

MECKEL'S DIVERTICULUM STUDY
UPDATED: AUGUST 2019

CPT CODE: 78290

Indications: To establish the presence of Meckel's diverticulum.

Rationale: Meckel's diverticulum is the vestigial remnant of the omphalomesenteric duct and represents the most common congenital anomaly of the gastrointestinal tract, with an incidence of 1%- 3% in the general population. It is normally located on the antimesenteric border of the terminal ileum within 80-100 cm of the ileocecal valve and is on average 2 cm in length. Approximately 57% of Meckel diverticula contain ectopic gastric mucosa, which actively secretes the hydrochloric acid responsible for mucosal ulcerations within the diverticulum and unprotected wall of the adjacent ileum. The most common sign of Meckel diverticulum is gross rectal bleeding, which may or may not be associated with abdominal symptoms. Almost all diverticula of children with symptoms of lower gastrointestinal bleeding contain ectopic gastric mucosa. ^{99m}Tc-pertechnetate is taken up by the mucin-producing cells of gastric mucosa and is then secreted into the gut lumen. The excretion of ^{99m}Tc-pertechnetate is not dependent on the presence of parietal (acid-producing) cells. Avid accumulation of ^{99m}Tc-pertechnetate in gastric mucosa makes scintigraphy with ^{99m}Tc-pertechnetate the study of choice for identifying ectopic gastric mucosa in a Meckel diverticulum. Properly performed ^{99m}Tc-pertechnetate scintigraphy in the appropriate clinical setting is an effective method for the detection of Meckel diverticulum containing functioning gastric mucosa, with overall sensitivity of 85%, specificity of 95%, and accuracy of 90%.

Patient Prep:

NPO for a minimum of four (3-4) hours.

In infants, the NPO period should equal the usual feeding interval.

No blocking agent such as KClO₄ or SSKI within previous 48 hours.

No CT scans or contrast studies for 48 hours prior

Pre-treatment with 300 mg (corrected for age) of Ranitine HCl (H₂-receptor antagonist) every 12 hours for 24 hours proceeding the study (total 2 doses) has been suggested, and in difficult cases should be considered when repeat studies are contemplated (reduces release of tracer into the bowel). Glucagon (not routinely done), by decreasing peristalsis, may also enhance identification. Glucagon is not indicated for diabetic patients.

Scheduling: 60 minutes camera time.

Radiopharmaceutical & Dose:

10 mCi \pm 20%(8 to 12 mCi) Tc-99m as pertechnetate injected intravenously. Dose will be adjusted for patient weight per NMIS or weight chart.

Imaging Device:

GE Millennium MPS, GE Infinia Hawkeye (I, II or III) or GE Optima 640 with LEHR collimator.

Imaging Procedure:

- Ask the patient to void prior to the study.
- Position patient under camera prior to injection of radiopharmaceutical.
- Place patient is in a supine position under the camera.
- Begin imaging immediately on injection of the radiopharmaceutical.
- Images should include the stomach and bladder area.
- Images are acquired as follows: Anterior images are obtained dynamically at 1-min per frame for 30 min with a matrix of 128x128 , then right lateral view at the end of 30 min dynamic for 500,000 counts. Consider post-void anterior and right lateral static views as needed.
- All images to be checked with NM physician

- Possible SPECT-CT as needed, preferably GE Optima 640 (high quality CT)
 - Matrix 128x128
 - View Angle: 3°
 - Stop time: 20 seconds

Processing:

- Load to new the dynamic study.
- Create a 5x6 grid
- Annotate images
- Screenshot in B&W
- Load to new statics
- Create a 2x3 grid
- Annotate images with appropriate labels i.e. RT/LT, ANT/POST, time post injection, post void
- Reference General SPECT/CT processing protocol for processing the SPECT/CT

PACS:

All raw images, Screenshots and SPECT/CT images(as directed by General SPECT/CT processing protocol), should be sent to the PACS.

Interpretation:

The activity in Meckel's occurs simultaneously with gastric appearance whereas common confusing sites (renal pelvis, inflammatory bowel lesions, intussusceptions, polyps) accumulate later. Sensitivity of 85% and specificity of 95% are reported.

False Positives: Radiopharmaceutical may be seen in the renal pelvis and duodenum and these can be difficult to separate. If the right renal pelvis is suspected, then look for the left renal pelvis that will be partially obscured by the gastric activity. Posterior views will show the paired nature of the renal pelvis. Lateral views will help separate duodenum (anterior or mid-abdomen vs posterior kidney).

List...

False - Positive

- Free technetium-99m pertechnetate
- Urinary tract activity
- Uterine or penile blush
- Accessory Spleen
- Hemangioma (hepatic)
- Varices

False - Negative

- Bleeding rate too low
- Intermittent bleeding

Comments:

A Nuclear Medicine staff or resident physician should be consulted to determine if additional views and/or SPECT-CT images are indicated.

 Scott B. Perlman, MD, MS
 Chief, Nuclear Medicine

 Derek Fuerbringer, CNMT
 Manager, Nuclear Medicine

 John Vetter, PhD, DABR
 Medical Physicist

 Scott Knishka, RPh, BCNP
 Radiopharmacist