Complete Duodenogastric Reflux: A Scintigraphic Sign of Significant Duodenal Pathology

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Complete reflux of duodenal contents into the stomach with persistent retention on hepatobiliary scintigraphy or radionuclide gastrointestinal bleeding studies is a relatively rare occurrence. Two cases of complete duodenogastric reflux are reported: one case in a patient with a perforated duodenal diverticulum and the other in a patient with an inflamed, bleeding duodenal ulcer. The finding of complete duodenogastric reflux and persistent retention in the stomach should instigate a thorough evaluation for significant duodenal pathology.


The occurrence of duodenogastric reflux during hepatobiliary scintigraphy performed for possible acute cholecystitis is not an uncommon finding (7). In fact, hepatobiliary scintigraphy is the only noninvasive test available for the detection of duodenogastric reflux and provides a semiquantitative measure of its severity (2, 3). It is, however, very unusual to observe complete passage of duodenal contents into the stomach with prolonged retention, in hepatobiliary or gastrointestinal bleeding scintigraphy. We report two cases of complete duodenogastric reflux and their diagnostic significance.

CASE REPORTS

Case 1

A 33-year-old female sought medical care for vague mid-abdominal pain, without initial clarification of its etiology on a single emergency room visit. One week later, she returned with more severe pain, localized to the right upper quadrant of the abdomen, and a hepatobiliary scan was performed to evaluate the possibility of acute cholecystitis. A technetium-99m (99mTc)DISIDA scan (Fig. 1A) showed prompt gallbladder visualization, and biliary-bowel transit was normal, but reflux of duodenal activity into the stomach occurred, without any significant distal passage. Images at 2 hr after injection (Fig. 1B) showed no significant gastric emptying. All images showed abnormal activity medial to the gallbladder, suspicious for a localized perforation. A computed tomographic (CT) scan of the abdomen (Fig. 1C) documented ascites, without definite perforation. The CT scan showed distal passage of orally administered, water soluble contrast material into the jejunum, excluding anatomical duodenal obstruction. Exploratory laparotomy found a perforated duodenal diverticulum.

Case 2

A 65-year-old man, undergoing combined chemo- and radiation therapy for esophageal cancer, developed melena and orthostatic hypotension. Endoscopy was not performed secondary to the esophageal tumor. A 99mTc-radiolabeled red blood cell (RBC) scan was performed in an attempt to localize the bleeding site. (Radiolabeling was performed using an in vitro, test tube labeling technique). This study showed progressive accumulation of activity in the stomach, compatible with either gastric secretion of free pertechnetate or blood in the gastric lumen. An image at 16 hr after injection (fig. 2) showed continued retention of activity in the stomach, without significant distal passage. Insertion of a small-bore pediatric feeding tube past the esophageal tumor and into the stomach, with subsequent gastric aspiration, confirmed radiolabeled blood in the stomach. (The aspirate was centrifuged, and the radioactivity was associated with the cellular components). Our initial diagnosis was a bleeding gastric ulcer. Exploratory laparotomy found an inflamed, actively bleeding ulcer in the first portion of the duodenum.

DISCUSSION

Despite the relatively common occurrence of duodenogastric reflux on hepatobiliary scintigraphy for acute cholecystitis, complete duodenogastric reflux is
FIGURE 1

A: Serial images from $^{99m}$Tc DISIDA study showing reflux of radiolabeled bile into the stomach, without passage into the small bowel distal to the duodenum. The gallbladder is visualized (arrows). However, a prominent collection of activity is seen adjacent to the gallbladder, obscuring delineation of the common bile duct, compatible with localized perforation (arrowhead). B: Two-hour images showing further accumulation of activity in the stomach and no distal passage. Evidence of local perforation is again seen. C: Two transverse CT scans from the mid (I) and lower (II) abdomen. Scan I shows water soluble contrast material in the duodenum (curved arrow). A small air-collection (arrow) is seen in or near the duodenum, but definitive perforation cannot be diagnosed. Scan II shows that contrast material has passed distally into the jejunum, excluding complete duodenal obstruction. [The volume load caused by hypertonic contrast material may have overcome the "functional" duodenal obstruction seen on the previous hepatobiliary scan.] Note the ascites throughout the peritoneal space.
very unusual. Colletti et al. (2) studied the incidence of duodenogastric reflux in 77 patients with prompt biliary excretion on hepatobiliary scintigraphy during evaluation for possible acute cholecystitis. They found duodenogastric reflux in 20 of 77 patients (26%). Sixteen of these 20 patients (80%) had acute cholecystitis. Though these authors propose that duodenogastric reflux is a secondary sign of acute cholecystitis, possibly secondary to duodenal irritation, it is likely that the duodenogastric reflux is simply due to the functional loss of the gallbladder as a bile reservoir, since duodenogastric reflux is more common after cholecystectomy (4). These authors emphasized that the gastric activity in their patients tended to clear rapidly. No mention was made of the occurrence of complete duodenogastric reflux. In our previous work in regard to duodenogastric reflux (2), in which stimulation of gallbladder emptying by sinalide was used to promote duodenogastric reflux and which included a number of patients with prominent symptoms of bile gastritis, we never encountered a case of complete and persistent duodenogastric reflux.

The reflux of blood into the stomach from a bleeding duodenal ulcer described in Case 2 is likely secondary to severe irritation of the duodenum with a functional gastric outlet obstruction. Most bleeding ulcers of the duodenum detected by radionuclide bleeding scans show distal passage of radiotracer, without the significant duodenogastric reflux and gastric retention exhibited by Case 2 (5). By far, the most common cause for gastric accumulation of activity on a tagged RBC bleeding study is breakdown of the radiolabel with uptake and excretion of free technetium by the gastric mucosa. As in Case 2, this can be excluded by analysis of a gastric aspirate. After the exclusion of free technetium as the cause, the most common causes of gastric accumulation would be gastritis and gastric ulcer. Case 2 points out that a duodenal bleeding site must always be considered when gastric accumulation of blood occurs.

Complete reflux and retention of duodenal contents into the stomach in the present cases likely represent functional duodenal and gastric obstruction secondary to severe duodenal inflammation. The significance of this pattern has not been previously emphasized, and this phenomenon has not been described in diseases characterized by inflammation of the surrounding structures, such as acute cholecystitis or pancreatitis. Complete gastric reflux of duodenal contents should instigate a thorough investigation for significant duodenal disease.

REFERENCES