

THE DISTENDED GASTRIC FUNDUS: SIMULATION OF A LEFT SUPRARENAL MASS

Philip A. Sorabella, Thomas L. Slovis*, Richard A. Fellows*, and Philip M. Johnson

The Presbyterian Hospital, New York, New York

A discrete region of low or absent activity in the left suprarenal area, simulating an avascular mass on renal imaging or radionuclide angiography, can result from dilatation of the gastric fundus.

A localized area of low activity was observed above the left kidney and medial to the spleen in several patients during the course of renal imaging using ^{99m}Tc -diethylenetriamine pentaacetic acid (DTPA). This finding initially suggested the possibility of a cyst or other avascular mass of renal, adrenal, or pancreatic origin. However, failure of further studies to confirm a mass lesion in these patients led us to hypothesize that the finding represents a void produced by distention of the gastric fundus.

To test this hypothesis, the effect of gastric distention by ingestion of carbonated fluid was evaluated in several patients during renal imaging. The results were concordant and are typified by the following observations in two patients.

ILLUSTRATIVE CASES

Both of these patients underwent clinically indicated dynamic renal imaging using ^{99m}Tc -DTPA (15 mCi intravenously) and the Searle Radiographics Pho/Gamma HP III scintillation camera fitted with a 140-keV parallel-hole high-resolution collimator.

Case 1. (PH #2265098) In this patient an early posterior image in the prone position demonstrated less activity in the left suprarenal area than in the comparable region on the right (Fig. 1A). The patient then drank 200 ml of a carbonated beverage. A well-defined rounded area of diminished activity was then clearly visualized above the left kidney (Fig. 1B). When the patient was turned into the supine position, the "cold" area persisted (Fig. 1C).

Received Jan. 15, 1975; revision accepted March 10, 1975.

For reprints contact: Philip M. Johnson, 622 W. 168 St., New York, N.Y. 10032.

* Fellows in Pediatric Radiology, Maternal Child Health Bureau, Department of Health Education and Welfare, Project # 153, 1972-75.

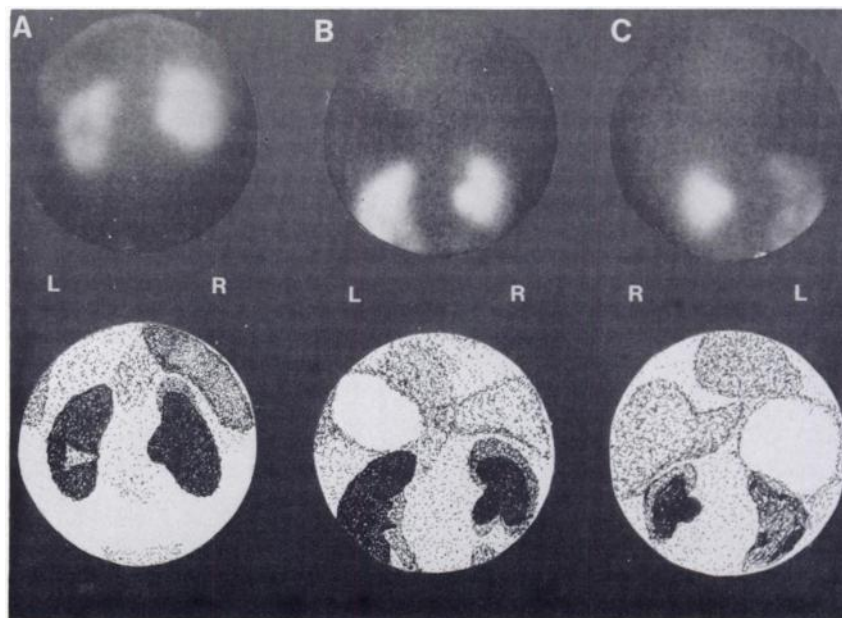


FIG. 1. (A) Posterior renal image of ^{99m}Tc -DTPA distribution in prone patient discloses less background activity in left suprarenal area than in right. (B) Following ingestion of carbonated beverage discrete activity-free area is delineated in left suprarenal region. (C) Left suprarenal "cold" defect persists with patient in supine position.

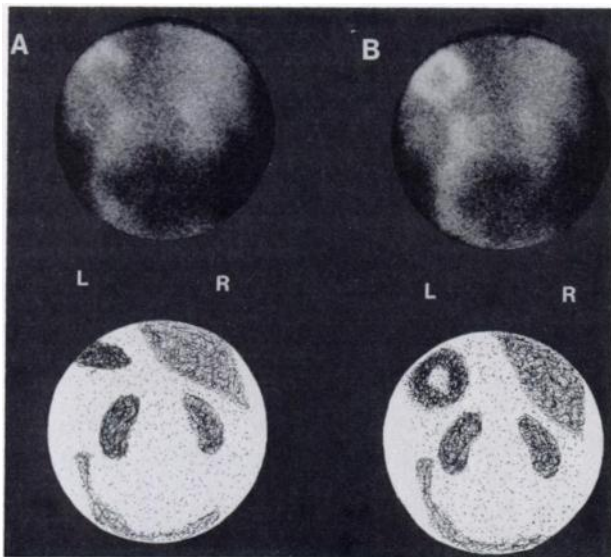


FIG. 2. (A) Note intense activity in left suprarenal area on posterior renal image at 5 min after injection of ^{99m}Tc -DTPA. (B) Following ingestion of carbonated beverage left upper quadrant "hot" spot is larger and furthermore contains central "cold" defect. This gastric "doughnut sign" indicates that walls of stomach, outlined by $^{99m}\text{TcO}_4^-$, are separated by nonradioactive gastric fundal contents.

At subsequent left pyelolithotomy exploration of the left suprarenal area was negative. The most reasonable explanation for the finding is that the initially slightly distended gastric fundus had undergone further distention by fluid and carbon dioxide to produce a frank negative (activity-free) mass effect.

Case 2. (PH #1885499) This patient received a preparation of ^{99m}Tc -DTPA inadvertently containing considerable unbound pertechnetate. Early posterior images (Fig. 2A) demonstrated bilaterally poor renal cortical localization with substantial extrarenal activity including an intense horizontal linear collection in the left suprarenal area. After drinking 200 ml of a carbonated beverage, subsequent images demonstrated a "cold" defect surrounded by a ring of intense activity (Fig. 2B). Concurrent intravenous pyelography and upper gastrointestinal series demonstrated no evidence of a suprarenal mass. The most

reasonable explanation for the finding is that gas and fluid within the gastric fundus created a negative mass defect that in turn was outlined by free pertechnetate within the gastric mucosa.

DISCUSSION

The low activity caused by air or fluid in the gastric fundus represents another potential pitfall in interpreting radionuclide studies of the abdominal viscera. "Hot" artifacts produced by localization of unbound radioactivity in the gastric fundus have been reported following administration of ^{75}Se -selenomethionine (1), ^{131}I -orthoiodohippurate (2), and ^{99m}Tc -DTPA (3). "Cold" artifacts can be equally misleading.

In our experience the low activity due to distention of the gastric fundus is not uncommon in patients undergoing renal imaging or radionuclide angiography. It is important to recognize that a negative defect in the left suprarenal area can result from distention of the gastric fundus. This normal variant must be considered in the differential diagnosis of left upper quadrant avascular lesions. Our experience in Case 2 suggests that when an avascular defect is seen in this region, the intravenous administration of ^{99m}Tc -pertechnetate can aid in differentiation. If the defect is subsequently ringed by gastric mucosal activity, the diagnosis of a distended gastric fundus is established obviating the need for further costly or potentially hazardous diagnostic procedures. Alternatively, disappearance of the defect after gastric aspiration would also be confirmatory.

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