

## **I-131 MIBG Scintigraphy**

- Primary Indications:** Diagnosis or staging of pheochromocytoma and neuroblastoma.
- Rationale:** Meta-iodobenzylguanidine (MIBG) is an analog of norepinephrine and is taken up selectively by the adrenal medulla, the sympathetic autonomic nervous system, and tumors derived from these tissues. Uptake occurs chiefly via the energy-dependent type I amine uptake mechanism. Retention of MIBG within the intravesicular hormone storage compartment of cells in the adrenal medulla, and in pheochromocytoma and neuroblastomas permits their scintigraphy detection.
- Interfering Conditions:** Many drugs interfere with the uptake of MIBG, particularly tricyclic antidepressants, sympathomimetics (e.g., pseudoephedrine), and certain anti-hypertensives (labetalol, reserpine, and calcium channel blockers). The patient may need to be off of these drugs for 4 to 6 weeks prior to imaging.
- Precautions:** MIBG is cleared primarily by the kidneys and is not dialyzable; it should not be used in anephric patients. Radiation dose to the thyroid gland should be minimized by blocking of thyroidal radioiodine uptake with stable iodine, and use of these tracers (but particularly I-131 MIBG) should be avoided in pregnant and breast-feeding patients. Rare hypersensitivity reactions have been reported. The tracer should be injected slowly (over 30-60 seconds) through a freely flowing venous angiocatheter, and the patient should be monitored for adverse reaction during and for 15 minutes after tracer administration; blood pressure should be taken prior to tracer administration and at 5 and 15 minutes following injection.
- Radiopharmaceutical:** I-131 Iobenguane Sulfate (I-131 MIBG)
- Adult Dose:** **I-131 MIBG:** 7 uCi/kg.  
Minimum Dose: 0.5 mCi to a maximum of: 1.0 mCi  
In patient with known malignant tumors, a dose of 1.0 mCi is recommended.
- Pediatric Dose:** **I-131 MIBG:** 7 uCi/kg  
Minimum Dose: 0.135 mCi to a maximum of 0.5 mCi.

In children with known malignant tumors, the dose should be increased to 14 uCi/kg, with a maximum dose of 1.0 mCi.

**Route of Administration:** Intravenous, by slow injection over 30-60 seconds through a freely flowing venous angiocatheter. Particular care should be taken to avoid extravasation of the dose. A 250 mL bag of 0.9% saline solution should be connected to the IV line to confirm its patency, for flushing of the line after tracer injection, and for administration of fluids if required for adverse reaction to MIBG. The patient should be monitored for adverse reaction during and for 15 minutes after tracer administration; blood pressure should be taken before tracer administration and at 5 minutes and 15 minutes following injection.

**Patient Preparation:** **To block uptake of radioiodine by the patient's thyroid gland**, the patient should receive SSKI (saturated solution of potassium iodide), starting 1 day before tracer administration and continuing for a total of 8 days for I-131 MIBG.

**Adult Dose:** 2 drops orally t.i.d. If it is not possible to start SSKI on the day before the procedure, the patient should receive 6 drops of SSKI orally 1 hour before tracer administration.

**Pediatric Dose:**

Age	Dose
< 1 month old	1 drop PO daily
1 month to 3 years old	1 drop PO twice a day
3 years old to 18 years old	1 drop three times a day

**Interfering drugs** should be withdrawn for an appropriate period of time (tricyclic antidepressants-4weeks; other drugs- $\geq$  6 half-lives).

**A negative pregnancy test** (preferably within 7 days) is desired in women of childbearing potential.

**For adults, a mild laxative** (e.g., Ducolax) should be administered on the evening prior to the day when image acquisition is scheduled.

**Equipment Setup:**

**I-131**

Gamma camera: Whole-body dual-head

Collimator: High-energy

Energy window: 364 keV with a 20% window

**Patient Positioning:** Supine

**Procedure:** The patient should void prior to imaging. Anterior and posterior, overlapping, spot images covering the area from the head to mid thighs are obtained. For I-131 MIBG images, the acquisition time should be 20 minutes. Additional spot images, images with addition of other localization tracer (e.g., Tc99m DTPA) may be requested by the nuclear medicine physician. Images are routinely obtained at 48 hours with I-131 MIBG. Other delayed images may be requested by physician.

**I-131 MIBG imaging for children.**

48 hour delayed images

20 minutes per view, 1.45 zoom.

Three views: Anterior / Posterior Head

Anterior / Posterior Chest and Abdomen

Anterior / Posterior Pelvis and Legs

<b>View</b>	<b>Digital Image</b>	<b>Digital Data</b>
<b>Spot images</b> <b>I-131</b> 20 minutes	Anterior and posterior images from head to mid thighs	256 x 256 matrix word mode
<b>Additional spot images</b> <b>I-131</b> 20 minutes	Views as requested by physician	256 x 256 matrix, word-mode

**Please do not let the patient leave before showing all images to the physician.**

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