Peritoneal Cavity Scintigraphy

Primary Indications: Peritoneal cavity scintigraphy is indicated for (1) assessing whether there is direct communication between the peritoneal cavity and an extraperitoneal fluid collection (e.g., pleural effusion, hydrocele) and (2) evaluating the intraperitoneal distribution of tracer before intracavitary therapy of malignant ascites with P-32 chromic phosphate colloid.

Rationale: A particulate radiopharmaceutical injected into the peritoneal cavity will normally distribute throughout this space. Abnormal connections of the peritoneal cavity with the pleural space or the scrotum are demonstrated by the presence of tracer in these regions. Evaluation for "hot spots" of the tracer distribution (due to loculations caused by adhesions) prior to intracavitary P-32 therapy is done to avoid excessive local radiation doses; if "hot spots" are seen, adjustment of catheter position or injection at multiple sites may be required.

Interfering Conditions: None

Contraindications: None

Precautions: Paracentesis should be performed by or under guidance of an experienced physician. In general, it is preferred that the referring physician place the needle and extracts fluid needed for laboratory testing, following which the nuclear medicine physician should inject the radiopharmaceutical. The risk of bowel puncture is increased inpatients with adhesions and in patients with only small amounts of peritoneal fluid.

Radiopharmaceuticals: Tc-99m sulfur colloid

Adult dose: 5 mCi in 3 mL 0.9% saline solution

Pediatric dose: 0.07 µCi/kg (minimum dose 1 mCi: maximum dose 5 mCi)

Route of Administration: Intraperitoneal

Patient Scheduling: This study should be scheduled only after consultation with a nuclear medicine physician. The indication for this study needs to be clearly understood since the indication will affect how the study is performed. At the time that the study is scheduled, the physician who will provide access to the peritoneal space needs to be identified and a tentative time for the performance of this study

needs to be set. The contact numbers for the physician who will be responsible for providing peritoneal access need to be recorded.

Patient Preparation: None

Equipment Setup: Gamma Camera: LFOV camera
Collimator: Low-energy all-purpose (LEAP)
Energy window: 140 keV with 20% window

Patient Positioning: Supine for injection and imaging.

Paracentesis: Required Equipment for Paracentesis.

1. One 26" x 23" sterile drape with hole
2. One small sterile drape
3. A sterile 6 mL syringe with 19 gauge, 1.5-inch needle
4. A 20-gauge, 3.5-inch spinal needle
5. Betadine and alcohol solutions
6. A package of sterile 4" x 4" gauze sponges
7. 1.0 % lidocaine solution (single-dose vial)

Procedure for Paracentesis: (Physician)

1. Explain the procedure, including its potential complications, to the patient.
2. Before paracentesis, the patient's bladder must be emptied either voluntarily or by catheterization.
3. Place the patient on the examining table in the supine position.
4. Examine the patient's abdomen for surgical scars, dermatitis, distention, mass, and hepatosplenomegaly.
5. Select one of the following puncture sites: (a) a point in the midline approximately midway between the umbilicus and the symphysis pubis; or (b) a point in the lower abdominal flank lateral to the rectus muscle.
6. Prepare the skin by cleansing with Betadine and alcohol, and drape the sterile field.
7. Anesthetize the skin and tissues, down to and including the peritoneum, by injecting 1.0 % lidocaine solution through a 22-gauge, 1.5-inch needle. A Z-track injection may be helpful since the injection site will seal more quickly. Remember to aspirate prior to injecting the lidocaine to avoid injection into a vessel. Aspiration also helps to confirm when the peritoneum has been entered. When the needle is withdrawn, note should be made of how far the needle has been inserted and this should be used as a guide for injecting the tracer. If no fluid can be aspirated with a

1.5-inch needle, use of a spinal needle may be required. Usually one can feel the needle entering the peritoneal cavity because there is a slight give. This is particularly true if the patient is asked to elevate the head at the time the puncture is being done. The syringe containing the tracer should contain about 0.5 mL of air so that the needle is purged by air when the injection is complete, insuring complete injection of the tracer. The needle is withdrawn immediately after the injection of the tracer.

8. Once correct positioning of the needle is obtained, the radiopharmaceutical is injected. A small amount (approximately 10 mL) of sterile 0.9% saline solution is used to flush the residual tracer from the line and needle. If the amount of ascites is small or if ascites is not present, injecting 50-100 mL of sterile 0.9% saline solution may facilitate dispersion of the tracer in the peritoneal cavity.

Imaging Procedure: Once the radiopharmaceutical has been injected, the patient should roll up first on one side and then the other side for up to 5 minutes to help disperse the tracer throughout the abdomen. The images to be acquired and imaging times vary depending on the indication for the study. Consult the table below for details. Use of markers or a transmission image is helpful to provide anatomic landmarks when necessary.

In patients who are being evaluated for abnormal fluid collections associated with peritoneal dialysis, it is desirable to evaluate the patient during normal dialysis procedure. The radiopharmaceutical should be injected into the dialysis catheter and should be flushed into the peritoneal cavity with the usual volume of the dialysate. Images of the abdomen should be obtained 2-4 hours after the infusion of the dialysate has been completed and again after the dialysate has been drained. The drained dialysate can be disposed of in the usual manner.

View	Digital Acquisition	Film Display (If Applicable)
Pleural Effusion: **Immediate images** 1. Anterior abdomen and chest 2. Anterior abdomen and chest with xyphoid marker or transmission source **30-minute delayed images**	5 minute images 256 x 256 matrix, word mode	4 x 5-minute images

Take the same views as above. **Additional images as needed**		
View	**Digital Acquisition**	**Film Display (If Applicable)**
Fluid Collection Related to Peritoneal Dialysis: **2-4 hours after infusion of the dialysate** 1. Anterior abdomen 2. Right lateral abdomen 3. Anterior abdomen with xyphoid marker or transmission source **After drainage of dialysate** Take the same views as above. **Additional images as needed.**	5-minute images 256 x 256 matrix word mode	6 x 5-minute images
Before Peritoneal Intracavitary Therapy: **Immediate images** 1. Anterior abdomen 2. Right lateral abdomen 3. Anterior abdomen with xyphoid marker or transmission source **Additional images as needed**	5-minute images 256 x 256 matrix word mode	3 x 5 minute images