

Radionuclide Demonstration of Small-Bowel Anatomy in the Afferent-Loop Syndrome: Case Report

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Radionuclide imaging with I-131 rose bengal and orally administered Tc-99m colloid was successfully used to show the presence of an afferent loop that was not visualized by radiographic, endoscopic, or ultrasonic procedures.

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The afferent loop syndrome (ALS) is a well-recognized complication of gastric surgery with a Billroth II anastomosis. The condition may be either acute or chronic; and the symptoms, including bilious vomiting, result from obstruction of the afferent loop. Depending on the degree of obstruction, radiologic visualization of the afferent loop may be very difficult (1). We recently examined a patient with symptoms suggestive of ALS, but an afferent loop could not be confirmed by conventional radiographic techniques. Radionuclide studies easily revealed its presence.

CASE REPORT

A 56-year-old man was referred from another institution for evaluation of intractable nausea and vomiting. He had had a gastroectomy 15 years earlier and apparently had done well until 2 years ago, when he underwent abdominal surgery for nephrolithiasis, with a subsequent cholecystectomy. No surgical records were available for either operation. Afterwards he developed recurrent episodes of nausea and vomiting, with severe burning pain in the chest and abdomen. These occurred most often at night and 30 min after breakfast, consisted of emesis of a yellowish-green bilious material, usually without food, and were often followed by diarrhea. No weight loss occurred.

Routine blood studies showed elevation of the alkaline phosphatase, LDH, and SGOT. Barium examination of the upper gastrointestinal tract (UGI) failed to reveal an afferent loop despite attempts in various dependent positions. An intravenous cholangiogram (IVC) showed a common bile duct of normal caliber with emptying into the small bowel.

The anatomic detail of the small bowel was insufficient to document an afferent loop. Ultrasonography was interpreted as nondiagnostic. Endoscopy revealed severe gastritis but no marginal ulceration. The efferent loop was entered with the endoscope, but an afferent loop could not be detected.

Since an afferent loop syndrome was suspected clinically, a radionuclide examination was requested. A liver scan was performed using 200 μ Ci of iodine-131-labeled rose bengal (Fig. 1A). Serial images were obtained and stored on a minicomputer system. Activity was seen in the gastrointestinal tract by 12 min, with apparent reflux into the gastric remnant by 20 min. Without moving the patient, 2 mCi of Tc-99m sulfur colloid diluted in 400 ml of water were administered orally. Although the amount of water is not critical, 400 ml were used to ensure gastric filling and passage of the tracer into the efferent loop with the patient in the supine position. Rapid-sequence films visualizing passage into the stomach and efferent loop were obtained and also stored (Fig. 1B). Superposition of the images with the minicomputer system showed the presence of an afferent loop filled with the rose bengal, clearly separated from the Tc-99m sulfur colloid in the efferent loop (Fig. 1C), thus indicating the presence of a Billroth II type of anastomosis. This was confirmed by subsequent laparotomy, at which time it was felt that because of the multiple adhesions, distension of the efferent loop could result in obstruction of the

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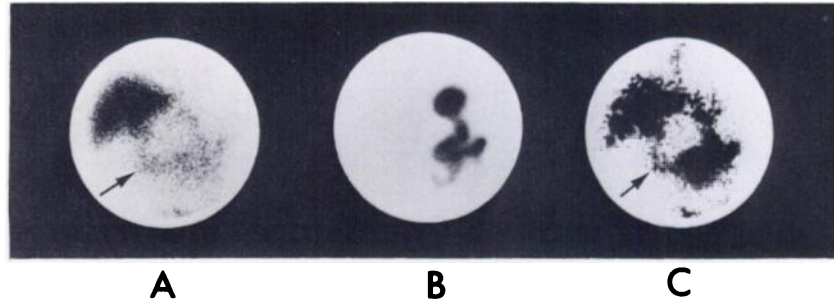


FIG. 1. (A) Iodine-131 rose bengal image showing activity in liver and afferent loop. (B) Orally administered Tc-99m colloid shows gastric remnant and efferent loop. (C) Composite of images A and B (arrow = afferent loop).

afferent limb. The anastomosis was converted to a Roux-En-Y gastrojejunostomy.

DISCUSSION

Mechanical obstruction is the most common cause of the afferent-loop syndrome. This often involves internal herniation of the afferent loop behind the gastroenterostomy. Other mechanical causes include kinking, obstruction at the anastomotic site, and adhesion formation (1). With internal herniation, the emptying of gastric contents into the efferent loop classically produces a temporary obstruction of the afferent loop. After passage of food distally into the small bowel, the obstruction to the afferent loop subsides. Bile then enters the gastric pouch, causing bilious vomiting associated with an intense burning pain in the throat and stomach. The severity of symptoms may necessitate surgical correction.

The exact role of radiologic examinations in the diagnosis of ALS is controversial. Since barium may not enter the area of obstruction, failure to demonstrate an afferent loop is not surprising. Dahlgren was unable to show filling of the afferent loop in 12 of 19 patients (1). Beranbaum et al. (2) felt that a significant percentage of ALS was secondary to organic, intrinsic disease and that roentgenologic examination played a significant role. Scott et al. (3) advocated the use of the IVC in the evaluation of postgastroectomy bilious vomiting, but the determination of regional small-bowel anatomy may be difficult with the small amount of contrast agent introduced into the GI tract by an IVC.

Most reports in the literature concern patients in whom the type of gastric surgery is known. In our case, however, prior surgical records were not avail-

able and visualization of the presence of an afferent loop was important for clarification of the patient's problem.

The dual radionuclide examination just described offers a simple and effective procedure for visualization of an afferent loop. The ease with which the imaging may be performed and the ability to fill the proximal afferent loop through the nonobstructed liver offer inherent advantages over conventional radiographic examinations. Improved visualization of the afferent loop might be obtained by employing a Tc-99m-labeled biliary agent, but this would require the use of a higher-energy radionuclide for oral administration. Although computer storage and image superposition were useful in this case, adequate information may be obtained with standard gamma-imaging techniques. Radionuclide imaging of the biliary tree and proximal gastrointestinal tract should be considered in symptomatic postgastroectomy patients in whom the presence of an afferent loop is uncertain. This procedure may be inappropriate in patients experiencing acute intractable emesis.

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