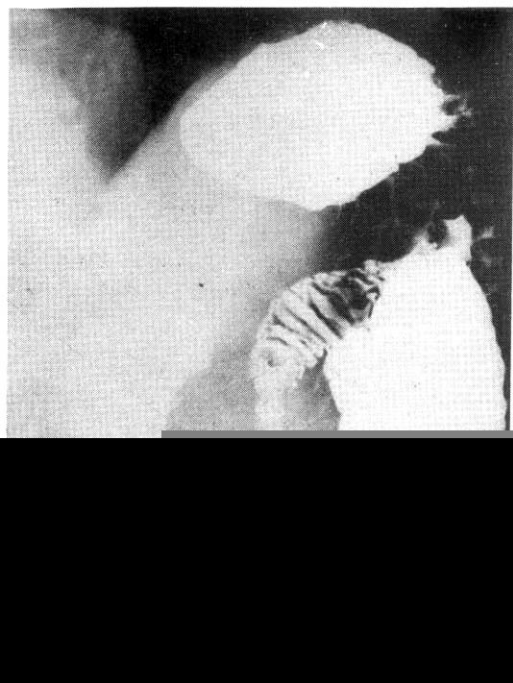
On examination, the patient appeared to be slender and chronically ill. No lymphadenopathy was found. The head and neck were normal. The conjunctivae were not anemic and the sclerae were not icteric.

The lungs were clear and the heart was normal. In the left quadrant, rebound tenderness was absent. Liver and spleen were not palpable. Laboratory results included normal urinalysis, hemoglobin 14.8 g/dl; hematocrit, 43%; WBC, 5,800/mm<sup>3</sup> with 67% neutrophils, 27% lymphocytes and 6% monocytes, and a platelet count of 204,000/mm<sup>3</sup>. Blood chemistries were nitrogen 14.7 mg/dl, creatinine 1.4 mg/dl, total protein 6.4 g/dl, albumin 4.2 g/dl, globulin 2.2 g/dl, cholesterol 215 mg/dl, total bilirubin 0.6 mg/dl, direct bilirubin 0.2 mg/dl and indirect 0.4 mg/dl. The serum aspartate aminotransferase was 18 units and the serum alanine

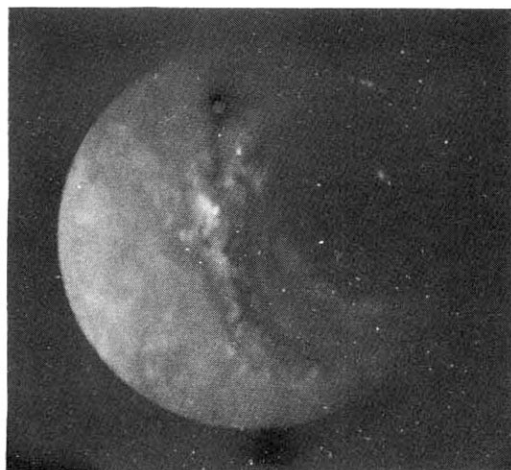
aminotransferase 9 units.

The CEA was 1.7 ng/dl by RIA. The chest X-ray was normal and a computerized tomographic scan of the abdomen showed a no evidence of metastatic lesions. On the 4th hospital day, the patient was transferred to the General Surgery Department.

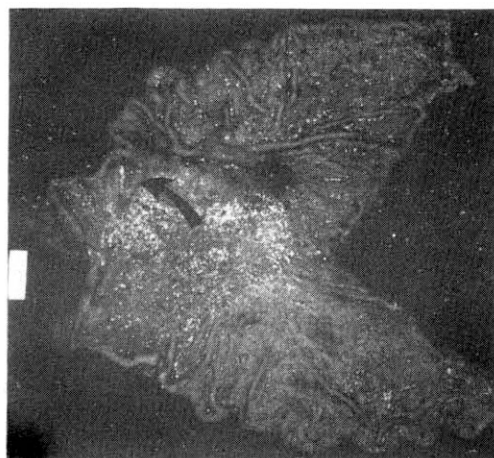
Surgery was performed on the 7th hospital day,



**Fig. 1.** UGIS shows a 1.5 x 1.3 cm oval depression filled with barium. Some of the irregular marginated, mucosal folds are converged, but some are not. It is suggestive of a chronic gastric ulcer or early gastric cancer.



**Fig. 2.** Gastrosfiberscopic findings revealed a depressed, discolored lesion with converging irregular radiating folds in the antral portion.



**Fig. 3.** A superficial depressed early gastric carcinoma (arrow), measuring 1.0 x 2.0 cm under the greater curvature in the antral portion of the resected subtotal stomach.

revealing a shallow depression in the anterior wall of the greater curvature side in the antrum and multiple perigastric lymph node enlargement. A Billroth type II subtotal gastrectomy was performed and lymph nodes along the portal hepatis, celiac axis branch were removed.

Mapping of the resected subtotal stomach was completed (Stage III; T<sub>1</sub> N<sub>1</sub> M<sub>0</sub>) (Fig. 3,4).

Grossly, the subtotal stomach, 25 cm along the greater curvature and 11 cm along the lesser curvature, presented a pinkish brown, smooth serosal surface. An irregular, superficial depressed lesion, 3×1.5 cm, was noted on the anterior wall of the greater curvature in the antrum, 3 cm from the distal pyloric ring, giving it a reddened and granular appearance with a relatively well defined margin. Small areas of the margins were slightly indurated and sloped toward the depression.

Microscopically, a pure signet ring cell car-

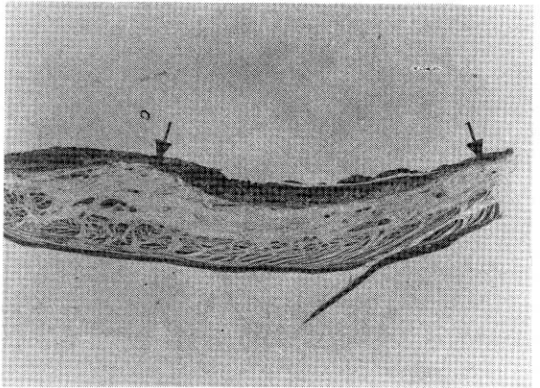
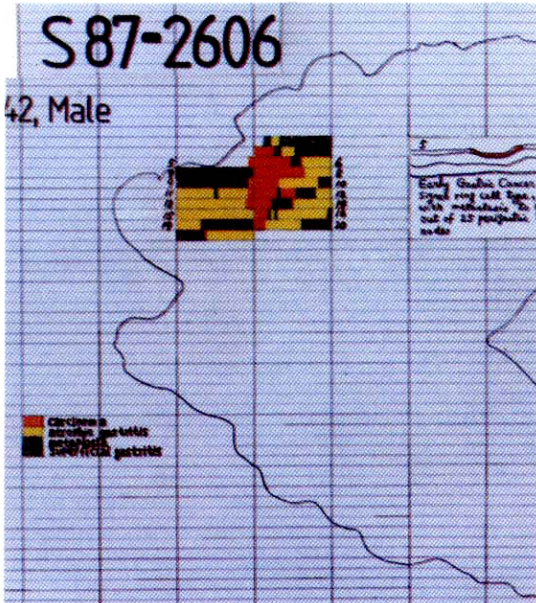


Fig. 4. Mapping of the resected stomach. The red color indicates early gastric carcinoma, type IIc.

Fig. 5. The carcinoma is restricted to the gastric mucosa (between the two arrows). (H-E stain, x4).

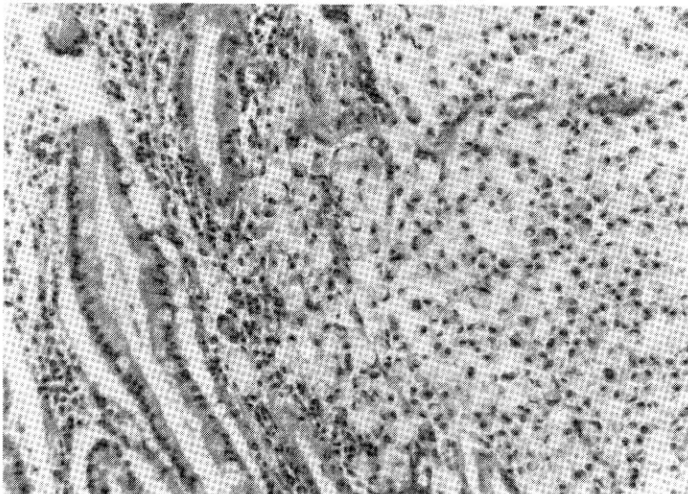
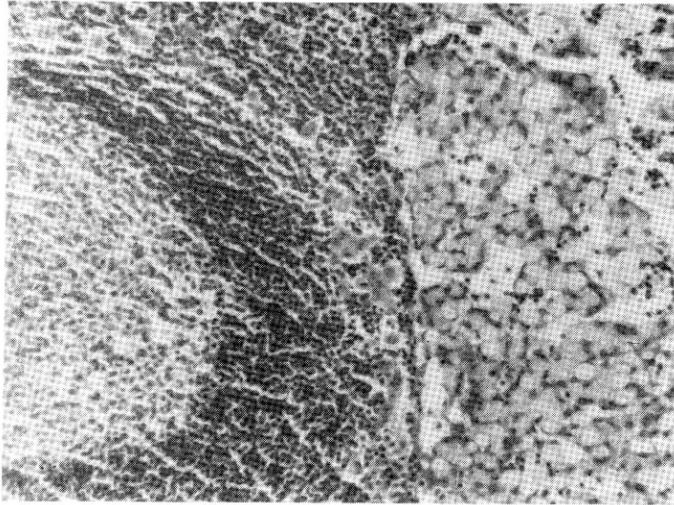


Fig. 6. Round signet ring cells containing large vacuoles of much which press the nucleus against the plasma membrane. (H-E stain, x250).



**Fig. 7.** A portion of a perigastric lymph node displaying metastatic signet ring cell type adenocarcinoma of the stomach (H-E stain, x100).

cinoma, confined by the muscularis mucosa but invading the lamina propria was observed. Areas of the carcinoma were infiltrated by isolated signet ring cells while others were composed of compactly aggregated signet ring cells. Lymph node involvement (metastases to 7 of 11 superior gastric nodes and to 10 of 14 inferior gastric nodes) was extensive, though the carcinoma was confined to the mucosa (Fig. 7).

On the 14th postoperative day, chemotherapy (5-FU, Adriamycin and Mitomycin) was administered to the patient and on the twenty third Hospital day, he was discharged in an improved condition.

On the 45th postoperative day, the patient received a second dose of KUR chemotherapy and was followed in the out-patient clinic.

## DISCUSSION

Early gastric cancer has been defined as a carcinoma which is confined to the mucosa or submucosa, regardless of the presence of lymph node metastasis<sup>5)</sup>.

In this case, a pure signet ring cell carcinoma located in the anterior wall of the greater curvature side in the antrum and restricted to the mucosa with no invasion of the muscularis mucosa was observed. Also widespread lymph node metastases were seen.

Histologically, diffuse type adenocarcinoma accounts for 33 to 40% of the cases of gastric

carcinoma, the intestinal type varies from 22 to 53 % and pylorocardiac gland cell type, 28%<sup>3,4)</sup>, but in Korea, Shim et al<sup>6)</sup>, reported in a review of 108 cases of gastric adenocarcinoma, that mucous cell carcinoma accounted for 62% of the cases; pylorocardiac gland cell carcinoma, 23%; intestinal cell carcinoma, 8% and unclassified type, 7%. In a review of 574 gastric carcinomas, Brander, et al<sup>1)</sup>, classified mucous carcinomas into three main types: pure signet ring cell type, well differentiated type and mixed type.

Recently, the incidence of signet ring cell in gastric carcinoma biopsy and resection has risen sharply<sup>8)</sup>.

The relationship between histologic types of gastric carcinoma and prognosis was investigated. Mulligan and Rember<sup>7)</sup> reported that mucous cell carcinomas composed of signet ring cells are more frequent in females than in males, occur at a comparatively younger age (less than 40 years old) and have a poor prognosis, while intestinal cell type and pylorocardiac gland cell type occur more frequently after the age of 40 years and have a better prognosis than mucous cell type. Stemmermann and Brown<sup>9)</sup> pointed out that the 5 year survival rates were about 27.4% for intestinal type and 9.9% for diffuse type, but according to the Miwa report<sup>10)</sup>, only the 'early' diffuse type had a better prognosis than 'early' intestinal type (5 year survival rates of 90% and 85% respectively).

The majority of the diffuse type shows mixed

patterns, in which extracellular mucus and gland formation are present with signet ring cells, while there are only a few cases of pure signet ring cell type. The survival for pure signet ring cell type and mixed type is about 5 and 21 months respectively<sup>11</sup>.

In a study of 167 early gastric carcinomas, Kodama, et al<sup>9</sup>, reported that in the so-called 'small mucosal type' a lesion of 4 cm. or less with only mucosal invasion, only one case exhibited lymph node metastasis.

Therefore, this case with widespread lymph node metastases although confined to the mucosa, is thought to be rare and highly malignant, although the pathogenesis is not yet known.

### REFERENCES

1. Brander WL, Needham PRG, Morgan AD: *Indolent mucoïd carcinoma of stomach. J Clin Path* 27: 536-541, 1974
2. Straus R, Heschel S, Fortman DJ: *Primary adenocarcinoma of the stomach; a case report and review. Cancer* 24:985-995, 1969
3. Rotterdam H, Sommers SC: *Biopsy diagnosis of the digestive tracts. Raven Press, New York* 119-138, 1981
4. Lauren P: *The two histological main types of gastric carcinoma; diffuse and so-called intestinal type carcinoma; an attempt at a histoclinical classification. Acta Pathol Acta Pathol Microbiol Scand* 64:31-49, 1965
5. Kodama Y, Inokuchi K, Soejima K, Matsusaka T, Okamura T: *Growth patterns and prognosis in early gastric carcinoma. Cancer* 51:320-326, 1983
6. Shim H, Kim KN, Lee GH, Yoon Ki, Park LG: *The histological study of gastric adenocarcinoma by gastrofiberscopy. Kor J Gastrointest Endosc* 4(1): 6-12, 1984
7. Mulligan RM, Rember RR: *Histogenesis and biologic behavior of gastric carcinoma. Arch Pathol* 58:1-25, 1954
8. Antonioli DA, Goldman H: *Changes in the location and type of gastric adenocarcinoma. Cancer* 50:775-781, 1982
9. Stemmermann GN, Brown C: *A survival study of intestinal diffuse types of gastric carcinoma. Cancer* 33:1190-1195, 1974
10. Miwa K: *Avances in treatment of stomach carcinoma in Japan. In: Epidemiology of stomach cancer; Key Questions and Answers, edited by T. Hirayama. WHO-HC monograph, Tokyo, p 199, 1977*