

A case of gastric duplication evaluated by gastric emptying scintigraphy

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Gastric duplications are relatively rare, and communication with the gastric lumen is extremely rare. A 67-year-old man was referred to our hospital because of recurrence of epigastric pain and fullness. An upper gastrointestinal contrast study revealed a double compartment stomach, with gastric duplication starting at the esophagogastric junction outside the greater curvature. Computed tomography of the stomach with gastrografin as contrast demonstrated complete communication of the gastric duplication and primary stomach. The patient was diagnosed with complete gastric duplication. Gastric emptying scintigraphy with Tc-99m diethyltriamine pentaacetic acid was performed. Test meal entered the primary stomach and duplication cyst simultaneously, and radioactivity in the primary stomach decreased linearly and gastric emptying was not delayed. In the duplication cyst, about 70% of the food that entered the cyst once was immediately evacuated from it, but the remaining 30% remained in the cyst for a long time. Gastric emptying of the primary stomach was not affected by formation of the duplication cyst.

Key words: gastric duplication, gastric emptying scintigraphy, Tc-99m DTPA

INTRODUCTION

GASTROINTESTINAL DUPLICATION CYSTS are uncommon congenital anomalies, but are an interesting development malformation of the gastrointestinal tract. The ileum is the most common site of isolated gastrointestinal duplication, followed by the esophagus, jejunum, colon, stomach and appendix in decreasing order.¹

Gastric duplications are relatively rare, comprising about 4% of all alimentary duplications.² Communication with the gastric lumen (complete gastric duplication) is extremely rare.^{3,4} Examination of gastric motility in patients with complete gastric duplication has never been reported. We report a case of complete gastric duplication in which gastric motility was examined by gastric emptying scintigraphy.

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CASE REPORT

A 67-year-old man was referred to our hospital because of recurrence of epigastric pain and fullness. He had no other significant medical illness. Complete blood count and liver function tests were normal.

An upper gastrointestinal contrast study revealed a double compartment stomach, with the gastric duplication starting at the esophagogastric junction outside the greater curvature. Both gastric lumina were filled with barium, demonstrating free communication of the duplication with the gastric cavity (Fig. 1). Computed tomography of the stomach with gastrografin as contrast demonstrated complete communication between the gastric duplication and primary stomach (Fig. 2). The patient was diagnosed with complete gastric duplication.

Gastric emptying scintigraphy was performed. The test meal consisted of a 200 g pancake (51.6 g carbohydrate, 8.1 g protein, 5.7 g fat, 291 kcal) containing 37 MBq of Tc-99m diethyltriamine pentaacetic acid. The pancake was ingested within 2 minutes by all subjects. Immediately after the test meal, the subjects were placed in the standing position, and a gamma camera (VERTEX-PLUS; ADAC Corp., CA, USA) recorded the radioactivity over

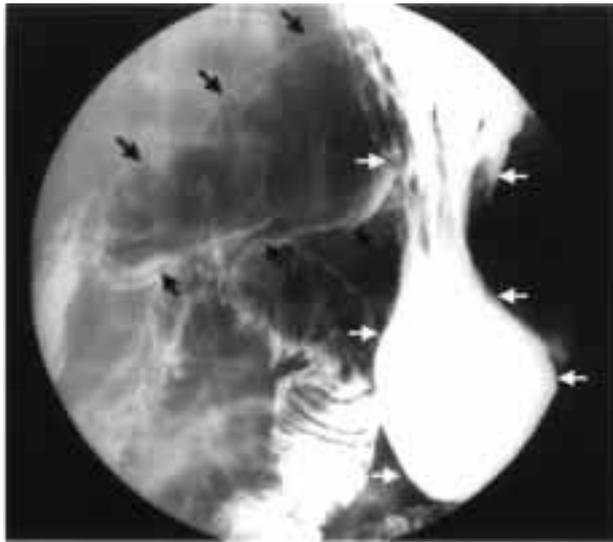


Fig. 1 An upper gastrointestinal contrast study revealed a double compartment stomach, with gastric duplication starting at the esophagogastric junction outside the greater curvature. White arrows show gastric duplication and black arrows show primary stomach.

the upper abdomen. Gastric emptying data were acquired with one minute anterior image of the stomach at 30-minute intervals for a total of 120 minutes. Between standing image acquisitions, the patient was allowed to sit. Data were corrected for radionuclide decay; the region encompassing the stomach was selected on the gamma camera images, and the radioactivity of this region was plotted. The half-time of gastric emptying ($T_{1/2}$), the time at which 50% of the peak radioactivity content had left the stomach, was calculated by computer analysis (PEGASYS; ADAC Corp., CA, USA). The test meal entered the primary stomach and duplication cyst simultaneously, and radioactivity in the primary stomach decreased linearly with a $T_{1/2}$ of 70 minutes. In the duplication cyst, in contrast, about 70% of the food that entered the cyst once was immediately evacuated from it, but the remaining 30% remained in the cyst for a long time (Figs. 3, 4).

The patient was treated with H₂-receptor antagonist, with good response. Six months after treatment he remains free of complaints.

DISCUSSION

Rowling established the morphologic criteria for correct diagnosis of gastric duplication cysts:⁵ 1) the cyst must be attached to the viscus and contiguous with its wall; 2) the cyst is surrounded by at least one coat of smooth muscle, fusing with the muscularis propria of the stomach; and 3) the cyst is lined by typical gastric mucosa, often accompanied by patches of ectopic intestinal, colonic, respira-



Fig. 2 Computed tomography of the stomach using gastrografin as contrast demonstrated complete communication of the gastric duplication and primary stomach. White arrows show gastric duplication and black arrows show primary stomach.

tory epithelium, or pancreatic tissue. The diagnosis of gastric duplication cyst is usually made early in life; most patients have presented within the first year of life in other countries⁶ but this condition is found more frequently in adults in Japan due to the popularization of medical checkup of the stomach. The site of duplication is outside of the greater curvature in most cases.⁶ This condition is classified into two types; cystic type and tubular type, with cystic type the more common.⁷ Our case was also the cystic type. Presenting symptoms are usually nonspecific, such as epigastric mass, pain, vomiting, weight loss, and rarely hematoemesis, melena and fever. Unusual complications include infection and development of peptic ulcer in the cyst.⁸

The diagnosis of gastric duplication is readily made if it communicates with the gastric lumen, but is extremely difficult when the cyst is not communicating. Although diagnosis of a cyst by computed tomography and ultrasonography is possible, it cannot in this fashion be determined whether the mucosa is gastric or not. Tanaka et al.⁹ reported that endoscopic ultrasonography was useful for determining whether the cyst lumen was gastric mucosa. The most useful method for diagnosing of gastric duplication is scintigraphy with Tc-99m pertechnetate.¹⁰ We used gastric emptying scintigraphy to evaluate gastric motility in a patient with complete gastric duplication. As a result, the test meal entered the primary stomach and duplication cyst simultaneously, and radioactivity in the primary stomach descended linearly with a $T_{1/2}$ of 70 minutes. In the duplication cyst, in contrast, about 70% of the food that entered once was immediately evacuated from the cyst, but the remaining 30% remained in the cyst for a long time. $T_{1/2}$ of the primary stomach was in the normal range (73 ± 15 minutes, mean \pm SD $T_{1/2}$ of normal controls), and the gastric emptying time was not

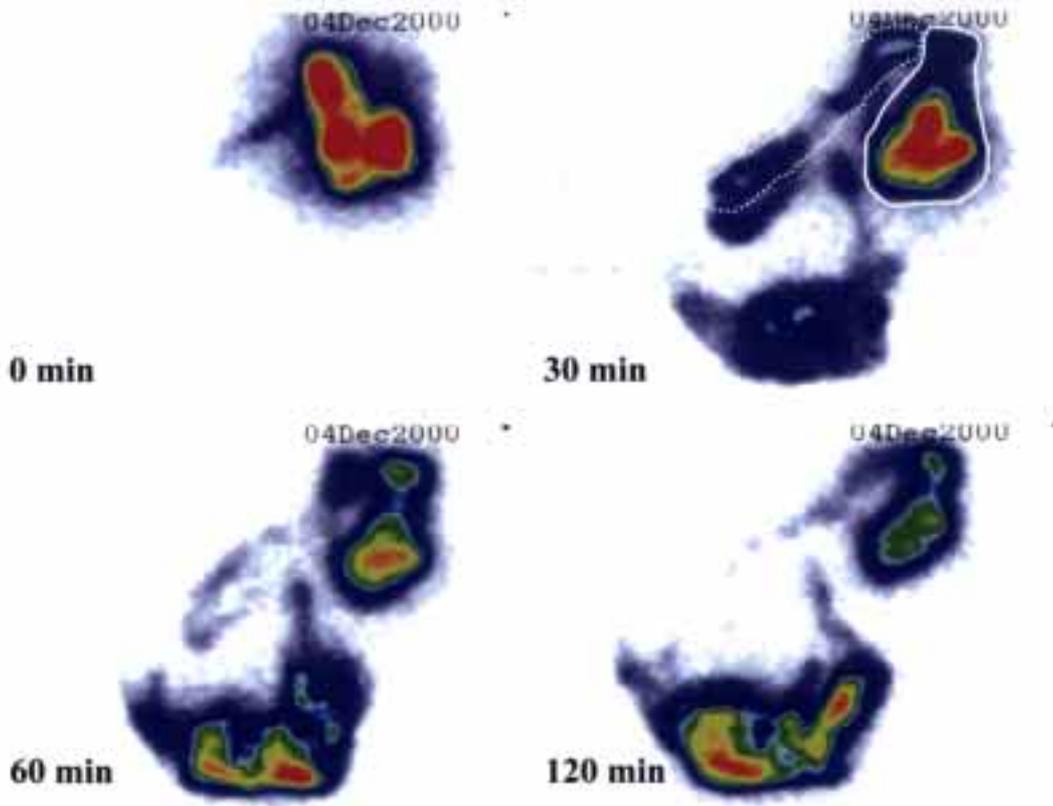


Fig. 3 Gastric emptying scintigrams of anterior view at 0, 30, 60, 120 minutes after ingestion of the test meal. The test meal entered the primary stomach (*dotted line*) and duplication cyst (*unbroken line*) simultaneously. The radioactivity in the primary stomach decreased soon, but that in the duplication cyst remained for a long period of time.

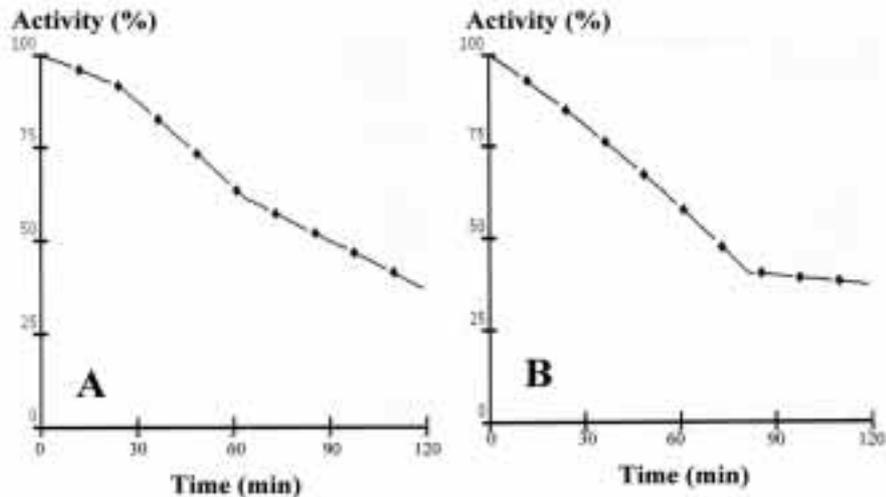


Fig. 4 A: Time-activity curve for primary stomach. B: Time-activity curve for duplication cyst.

affected by formation of the duplication cyst.

Scintigraphic techniques are regarded as the most reliable means of measuring gastric emptying. Gastric emptying scintigraphy is simple, non-invasive, well accepted by patients, and widely used clinically and experimen-

tally.¹¹ Nevertheless, comparison of the results of scintigraphic studies from independent centers is difficult because of methodological differences¹² (choice of meal and radiolabel; method used for data acquisition; data analysis and interpretation). We used a method that is

widely recognized in Japan,¹³ highly reproducible¹⁴ and useful for determining temporal changes in the same patient.

Surgical excision is the primary treatment for gastric duplication cyst since occurrence of cancer in such cysts has been reported,⁸ and the adjacent mucosa may become ulcerative or hemorrhagic.⁸ Non-communicating gastric duplication is treated by complete resection of the duplication or by excision of the wall shared by the normal and duplicate stomach, converting the non-communicating cyst into a communicating one.¹⁵ This surgical method has been used for many years and has a high rate of success without reported complications. Communicating duplications usually do not require any intervention when both gastric lumina are patent. No endoscopic lesion was found in the duplication cyst to explain the digestive symptoms in our patient. As the food remained in the duplication cyst, gastric acid might be secreted for a long time. He was treated with H₂-receptor antagonist, with good response.

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