

Quality Assurance in Gastric Emptying Studies Group PQI

Primary Authors David Brandon, MD
 Dacian Bonta, MD, PhD

Purpose and Rationale

Prior to the standardization of a low fat meal by Tougas et al, the solid phase gastric emptying scintigraphy technique varied widely, leading to difficulty comparing studies on the same patient performed at different institutions. As this paper demonstrates, poor radiolabeling of the eggs due to inadequate mixing during the cooking process can result in unbound technetium-99m sulfur colloid exiting in the liquid phase. While the Tougas protocol is fairly resilient to such a technical error, 2 hour cut off values from the literature have a smaller margin of error and thus a higher likelihood of a false negative study.

The goal of this project is to review the technical standards of gastric emptying scintigraphy and compare them to your practice's protocol, assess the quality of egg radiolabeling, and demonstrate improvement by objective scan criteria if deficiencies were found during the practice assessment.

Project Resources

1. Bonta DV, Brandon D, Hernandez J, et al. Quality assurance in gastric emptying studies. (publication data)
2. Donohoe KJ, Maurer AH, Ziessman HA, et al. Society for Nuclear Medicine; American Neurogastroenterology and Motility Society. Procedure guideline for adult solid-meal gastric-emptying study 3.0. J Nucl Med Technol. 2009; 37:196-200.
3. Tougas G, Eaker EY, Abell TL, et al. Assessment of gastric emptying using a low fat meal: establishment of international control values. Am J Gastroenterol. 2000 Jun; 95(6):1456-62.
4. Practice protocol manual

Project Measures

Metric #1

Numerator Number of cases where small bowel activity is present at time 0
Denominator Total number of cases

Metric #2

<u>Numerator</u>	<u>Number of cases where 0-30 minute emptying % is greater than the 30-60 %</u>
Denominator	Total number of cases

Metric #3

<u>Numerator</u>	<u>Number of positive cases</u>
Denominator	Total number of cases

Baseline Data Collection

Read project resources 2 and 3 and use them as a guide to review your local gastric emptying protocol. Meet with the lead nuclear medicine technologist to discuss any needed protocol changes and the actual meal preparation technique being used by the technologists.

Review the previous 20 gastric emptying studies performed in your practice that followed the Tougas protocol. Record the number of cases where tracer activity is in the small bowel at 0 minute images. Note the number of cases where 0-30 minute emptying is greater than 30-60 minute emptying (ex. the 0-30 minute retention percentage was 77% and the 30-60 minute retention was 60%, thus 23% emptied from 0-30 minutes and only 17% emptied from 30-60). Calculate the percent of studies that were positive. Use the data sheet at the end of the supplement for documentation.

For the next 10 patients undergoing gastric scintigraphy using the Tougas protocol, have the technologist image the eggs in the dish they were cooked in for 30 seconds prior to presentation to the patient. Assess the adequacy of labeling using the images in Figures 2 and 3 from Resource 1 as a guide. Record the number of cases of notably inhomogeneous tracer activity on egg images.

Data Analysis

In a group meeting, review the data collection sheet. The goal is to have zero cases of activity in the small bowel at time 0 or greater 0-30 emptying percentage unless rapid emptying was clinically suspected in a case. Exclude any patients where gastric emptying was performed for dumping syndrome or prior surgery would lead to accelerated emptying. Review the egg images and guide in Resource 1 which provides a visual assessment of a quality parameter independent from patient factors.

Factors Potentially Influencing Performance

After analyzing the data, determine whether a quality deficit is present. If poor

radiolabeling is apparent based on the data analysis or the images of the eggs, design an intervention to ameliorate the problem. Reflect on the barriers that exist in your practice that hinder high quality gastric emptying scintigraphy from being performed.

Possible contributors may include:

1. Inhomogeneous radiolabeling of eggs
 - a) Review the technique the technologists use to prepare the radiolabeled eggs and share the egg image data with the technologists.
 - b) Design an intervention to improve egg preparation technique and reassess the egg radiolabeling through the imaging method. Provide feedback to the technologists.
2. Excessive time allowed for the patient to ingest the meal. This may lead to activity in the small bowel on time 0 images from normal emptying.
 - a) Review the Tougas protocol with the technologists and stress that the meal needs to be ingested within 10 minutes
 - b) Possible intervention: have the technologist record the time the patient took to eat the meal

Post Intervention Data Collection

After your intervention has been completed, review the next 10 gastric emptying studies using the Tougas protocol and record the number of cases where small bowel activity is present at time 0 or the 0-30 minute emptying percentage is greater than the 30-60 percentage. Calculate the percentage of positive studies. Reassess these same parameters in 10 consecutive patients who underwent the Tougas protocol 6 months after the intervention. The goal is to have zero cases of small bowel activity present at time 0 or a greater emptying percentage at 0-30 minutes unless rapid emptying is clinically suspected. Given the small number of cases assessed, changes in the number of positive cases are not expected to be statistically significant but collection of this data may demonstrate a trend. High volume practices may want to consider reviewing more than 10 patients. If the goal is not achieved, then additional training is warranted and it may be beneficial to repeat the egg imaging on a number of studies as this provides direct visual feedback to technologists on the quality of their preparation.

Data Sheet

Pre-intervention

Number of studies with small bowel activity at time 0 _____

Number of studies where 0-30 emptying > 30-60 emptying _____

Percentage of studies that were positive _____

Images with inhomogeneously mixed eggs _____

Post-intervention

Immediate

Number of studies with small bowel activity at time 0 _____

Number of studies where 0-30 emptying > 30-60 emptying _____

Percentage of studies that were positive _____

6 months

Number of studies with small bowel activity at time 0 _____

Number of studies where 0-30 emptying > 30-60 emptying _____

Percentage of studies that were positive _____