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Radionuclide Gastric Emptying

Gastric-emptying scintigraphy is a quantitative and noninvasive study that measures how quickly radiolabeled liquids and solids move through the stomach. Disorders for which this study is useful include both delayed emptying and rapid emptying (dumping). Delayed emptying can cause nausea, vomiting, abdominal discomfort, bloating and early satiety; and may have a variety of causes including diabetes mellitus, postsurgical effects, certain drugs and idiopathic factors. Gastric dumping can be associated with a number of gastric surgical procedures that allow the passage of larger particles into the small bowel. Symptoms from dumping usually occur after eating and include dizziness, weakness, nausea, vomiting, sweating, and palpitations.

The rate and pattern of gastric emptying is influenced by multiple factors (e.g. the composition, volume, osmolarity, pH and fluidity of a meal; the specific gravity, viscosity, digestibility and size of the more solid components; the posture of the subject; and the subject's emotional state). Therefore, to obtain valid and meaningful results, a standard protocol for performing these studies must be closely followed.

Although radionuclide gastric emptying studies are relatively simple to perform, accurate results require strict attention to several aspects of the protocol: (1.) the radioactive solid should have a high labeling efficiency and remain stable in the gastric environment; (2.) the meal size and composition should be standardized; and (3.) patient position should be standardized. The composition of radiolabeled meals varies widely between different facilities performing this procedure. Normal emptying rates must be established for the specific meal, patient position, imaging protocol, and environment.

Solid Meal	% bound in gastric juice (3h)
Tc ^{99m} -Chicken Liver	98
Tc ^{99m} -Whole egg	82
Tc ^{99m} -White egg	>95
Tc ^{99m} -surface labeled chicken liver	84

Currently, the most commonly used radiolabeled solid meals are scrambled eggs and egg substitute, oatmeal, and beef stew. Tc^{99m} Sulfur Colloid labeled eggs is preferred by many facilities because the radioactive colloid is incorporated into the egg solid. Liquid meals most often include Tc^{99m} DTPA or In¹¹¹ DTPA added to water. Tc^{99m} Pertechnetate can not be used for gastric emptying studies because it localizes in the gastric mucosa.

Patients should fast for at least 8 hr before a gastric-emptying study. It is preferable to study women during the first 10 days of the menstrual cycle to avoid possible hormonal effects on gastrointestinal motility. Any medication that potentially interferes with gastric motility (narcotic analgesics, anticholinergics, antidepressants, calcium channel blockers, gastric acid suppressants, aluminum-containing antacids, or somatostatin) should be discontinued for an appropriate period; unless the test is being performed to assess the effect of such drugs on gastric motility. Tobacco and alcohol should also be withheld for at least 24 hours. The radiolabeled meal should be ingested within 10 minutes under standardized environmental conditions (ambient noise, ambient light, and patient comfort). If any portion of the meal is not eaten, the uneaten amount should be recorded.

Imaging can be performed while the patient is either standing, sitting, or supine, provided the position does not change during the study. Movement of solids from the posterior fundus to the more anterior antrum of the stomach results in nonuniform attenuation of the gastric activity. Anterior and posterior imaging with subsequent calculation of the geometric mean can be used to correct for attenuation nonuniformity. Alternatively, a single left anterior oblique view can be used. Images are acquired in at least a 64 x 64 pixel matrix. Continuous data recording at 30-60 seconds/image for at least 90 min is generally recommended. Data recorded at discrete 15-min intervals has also been shown to provide reliable gastric-emptying results. However, with this approach no information is available on the lag phase, and rapid gastric dumping may not be fully characterized. Four hour imaging may be necessary to characterize delayed gastric emptying in cases with borderline 2-hr emptying.

Reference: Journal of Nuclear Medicine, Vol. 45, No 6, June 2004: 1019-1023, SNM Procedure Guidelines

Nobel Prize Awarded to Pair Who Made 'Accidental' Ulcer Break-through

Two Australian pathologists have won the 2005 Nobel Prize for Medicine for their landmark discovery that a specific type of bacterium - and not stress - was the main cause of painful ulcers in the stomach and intestine.

The discovery by Barry J. Marshall, 68, and Robin Warren, 55, more than 20 years ago transformed the understanding of peptic ulcer disease and made intrusive stomach operations unnecessary.

"Thanks to the pioneering discovery by Marshall and Warren, peptic ulcer disease is no longer a chronic, frequently disabling condition, but a disease that can be cured by a short regimen of antibiotics and acid secretion inhibitors," the Nobel Institute said.

Warren, a pathologist from Perth, Australia, was the first to observe small curved bacteria in the lower part of the stomach in many patients with ulcers. "He made the crucial observation that signs of inflammation were always present in the gastric mucosa close to where the bacteria were seen," the assembly said.

However, a number of attempts to cultivate the previously unknown bacteria in a lab failed — until Dr. Marshall, then a young researcher, accidentally left a bacteria sample in his lab over the Easter holiday in 1982.

"When he returned five days later, the bacteria, later denoted as *Helicobacter pylori*, had cultivated," said Sten Grillner, a member of the Nobel Assembly. "It was kind of an accident," Mr. Grillner said. "But then many great discoveries are made by a combination of an accident and the prepared mind."

The two researchers then found that the organism was present in almost all patients with gastric inflammation, duodenal ulcer or gastric ulcer. "Based on these results, they proposed that *H. pylori* is involved in the etiology of these diseases," the Assembly said.

By the 1990s, a series of antibiotics had been produced that can completely cure ulcers, and prevent them from returning. Before then ulcers were often treated by surgery to remove part of the stomach. "That is now absolutely unnecessary," Mr. Grillner said. "So the everyday benefits of this are rather substantial."

Dr. Barry Marshall also developed the ¹⁴C-Urea Breath Test for detecting the presence of *H. pylori* in humans. The test has 96% sensitivity and 96% specificity, and detects active infection. Blood tests detect only the antibody to *H. pylori*, not the actual bacteria. The ¹⁴C-Urea Breath Test is simple and non-invasive. The patient simply swallows a capsule and fills a balloon with their breath. Breath samples are analyzed at Radiopharmacy, and results returned the next day.

If you would like more information on ¹⁴C-Urea Breath tests please give us a call.

Radiopharmacy, Inc. After Hours Contact Information

(812) 421-1002 or (800) 755-5889 Answering Service
(812) 589-5947 Cellular phone carried by pharmacist on call
(812) 421-1004 Fax

Pharmacist's Home Phone Numbers

(812) 858-6957 John Haney
(812) 490-2529 Tim Quinton
(812) 424-3194 Matt Broshears
(812) 682-3801 Jason Wilson
(812) 490-3723 Charlie Bockelman
(812) 490-1540 Nicole Spurling



Ordering Doses After Hours:

Radiopharmacy, Inc. has a pharmacist on call at all times. If doses are needed, after hours, call the regular pharmacy phone number, (812) 421-1002 or (800) 755-5889. This number will go directly to our answering service and you will then have two options to choose from:

1) For routine Tc^{99m} doses to be delivered the next weekday hit (1) on your phone's keypad and leave the following dose information: dose, drug, time of calibration, and phone number where you can be reached if the morning pharmacist has any questions. This option does **not** page the on call pharmacist. Routine Tc^{99m} doses include: Myoview, Cardiolite, Choletec, MAA, DTPA, HDP, MDP, Sulfur Colloid, NeutroSpec, MAG3, and ^{99m}Tc pertechnetate.

2) For all Stat doses, weekend or holiday doses, non-routine Tc^{99m} doses, or non Tc^{99m} doses hit (2) on your phone's keypad and leave the dose information and the phone number where you can be reached. This option will automatically page the pharmacist on call. If the pharmacist has no questions and can fill your order we will not call you back unless you request it. Non-routine Tc^{99m} doses include Ceretec White Blood Cell studies, CEA scan, Accutect, and DMSA. Non Tc^{99m} doses that are stocked in limited quantities and available for next day delivery include: Tl²⁰¹, I¹³¹, Cr⁵¹, and Co⁵⁷.

Other radiopharmaceuticals that we do not routinely keep on hand include: Zevalin, Bexxar, In¹¹¹, I¹²³, Sr⁸⁹, Sm¹⁵³, I¹²⁵, Pd¹⁰³, and P³². These items need to be ordered in advance during regular weekday business hours.

When leaving messages with the answering service, it is very important to leave a phone number where we can reach you. Even if you do not need us to call you back, there may be an instance when we need to contact you. This has proven to be a difficult task if we do not have your contact information. If you have any questions please call the pharmacy and we will be happy to help in any way.

KSNMT Fall 2005 Continuing Education Meeting

Mark your calendar! The KSNMT's Fall 2005 Continuing Education Meeting is on the way. The meeting, "Protocols, Policies, and Personal Growth: Connecting the Dots for the Big Picture", is packed with informative speakers and should be a minimum of 6 VOICE CE hours.

The meeting is scheduled for Saturday November 19th at the Holiday Inn, Capital Plaza in Frankfort, KY. Registration on the day of the meeting will begin at 7:00 am and the meeting should last until 4:00 - 5:00 pm. Lunch is provided along with a continental breakfast and afternoon snack.

For more information on the program, or on available lodging, or to obtain a registration form, contact Radiopharmacy, Inc. Don't let this incredible CE opportunity pass you by.

Christmas Party 2005!

It is that time of year again. The Radiopharmacy Christmas party will be upon us before we know it. As a gesture of our appreciation to our customers and employees, Radiopharmacy will be hosting our annual party on Saturday December 10, 2005. The party will once again be held at the Casino Aztar. Details will follow for room reservations, menu, RSVP deadline, etc. Mark your calendars now, we hope to see many of you on the 10th.



If you have questions about anything in the "Monthly Scan" don't hesitate to call us at
(812) 421-1002
or
(800) 755-5889
or visit us online



www.radiopharmacy.com