University Hospitals of North Midlands **NHS**

NHS Trust

Imaging Directorate

Nuclear Medicine Scanning Protocol

Gastric Emptying +/- Small Bowel Transit Scan

Operational Lead:	Lead Technologist
Document Owner:	Lead Technologist
Clinical Approval by:	Dr David Bailey
Procedure Version:	6.0
Date Issued:	03/05/2022
Date of Review:	Quarter 2 2025
Electronic Location:	Imaging Sharepoint
Key Words (to aid searching):	Nuclear Medicine, Gamma Camera, GI, Gastric Emptying, Small Bowel Transit, SBT, GE, Stomach, Transit time

Special Requirements:

The patient must fast for 6 hours prior to the study. The patient will be required to eat a radiolabelled meal, therefore patient allergies or intolerances of egg, wheat or gluten must be checked with the patient and highlighted to a senior technologist if applicable.

If the patient is diabetic and controlled by insulin it should be requested that they bring their insulin with them since they will be eating a meal and imaging may be required for most of the day.

For radiopharmaceutical and dose information please see NM-DISP-01 Local Diagnostic Reference Levels

Authorisation:
Authorisation is by ARSAC certificate holder or by operators using NM-Auth-8 'Operator Authorisation Gastric Emptying - Small Bowel Transit' located in the 'Authorisation procedures' section of Sharepoint.

Patient Preparation:

Prior to the appointment: Ensure that the patient has been informed that they must fast for 6 hours but can drink water prior to the scan.

If further advice is needed a senior technologist should be consulted.
If the patient is diabetic and controlled by medication, ask the patient to bring their medication with them for administering with the food in the department.

Some people are allergic to or intolerant of egg and wheat or gluten so it is important to check with the patient that they are able to eat these foods prior to booking the appointment. (Patients with food intollerances may not simply omit ingredients but must consume an alternative such as gluten free toast – they will likely need to be advised to bring their own since sodexo usually cannot provide us with this)

The meal of choice is Scrambled eggs and 2 whole slices of toast. Porridge should be offered if the patient cannot tolerate eggs. The meals should be eaten in less than 10 minutes.

Prior to and following administration of the radiopharmaceutical: Ensure that the patient has fasted prior to the study as requested. If the patient is diabetic they may need to take medication prior to or just after the meal.

Prior to imaging: Ask the patient to remove any metal objects from the patient's chest and abdominal area. Provide the patient with an apron to wear whilst eating.

Food Preparation:

All food should be ordered and delivered from Sodexo. Food should be ordered by the receptionist the previous day and should be scheduled to arrive in the department

immediately prior to the test taking place. Suitable food options for this include scrambled egg on toast or porridge made with full fat milk.

Food preparation:

- food handling should be kept to a mimumum. Hands should be washed prior to handling food and the person preparing the meal should wear an apron and gloves at all times during the food preparation process.
- Scrambled eggs are the meal of choice. Porridge should only be offered if the patient cannot tolerate eggs. If the patient refuses both eggs and porridge, speak to the NM Consultant for advice.
- A disposable plate and disposable cutlery should be used to serve all food.

Scrambled eggs: eggs
- Egg and toast (or bread) – this should be 2 eggs and 2 slices of bread (4 halves of toast)
- Add butter and two eggs to the saucepan and heat at an appropriate level to cook the eggs. Whisk the eggs during the cooking to produce scrambled eggs. As soon as the egg begins to solidify, add in the radiopharmaceutical and continue to cook until all of the eggs is cooked and has solidified. Serve on buttered toast. Salt and Pepper can be used to flavour the meal. The entire meal needs to be consumed.

DO NOT serve the meal if the patient is unsure they will be able to consume the whole meal.

Porridge:
- Porridge – 40 g oats + 200 ml whole milk (please do weigh/measure the ingredients)
- Add the porridge oats and milk to the saucepan and heat to a sufficient level to boil the porridge mixture. Add the radiopharmaceutical to the mixture as soon as heat is applied to ensure that it binds to the protein in the milk during the cooking process. Serve to the patient in a bowl.

NB the patient may consume upto 200ml of water following the meal.

Cleaning instructions
- All equipment used in the preparation of food should be cleaned in a designated radiation sink. Once the equipment has been cleaned, monitor prior to re-using.

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Administration of Radiopharmaceutical and Additional Medication:

Prepare the food and add the Tc99m DTPA to the food during the cooking process.
(Protocol NM-RPAdministration-06).

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Imaging Parameters:

Note: The following imaging parameters are split into 3 stages. Stage 1 and Stage 2 are required for both a Gastric Empting Study and a Small Bowel Study.

Gastric Emptying studies are complete after Stage 2.

Stage 3 is only required for Small Bowel Transit studies.

Consuming the meal

The patient should be instructed to consume the entire meal within 10 minutes. Be clear that the test is based on the consumption of the entire meal, and any not consuming the entire meal will likely compromise the results.

Document on CRIS how long the patient took to consume the meal and precisely what they ate.

After the meal the patient may drink after to 200ml still water – that is one plastic cup.
(Please ensure no tea/coffee/carbonated drinks).

Stage 1:
Imaging is to commence 10 minutes after the beginning of the meal*.*

Rotate the camera heads to a lateral orientation and place the imaging chair in-between the heads with Detector 1 in the anterior projection. Position the patient sitting on the chair and move Detector 1 as close as possible to the patient. Instruct the patient to keep as still as possible.

Static Acquisition	Symbia T	Intevo	Symbia S
	7. Gastro-intestinal – UHNS GASTRIC EMPTYING		
Isotope	^{99m}Tc		
Collimator	LEGP		
Head Orientation	Upright (patient sitting between the camera heads)		
Matrix	128x128		
Zoom	1		
Views	Ant and Post 0 min to 28 min		
Time per View	2 min		

Stage 2:
This stage automatically follows on from Stage 1 in the acquisition workflow. This stage requires images to be taken at 15 minute intervals. For each image the patient should be positioned the same as Stage 1.

Static Acquisition	Symbia T	Intevo	Symbia S
Static Acquisition	7. Gastro-intestinal – UHNS GASTRIC EMPTYING		
Isotope	^{99m}Tc		
Collimator	LEGP		
Head Orientation	Upright (patient sitting between the camera heads)		
Matrix	128x128		
Zoom	1		
Views	Ant and Post images required at: 45 min 60 min 75 min 90 min 120 min 180 min 240 min		
Time per View	2 min		

Stage 3:
This stage is required only if a Small Bowel Transit study is requested and authorised.

Images should be acquired at 30 minute intervals using the Delayed GE or SBT statics workflow. For each image the patient should be positioned the same as Stage 1.

Static Acquisition	Symbia T	Intevo	Symbia S
Static Acquisition	7. Gastro-intestinal – UHNS GASTRIC EMPTYING		
Isotope	^{99m}Tc		
Collimator	LEGP		
Head Orientation	Upright (patient sitting between the camera heads)		
Matrix	128x128		
Zoom	1		
Views	Ant and Post		
Time per View	LEGP=2min		

Continue to acquire 2 minute static images as above at 30 minute intervals until activity in the large bowel can be visualised. If required, advice from a suitably trained clinical technologist can be sought of when to enough imaging has been acquired to end the study.

Data Processing:

Analysis: Use the associated workstation or the Symbia.net. workstation.

Select the whole patient study and load into the Gastric empting protocol. This automatically adds all the static images together in the correct order.

If any images need labelling or the labels editing use the **Dicom Toolbox.**

On the **Gastrointestinal Tab** of the workflow, open **ROI Tool,** then using the scroll bar select a 2 minute dynamic image where the stomach is well defined. Draw a region of interest around the stomach on this image, Using the scroll go through the images checking that the stomach is within the ROI.
Hint: Do not change the shape of the ROI between the images, The ROI must remain the same size and shape on all the images
A background region of interest is required. Ensure that it is drawn so it is clear of any stomach activity but within the body of the patinet. Check that the background region is clear of any gastric activity on all the frames.
The workflow creates a time-activity curve. Move 'T empty' to the end point on the graph. Move 'T0' to the start point of the study.
Move 'T fit' to get the best line. Request assistance from a senior technologist is required to identify the correct position of these parameters if needed..

The snapshot below shows an example of the graph correctly:
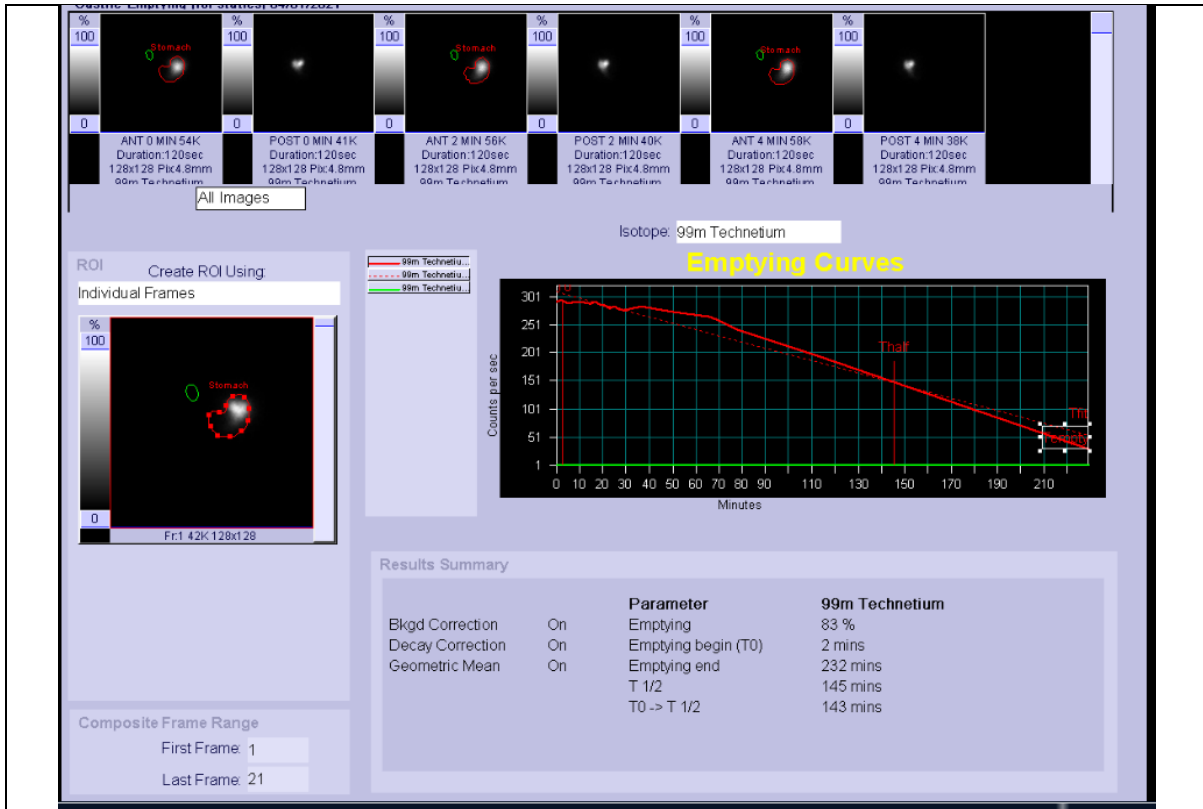
Note: The axis need to be in a usable scale. **Right click on the graph in the gastrointestinal tab,** selct properties de-select automatic plot, and use 0 as Y start. Change the X end and Y end so they are whole numbers. Click **Apply** and **ok.**

Using the **Flexible display Tab.** Static images: Display and window the static image displays of the dynamic and delayed phases of the gastric emptying, and if applicable the delayed images of the small bowel transit study, so that the full series can be visualised for reporting. Ensure all static images are displayed and labelled correctly. screen shots need to be taken of all the acquired images. To do this start at 0 min and press the save screen button, scroll down for the next step and again press the save screen button, repeat till all the images have been captured. Repeat this for the page *Statics with ROI.*

The following should be seen:

For a small bowel transit study there may be more images that need sending to PACS. If unsure speak to a senior technician.

Once complete, complete the study.

Archiving to PACS
Once the study has been processed and savescreens have been created, click on the **Viewing** tab on the right hand side of the screen (on the processing terminal).
Next select the **Patient** dropdown menu and select the **Browser** option. In the **Local Database** sub-section, select the correct patient and double click the **SAVE_SCREEN** icon to load the savescreen into the viewing window.

Hold **Control** on the keyboard and using the mouse, click on the savescreen required from the **Viewing** window (selection is confirmed when the desired savescreen is highlighted by the solid line blue boarder).

Finally, select the **Transfer** dropdown menu and select the **Archive to SECTRA PACS.**

Summary of Changes

Date	Who	Version	Comments
27.Apr.2022	SD	5.0	Added details from the e-mail/memo that Dave sent out to everyone on Tue 26 Apr 2022 regarding this study, and specifically the importantce of selecting and documenting the food selections.

Document Authorisation

Position	Signature
Nuclear Medicine Service Manager or Nominated Deputy	
Head of Nuclear Medicine Physics	