Radiographic Observation of a Case of Gastrointestinal Stromal Tumor in Stomach

FUMIHIKO YAMASHITA, EIZABURO SASATOMI*, MASAHARU KIYAMA, KAZUTA FUKUMORI, YOICHI YANO, OSAMU KATO, TAKENORI SAKAI**, KAZUMITSU KIYOMATSU**, NAOKI HIROSE**, HIROSHI YAMAMOTO**, OSAMU TOKUNAGA*, MASATOSHI TANAKA†, ATSUSHI TOYONAGA† and MICHIO SATA†

Departments of Medicine and Surgery**, Saga Social Insurance Hospital, Saga 849-8522, *Department of Pathology, Saga Medical College, Saga 849-0937 and †Department of Medicine, Kurume University School of Medicine, Kurume 830-0011, Japan

Summary: A case of gastrointestinal stromal tumor (GIST) in stomach was presented. Serial barium meal x-ray examinations revealed an enlarging elevated lesion on the fornix of the stomach. Tumor volume doubling time was found to be 299 days. Microscopic and immunohistochemical studies of the resected tumor disclosed GIST, uncommitted type, low grade malignant/potentially malignant. A radiographic feature of this rare type of gastric submucosal tumor was demonstrated in this report.

Key words gastrointestinal stromal tumor (GIST), stomach, submucosal tumor, growth rate, tumor volume doubling time

INTRODUCTION

Gastrointestinal stromal tumors (GISTs) are neoplasms that have a nonepithelial, mesenchymal nature [1,2]. They are composed of either undifferentiated stromal cells or those of poor muscle or neural differentiation [1,2]. Most reports are concerned with the histopathologic or immunohistochemical features, while little information on the clinical aspects is described [3,4]. We present a case of GIST of the stomach, in which the tumor volume doubling time (TVDT) could be measured.

CASE REPORT

A 52-year-old Japanese female had a mass screening barium meal x-ray examination on January 6th, 1998, and a hemispherically elevated lesion, 14×13×10 mm in size, was revealed on the fornix of the stomach (Fig. 1A, B). She refused further studies such as endoscopy and computed tomography. A follow-up examination performed on December 17th, 1998 disclosed an enlargement of the tumor, 18×15×15 mm in size (Fig. 1C, D). The tumor volumes (V), calculated by the formula reported by Steel [5] \[V=\pi \times \left(\text{product of 3 principal diameters}\right)/6\], on the first and second x-ray studies were 847 mm³ and 1885 mm³, respectively.

The TVDT was found to be 299 days using the formula reported by Collins et al. [6]
\[TVDT=\left(\frac{t \times \log 2}{\log V2/V1}\right)\]
where “t” is the time interval between the examinations (346 days), and “V1 (847 mm³)” and “V2 (1885 mm³)” are the tumor volumes at the first and second examinations, respectively. Endoscopic study disclosed the gastric elevated lesion covered by an intact mucosa (Fig. 2). A computed tomography disclosed a protruded lesion in the gastric wall (Fig. 3). She was transferred to surgery for resection of the tumor.

The resected specimen disclosed an intramural mass, 22×18 mm in size, which was in direct continuity with the upper portion of the muscularis propria showing expansive growth into the submu-
Fig. 1. Double-contrast barium meal x-ray examinations performed on January 6th, 1998 (A, B) and December 17th, 1998 (C, D). A hemispherically elevated lesion of the fornix of the stomach was shown, which demonstrated an apparent enlargement. The tumor volume doubling time was found to be 299 days.

A: Frontal view (a1=14 mm, b1=13 mm)  B: Lateral view (c1=10 mm)
C: Frontal view (a2=18 mm, b2=15 mm)  D: Lateral view (c2=15 mm)

Fig. 2. Endoscopic study revealed a submucosal tumor in the stomach (arrow).

Fig. 3. Computed tomography disclosed a protruded tumor in the stomach (arrow).
cosal layer (Fig. 4). Microscopically, the resected tumor showed moderately high cellularity and was composed of elongated spindle cells with eosinophilic cytoplasm and blunt-ended nuclei. Mitotic figures were occasionally seen (2 mitosis/10 high power fields) (Fig. 5). Immunohistochemically, the tumor cells were strongly positive for both CD117 [c-kit protein [1]] and CD34 [hematopoietic cell progenitor cell antigen [1]] (Fig. 6); however, positivity was seen neither for alpha-smooth muscle actin nor S-100 protein. The tumor was compatible with the histologic findings of GIST [1,2], uncommitted type, low grade malignant/potentially malignant.

DISCUSSION

GISTs of the stomach are reported to have clinical symptoms similar to those caused by other gastric tumors [1,2]. However, unique cases of GIST have been reported [3,4]; one showed a pouch-like form of the gastric wall and the other presented an intraluminal bleeding as an initial manifestation.

The growth rate of the tumor can be represented by TVDT [6,7], however the obtainable information of TVDT is limited. Determination of TVDT is reported to be useful to evaluate the grade of malignancy [6]. Bolin et al. reported that the mean TVDT of colorectal carcinoma was 195 days. Takahashi et al. [8] reported that the mean TVDT of 80 cases of gastric carcinoma was 302 days, which was comparable to that of the present case.

In summary, the present study demonstrated a radiographic feature of relatively small gastric submucosal malignant tumor [the majority of GISTs of the stomach smaller than 5 cm were reported to be benign [1]] with an apparent enlargement showing a rare histologic type. Data should be accumulated in order to elucidate the natural history and clinical aspects of GIST of the stomach.

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