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Parathyroid Scintigraphy

Normally, four parathyroid glands sit behind the thyroid at the upper and lower areas of each lobe. Parathyroid glands secrete parathyroid hormone (PTH), which regulates calcium and phosphate levels in the body. Hyperparathyroidism (excess parathyroid hormone) leads to increased serum calcium and bone weakening. Most cases of hyperparathyroidism are the result of single or multiple hyperfunctioning adenomas. Less commonly, hypocalcemia can lead to overproduction of parathyroid hormone and hyperplasia of the parathyroid glands (secondary hyperparathyroidism). Parathyroid carcinomas are the cause in only 1-3% of patients with hyperparathyroidism.

Parathyroid nuclear scintigraphy is a very useful study for detecting hyperfunctioning parathyroid adenomas. Hyperplasia is differentiated from adenoma by noting the number of hyperfunctioning parathyroid glands. In general, an enlarged gland is classified as adenoma if the remaining three are normal. If all four glands are enlarged, the diagnosis is hyperplasia.

Parathyroid scintigraphy is often used in high-risk surgical patients and those with life-threatening adenomas to help streamline the surgery and reduce the risk of complications. In patients with persistent or recurrent adenomas, exploratory surgery may be technically difficult. Preoperative scintigraphic localization can identify areas of ectopic tissue and likely increase surgical success. Scanning post-surgery is useful for localizing residual adenoma after previous parathyroidectomy.

Currently used radiopharmaceuticals do not specifically target the parathyroid glands. Therefore, dual isotope, subtraction, and wash-out techniques are necessary to visualize parathyroid adenomas.

Early imaging studies utilized 2-4 mCi ^{201}Tl thallous chloride and 2-4 mCi $^{99\text{m}}\text{Tc}$ pertechnetate. Thallous chloride localizes in both parathyroid and thyroid tissue, but pertechnetate localizes only in thyroid tissue.

Subtraction of $^{99\text{m}}\text{Tc}$ thyroid activity allows visualization of enlarged or hyperactive parathyroid tissue. Iodine ^{123}I NaI has also been used in place of $^{99\text{m}}\text{Tc}$ pertechnetate for thyroid subtraction.

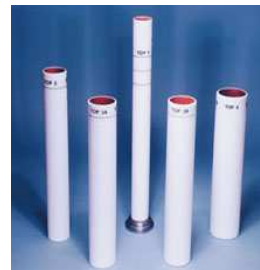
$^{99\text{m}}\text{Tc}$ sestamibi, like ^{201}Tl thallous chloride, also localizes in parathyroid and thyroid tissue. Like ^{201}Tl , $^{99\text{m}}\text{Tc}$ sestamibi washes out of the thyroid over time, but washes out of parathyroid tissue more slowly than ^{201}Tl . This property allows parathyroid imaging using a single 20-25 mCi injection of $^{99\text{m}}\text{Tc}$ sestamibi. A dual phase study with sestamibi combines early (10-minute postinjection) and delayed images (1.5-2.5 hours postinjection) to take advantage of these patterns of localization and wash-out.

Areas of relatively increased uptake of Tl-201 or Tc-99m sestamibi may be interpreted as abnormal parathyroid tissue. When a dual-phase sestamibi protocol is performed, abnormal parathyroid tissue will usually appear as an area of increased uptake that becomes more prominent on the delayed images. Computer subtraction is useful when visual findings are equivocal.

Image acquisition varies by the radiopharmaceutical and procedure utilized. In all cases the mediastinum should be imaged (in addition to the neck) to survey for ectopic tissue, especially in cases of recurrent or residual disease. SPECT may be useful in revealing small lesions by improving sensitivity and anatomical localization.

Linearity Check

Radiopharmacy, Inc. utilizes a Lineator for performing dose calibrator linearity. The Lineator allows linearity to be performed in minutes rather than days. This device consists of a set of five lead tubes which when placed around a source of activity, simulates decay



over time. Since NRC requires that linearity be done according to manufacturers recommendations (upon installation, after repair, and quarterly), whenever a "loaner" dose calibrator is used a linearity should be performed. Linearity testing by decay method takes days to complete. This means that "loaner" dose calibrators should not be used for days until the linearity test is complete. Testing using the Lineator allows you to use the dose calibrator almost immediately.

Radiopharmacy offers a rental Lineator to all of our regular customers for \$25.00/day. It should not be needed for more than one day.

Use of a Lineator must be included in your radioactive materials license for Agreement States (Kentucky, Illinois). Fortunately, this is an easy process, and we can supply you with a standard amendment form. Licensees in NRC States (Indiana) are not required to file a license amendment.

Medicare Reimbursement Updates for 2006

The SNM website has been updated with the recently released 2006 HOPPS information. You can find an excellent 2006 compared to 2005 HOPPS Rate APC chart at:

<http://interactive.snm.org/index.cfm?PageID=1981&RPID=43>

This file contains all nuclear codes for the scans, radiopharmaceuticals and all other nuclear related drugs. Quite a few of the procedure and product code descriptions have been changed or deleted. The table to the right highlights the 2005 codes that were deleted and provides the new codes for 2006. There are two new codes for 2006. The new descriptions, for the most part, are much clearer and more accurate than before.

Radiopharmaceuticals whose costs were packaged into the APC rate (not paid separately) will continue to be packaged. Radiopharmaceuticals that were previously reimbursed in addition to the APC rate are now "Paid under OPPS: Separate cost-based non-pass-through payment."

2006 Calendars

Radiopharmacy calendars are now available for 2006. We will be sending out at least one calendar to each nuclear medicine department. If you would like additional calendars, please let us know and we will be happy to send more.

Christmas Party 2005!

It is that time of year again. The

2005 CPT/ HCPCS	Description	Trade Name	2006 CPT/ HCPCS
A9511	Tc-99m depreotide	Neotect®	A9536
A9513	Tc-99m mebrofenin	Choletec®	A9537
A9514	Tc-99m pyrophosphate	Pyrolite®	A9538
A9515	Tc-99m pentetate	Tc-99m DTPA	A9539
A9519	Tc-99m albumin aggregated	MAA	A9540
A9520	Tc-99m sulfur colloid	Sulfur Colloid	A9541
A9522,C1082	In-111 ibritumomab	In-111 Zevalin®	A9542
A9523,C1083	Y-90 ibritumomab	Y-90 Zevalin®	A9543
A9533,C1080	I-131 tositumomab diagnostic	Dx Bexxar®	A9544
A9534,C1081	I-131 tositumomab therapeutic	Rx Bexxar®	A9545
C1079	Co 57/58	Nycomed	A9546
C1091	In-111 oyoquinoline	Used with WBC Labeling	A9547
C1092	In-111 pentetate	In-111 DTPA	A9548
C1093	Tc-99m fanolesomab	NeuroSpec™	A9566
C1122	Tc-99m arcitumomab	CEA-Scan®	A9549
C1200,Q3006	Tc-99m glucoheptonate	Glucoscan®	A9550
C1201	Tc-99m succimer	DMSA	A9551
C1775	FDG	F-18 FDG	A9552
C9000,C9102	Cr-51 sodium chromate	-	A9553
C9013,Q3012	Co-57 cyanocobalamin	-	A9559
C9103	I-125 iothalamate	-	A9554
C9400	Tl-201 thallous chloride	-	A9505
C9401	Sr-89 strontium chloride	Metastron®	A9600
C9402	I-131 sodium iodide, therapeutic cap	-	A9517
C9403	I-131 sodium iodide, diagnostic cap	-	A9528
C9404	I-131 sodium iodide, diagnostic solution	-	A9529
C9405	I-131 sodium iodide, therapeutic solution	-	A9530
Q3000	Rb-82	Cardiogen®	A9555
Q3002	Ga-67 gallium citrate	-	A9556
Q3003	Tc-99m bicesate	NeuroLite®	A9557
Q3004	Xe-133 gas	-	A9558
Q3005	Tc-99m mertiatide	MAG3®	A9562
Q3007	P-32 sodium phosphate	-	A9563
Q3008	In-111 pentetate	OctreoScan®	A9565
Q3009	Tc-99m oxidronate	HDP®	A9561
Q3010	Tc-99m RBC	Ultragag® or Cold PYP	A9560
Q3011	P-32 chromic phosphate	-	A9564
None	Tc-99m pentetate aerosol	DTPA Aerosol	A9567
None	Sinclide Injection	Kinevac®	J2805



Radiopharmacy Christmas party will be upon us before we know it. As a gesture of our appreciation to our customers and employees, Radiopharmacy will be hosting our annual party on Saturday December 10, 2005. The party will once again be held at the Casino Aztar. For Casino Aztar Hotel room availability and group discount, phone Andrew Dill at (812) 433-4352 or (800) 342-5386 and reference "Radiopharmacy Block #2491."

Tc-99m Supply Update

On November 16, 2005 Radiopharmacy, Inc. was informed of a Tc-99m Generator production failure at Mallinckrodt Medical. Bristol Myers Squibb has been able to supply most US pharmacies with an adequate supply of generators and Radiopharmacy, Inc. is currently able to handle all orders for Tc-99m products. Thanks to all nuclear medicine staff for their patience as we dealt with this situation.

If you have questions about anything in the "Monthly Scan" don't hesitate to call us at
(812) 421-1002 or
(800) 755-5889
 or visit us online



www.radiopharmacy.com