

# Meckel's Diverticulum Imaging\*

Mary Beth Farrell

## RATIONALE/INTRODUCTION

Meckel's diverticulum is a vestigial remnant of the omphalomesenteric duct (yolk stalk). It is usually 2 inches in length and located on the ileum about 2 feet from the end of the small intestine. Most people who have a Meckel's diverticulum never have symptoms, but those who do are usually younger than 20 years of age, with the majority younger than 2 years of age. Most Meckel's diverticula contain gastric mucosa, and the predominant symptom is lower intestinal bleeding from an ileal mucosal ulceration caused by acid secretion. Because  $^{99m}\text{Tc}$ -pertechnetate avidly accumulates in gastric mucosa, this protocol is the study of choice for identifying ectopic gastric mucosa in a Meckel's diverticulum.

## INDICATIONS

1. Localization of a Meckel's diverticulum with functioning gastric mucosa
2. Explanation of unexplained gastrointestinal bleeding
3. Evaluation of blood in feces
4. Evaluation of abdominal pain
5. Evaluation of bleeding, diverticulitis, or intestinal obstruction

## CONTRAINDICATIONS

1. Pregnant/breast-feeding: Pregnancy must be excluded in accordance with local institutional policy. If the patient is breast-feeding, appropriate radiation safety instructions should be provided.
2. Active bleeding at the time of the study
3. Recent administration of potassium perchlorate; potassium perchlorate may be given after completion of the study
4. Cathartics or other bowel irritants within 24 h of examination
5. Barium study within 3 to 4 days of the study
6. Recent nuclear medicine study, especially studies with labeled red blood cells

## PATIENT PREPARATION/EDUCATION

1. The patient should not eat or drink for 2 to 4 hours before the examination.
2. A focused history containing the following elements should be obtained:
  - a. History of past bleeding episodes
  - b. Results of prior studies to localize the bleeding site
  - c. Recent nuclear medicine study using in vivo red blood cell labeling
  - d. Clinical signs of active bleeding

## PHARMACEUTICAL IDENTITY, DOSE, AND ROUTE OF ADMINISTRATION

See common options in the following text (Table 1).

## ACQUISITION INSTRUCTIONS (TABLE 2)

1. Ask the patient to void before beginning the procedure.
2. Position the patient supine on the imaging table, with the detector positioned over the right lower quadrant of the abdomen.
3. Inject the dose intravenously and acquire a flow study at 1 second/frame for 1 minute.
4. Continue to acquire a dynamic study in the same position every minute for 30 to 60 minutes.
5. Obtain additional static images after dynamic images in the anterior oblique, lateral, and posterior projections.
6. Ask the patient to void and then acquire postvoid anterior, oblique, lateral, and posterior projections as necessary.
7. Images in the decubitus or upright position can aid in moving the Meckel's diverticulum away from the bladder.

## COMMON OPTIONS

1. The patient may be pretreated with cimetidine (Tagamet) to enhance the sensitivity of the Meckel's scan. The dose is 20 mg/kg orally starting 24 hours before the study and last taken 1 hour before the study.
2. The patient may be given potassium perchlorate orally after the scan (adult, 250 mg; child, 6 mg/kg) to facilitate the washout of  $^{99m}\text{Tc}$  from the thyroid gland.

## PROCESSING INSTRUCTIONS

1. Sum the dynamic images and display for optimal visualization of the area of interest.
2. Scale planar images to accurately visualize areas of normal anatomy and increased uptake.

For correspondence or reprints contact: Mary Beth Farrell, Intersocietal Accreditation Commission, 27 Boxwood Lane, Langhorne, PA 19047.

E-mail: farrell@intersocietal.org

\*This book chapter was previously published in *Quick-Reference Protocol Manual for Nuclear Medicine Technologists* in 2014 (<https://www.snmmi.org/Store/ProductDetail.aspx?ItemNumber=11002>).

COPYRIGHT © 2020 by the Society of Nuclear Medicine and Molecular Imaging.  
DOI: 10.2967/jnmt.120.244137

**TABLE 1**  
Radiopharmaceutical Identity, Dose, and Route of Administration

Identity	Dose	Route of administration
<sup>99m</sup> Tc-pertechnetate	300 MBq (8 mCi)	Intravenous
	Range: 300–450 MBq (8–12 mCi)	
Pediatric dose: <sup>99m</sup> Tc-pertechnetate	1.85 MBq/kg (0.05 mCi/kg)	Intravenous
	Minimum administered activity: 9.25 MBq (0.25 mCi)	

**TABLE 2**  
Acquisition Parameters: Dynamic/Static/Planar

		Standard/preferred/optional
Camera type	Large field of view	Standard
Energy peak	140 keV	Standard
Energy window	20%	Standard
Collimator	Low energy all purpose	Standard
Patient position	Supine	Standard
Camera position	Anterior	Standard
Injection to imaging time	Immediate	Standard
Acquisition type	Dynamic flow	Standard
	Planar	
Views	Anterior flow	Standard
Additional views	Anterior, oblique, lateral, and posterior projections	Standard
	After void, decubitus and upright images	
Orbit	NA	NA
Orbit type	NA	NA
Matrix	128 × 128	Standard
Number of projections	NA	NA
Time/view	1–5 seconds/frame for flow for 1 minute	Standard
	1 minute per view for 30 minutes	
Additional images: time/view	5 min/view	Standard

NA, not applicable.

### ADJUNCT IMAGING/INTERVENTIONS

If the Meckel's diverticulum is adjacent to the bladder and the patient is unable to void, a urinary catheter to drain the bladder of activity may be helpful.

### PRECAUTIONS

None

### REFERENCES

- Ford P, Bartold S, Fink-Bennett D, et al. Society of Nuclear Medicine procedure guideline for gastrointestinal bleeding and Meckel's diverticulum scintigraphy. Version 1.0. 1999. <http://interactive.snm.org/index>. Accessed September 1, 2012.
- Nadal H, Legett J, McGuire D, Weiss SC, Conway JJ. Pediatric imaging. In: Christian PE, Waterstram-Rich KM, eds. *Nuclear Medicine and PET/CT Technology and Techniques*. 7th ed. St Louis, MO: Elsevier Mosby; 2012:671–672.
- Shackett P. *Nuclear Medicine Technology: Procedures and Quick Reference*. 2nd ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009:173–177.