When You’re Looking At The Thyroid,

Get A Better Look.
Sodium Iodide I 123.

1. Radioiodine is trapped by the thyroid and organified in the synthesis of thyroxine.\(^{1,4}\) \(^{99m}\)Tc\(\text{O}_4^-\) is trapped, but not organified, by the thyroid. Consequently, Tc99m activity does not always indicate the physiologic condition of the thyroid.

2. Radioiodine clearly demonstrates the “cold” nonfunctioning nodules that may be associated with malignant thyroid tumors. Such nonfunctioning nodules have appeared “hot” or “cold” on images obtained with Tc99m, necessitating a confirmatory radioiodine scan.\(^2,3\)

3. Radioiodine thyroid imaging is preferred to Tc99m for investigation of patients with possible retrosternal thyroid tissue or in those patients whose images are unsatisfactory with Tc99m due to poor radionuclide concentration.\(^4\)

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Sodium Iodide I 123: Clearly Different

DESCRIPTION: Sodium iodide I 123 for diagnostic use is supplied as capsules and in vials as an aqueous solution for oral administration. At calibration time, each capsule has an activity of 100 microcuries and each vial contains solution with a total specific concentration of two millicuries per ml.

INDICATIONS: Sodium iodide I 123 is indicated for use in the diagnosis of thyroid function and imaging.

CONTRAINdications: None known.

WARNINGS: This radiopharmaceutical should not be administered to children or to patients who are pregnant or to nursing mothers unless the information to be gained outweighs the potential hazards. Ideally, examinations using radiopharmaceuticals, especially those elective in nature, in women of childbearing capability should be performed during the first few (approximately 10) days following the onset of menses. However, when studies of thyroid function are clinically indicated for members of these special population groups, use of I 123 would be preferable to the use of I 131 in order to minimize radiation dosage.

DETAILED ADVERSE REACTIONS: There were nine adverse reactions reported in a series of 1,393 administrations. None of these were attributed to I 123. Five adverse reactions, consisting of gastric upset and vomiting, were attributed to a filler in the capsule. Two cases of headache and one case of nausea and weakness were attributed to the fasting state. One case of garlic odor on the breath was presumed to be attributable to the presence of tellurium.

DOSAGE AND ADMINISTRATION: The recommended oral dose range for diagnostic studies of thyroid function in the average adult patient (70 kg) is from 100 to 400 microcuries. The patient dose should be measured by a suitable radioactivity calibration system immediately prior to administration. Concentration of I 123 in the thyroid gland should be measured in accordance with standardized procedures.

SPECIAL CONSIDERATION: Radiopharmaceuticals should be used only by physicians who are qualified by training and experience in the safe use and handling of radionuclides and whose experience and training have been approved by the appropriate government agency authorized to license the use of radionuclides.

HOW SUPPLIED: Sodium iodide I 123 for oral administration is supplied in aqueous solution in glass vials of 1mCi and in capsules of 100 μCi.
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**FEATURES**

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- R-Trigger pulse output, ECG output, Heart Rate/R-R int., Strip Chart Recorder, Digital CRT Monitor and Isolation Amplifier for patient safety.

**AccuSync-I**

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- All AccuSync-I features incorporated into a Module designed to fit into certain Mobile cameras.

**AccuSync-III**

- All AccuSync-I features with the exception of the Strip Chart Recorder.

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A superior bone scanning agent

Osteoscan-HDP represents a significant technological advance in bone scanning agents. Its unique active ingredient, hydroxymethylene diphosphonate (HDP), provides higher bone uptake than MDP-based agents for clear, definitive scans and excellent lesion detection.

Bone uptake superior to MDP

HDP shows unusually high adsorption to bone. In a clinical comparison, Osteoscan-HDP averaged 21% higher bone uptake than the MDP-based agent.¹

Rapid blood clearance

No bone agent clears the blood faster. Only 6% of Osteoscan-HDP remains in the blood two hours after injection.² Osteoscan-HDP’s rapid blood clearance contributes to the overall quality of the image and permits flexibility in scheduling patient scans from 1 to 4 hours post-injection.

Scan data:
The two scans above are of a 56-year-old female patient with breast cancer. Scan: abnormal activity in right ischial ramus. Instrument: General Electric MaxiCamera™ 535; total counts: 2000K; dose: 20.8 mCi; 5'5", 175 lb; dose-to-image time: 2.25 hours
Notice excellent bone delineation in this obese patient.

References:
offering higher bone uptake

PROCTER & GAMBLE
OSTEOSCAN-HDP®
Technetium Tc99m Oxidronate Kit

Unexcelled image quality³

Osteoscan-HDP's high bone uptake and rapid blood clearance permit clear visualization of skeletal detail even in difficult-to-scan elderly patients.

See for yourself

To order Osteoscan-HDP, or for further information, call or write Procter & Gamble, Professional Services, P.O. Box 85507, Cincinnati, Ohio 45201, (513) 977-5547.

High lesion sensitivity

HDP offers a high tumor-to-normal bone ratio. This results in high resolution scans capable of demonstrating subtle skeletal metastases and fractures with no sacrifice in overall image quality.

Scan data:
The two scans above are of a 79-year-old male patient with adenocarcinoma-prostate. Scan: multiple lesions. Instrument: Picker 4/15 Gamma Camera; information density: 3000; dose: 15 mCi; dose-to-image time: 3 hours IVP revealed mass in right kidney causing retention.

Please see the following page for a brief summary of prescribing information.
INDICATIONS AND USAGE
OSTEOSCAN-HDP (Technetium Tc99m Oxidronate Kit) is a diagnostic skeletal imaging agent used to demonstrate areas of altered osteogenesis.

CLINICAL PHARMACOLOGY
During the 24 hours following injection, Technetium Tc99m-labeled OSTEOSCAN-HDP is rapidly cleared from blood and other non-osseous tissues and accumulates in the skeleton and urine. In humans, blood levels are about 10% of the injected dose at six hours post-injection and continue to fall to about 6%, 4% and 3% at 2, 3 and 4 hours respectively. When measured at 24 hours following its administration, skeletal retention is approximately 50% of the injected dose. OSTEOSCAN-HDP exhibits its greatest affinity for areas of altered osteogenesis and actively metabolizing bone.

CONTRAINdications
None known.

WARNINGS
This class of compounds is known to complex cations such as calcium. Particular caution should be used with patients who have, or who may be predisposed to hypocalcemia (i.e., alkalosis).

PRECAUTIONS
General
Contents of the vial are intended only for use in the preparation of Technetium Tc99m Oxidronate and are NOT to be administered directly to the patient. Technetium Tc99m Oxidronate should be formulated within eight (8) hours prior to clinical use. Optimal imaging results are obtained one to four hours after administration. Technetium Tc99m Oxidronate as well as other radioactive drugs, must be handled with care, and appropriate safety measures should be used to minimize radiation exposure to the patient, consistent with proper patient management.

Radiopharmaceuticals should be used only by physicians who are qualified by specific training in the safe use and handling of radionuclides and whose experience and training have been approved by the appropriate government agency authorized to license the use of radionuclides.

To minimize radiation dose to the bladder, patients should be encouraged to drink fluids and to void immediately before the examination and as often thereafter as possible for the next four to six hours.

Carcinogenesis, Mutagenesis, Impairment of Fertility
No long-term animal studies have been performed to evaluate carcinogenic potential or whether Technetium Tc99m Oxidronate affects fertility in males and females.

Pregnancy — Category C
Animal reproduction studies have not been conducted with Technetium Tc99m Oxidronate. It is also not known whether Technetium Tc99m Oxidronate can cause fetal harm when administered to a pregnant woman or can affect reproduction capacity. Technetium Tc99m Oxidronate should be avoided in the presence of a pregnant woman only if clearly needed. Ideally, examinations using radiopharmaceuticals, especially those elective in nature, of a woman of childbearing capacity should be performed during the first few (approximately 10) days following the onset of menses.

Nursing Mothers
Technetium Tc99m is excreted in human milk during lactation. Therefore, formula feedings should be substituted for breast feedings.

Pediatric Use
Safety and effectiveness in children have not been established.

ADVERSE REACTIONS
Although adverse reactions have not been reported that are specifically attributable to the use of Technetium Tc99m Oxidronate, allergic dermatological manifestations (erythema) have been infrequently reported with similar agents.

Dosage and Administration
General Instructions
The recommended adult dose of Technetium Tc99m-labeled OSTEOSCAN-HDP is 15 mCi with a range of 10 to 20 mCi. The activity of each dose should be measured by a suitable radiation calibration system just prior to administration. The dose should be given intravenously by slow injection. For optimal results imaging should be done 1-4 hours post-injection.

How Supplied
OSTEOSCAN-HDP is supplied as a lyophilized powder packaged in vials. Each vial contains 3.0 mg oxidronate sodium and 0.16 mg stannous chloride as active ingredients, and 0.56 mg gentisic acid as a stabilizer. Kits containing 5 or 30 vials are available. The NDC number for this product is NDC 37000-403-01.

The drug can be stored at room temperature in a light-tight container with refrigeration. Reconstitution with ADDITIVE-FREE sodium pertechnetate Tc99m is unstable. For additional product information, call (513) 977-5547 or write: Procter & Gamble, Professional Services, P.O. Box 171, Cincinnati, OH 45201.
Diagnosis: normal ventilation, abnormal perfusion — pulmonary embolism

Imaging information: Instrument: Picker Model 4/15 Gamma Camera
Dose: 15 mCi Xenon 133; 3 mCi PULMOLITE
Information density: 1,000 counts/cm²; 2,000 counts/cm²

Xenon Xe 133 Gas (CALIDOSE™) Dispensing System

PULMOLITE™
Technetium Tc 99m Aggregated Albumin Kit

Please see following page for brief prescribing information.
**PULMOLITE™**

**Technetium Tc 99m Aggregated Albumin Kit**

**INDICATIONS AND USAGE:** Technetium Tc 99m aggregated albumin is indicated as a lung imaging agent to be used as an adjunct in the evaluation of pulmonary perfusion.

**CONTRAINDICATIONS:** Technetium Tc 99m aggregated albumin should not be administered to patients with severe pulmonary hypertension.

The use of Tc 99m aggregated albumin is contraindicated in persons with a history of hypersensitivity reactions to products containing human serum albumin.

**WARNINGS:** The possibility of allergic reactions should be considered in patients who receive multiple doses.

Theoretically, the intravenous administration of particulate material such as aggregated albumin imposes a temporary small mechanical impediment to blood flow. While this effect is probably physiologically insignificant, most patients who have been exposed to the administration of aggregated albumin are possibly hazardous in acute cardiac pulmonary and other states of severely impaired pulmonary blood flow.

This radio pharmaceutical preparation should not be administered to children or to pregnant or lactating women unless the expected benefits to be gained outweigh the potential risks.

Ideally, examinations using radio pharmaceuticals, especially those effective in nature, of a woman of childbearing capability should be performed during the first few (approximately 10) days following the onset of the menses.

**PRECAUTIONS:** In cases of right-to-left cardiac shunt, additional risk may exist due to the rapid entry of aggregated albumin into the systemic circulation. 

When the patients are not radioactive. However, after the sodium pertechnetate Tc 99m is added, adequate shielding of the final preparation must be maintained.

The labeling reactions involved in preparing the agent depend on maintaining it in the reduced state. Any oxidant present in the sodium pertechnetate Tc 99m supply may thus adversely affect the quality of the prepared agent. Hence, sodium pertechnetate Tc 99m containing oxidants, or other additives, should not be employed without first demonstrating that it is without adverse effect on the properties of the resulting agent.

The contents of the vial are sterile and non-pyrogenic. It is essential that the user follow the directions carefully and adhere to strict aseptic procedures during preparation of the radiolabeled Technetium Tc 99m aggregated albumin is physically unstable and as such the particles will settle with time. Failure to mix the vial contents adequately before use may result in non-uniform distribution of radioactivity.

It is also recommended that, because of the increasing probability of agglomeration with aging, a batch of Technetium Tc 99m aggregated albumin not be used after eight hours from the time of reconstitution. Refrigerate at 2 to 8°C after reconstitution. If blood is withdrawn into the syringe, unnecessary delay prior to injection may result in clot formation in situ.

The contents of the vial are under a nitrogen atmosphere and should be protected from air. Do not use if clumping or foaming of the contents is observed.

**Usage:** Adequate reproduction studies have not been performed in animals to determine whether this drug affects fertility in males or females, has teratogenic potential, or has other adverse effects on the fetus. Technetium Tc 99m aggregated albumin should be used in pregnant women only when clearly needed.

It is not known whether this drug is excreted in human milk. As a general rule, nursing should not be undertaken while a patient is on a drug since many drugs are excreted in human milk.

Safety and effectiveness in children have not been established.

As in the use of any radioactive material, care should be taken to minimize radiation exposure to the patient, consistent with proper management, and to insulate minimum radiation exposure to the occupational personnel.

Radio pharmaceuticals should be used only by physicians who are qualified by training and experience in the safe use and handling of radionuclides and whose experience and training have been approved by the appropriate government agency authorized to license the use of radionuclides.

**ADVERSE REACTIONS:** The literature contains reports of deaths occurring after the administration of aggregated albumin to patients with pre-existing severe pulmonary hypertension. Instances of hemodynamic or idiosyncratic reactions to preparations of Tc 99m-labeled aggregated albumin have been reported.

Hypersensitivity reactions are possible when protein-containing materials such as Tc 99m-labeled aggregated albumin are used in man. Epinephrine, antihistamines and corticosteroid agents should be available for use.

**DOSAGE AND ADMINISTRATION:** The recommended intravenous dose range for the average patient (70kg) is 1 to 4 millicuries. The volume of the dose may vary from 0.2 to 1.3 ml.

The recommended number of aggregated albumin particles to be administered per dose is 200,000-700,000 with the suggested number being approximately 350,000.

For ease and accuracy in dispensing the prepared agent, it is recommended that prior to reconstitution, concentrated sodium pertechnetate Tc 99m be further diluted to a volume of 8ml with fresh, preservative-free sodium chloride solution (U.S.P.).

**HOW SUPPLIED:** PULMOLITE™ Technetium Tc 99m Aggregated Albumin Kit is supplied in kits of five (5) or thirty (30) vials, sterile and non-pyrogenic, each vial containing in lyophilized form:

- Aggregated albumin (human) 1.0mg
- Normal human serum albumin-10mg
- Sodium chloride-10mg
- Stannous chloride dihydrate, maximum-0.07mg

Each vial contains 3.6-6.5 x 10⁴ aggregated albumin particles.

PULMOLITE™ contains no preservative, after reconstitution the shielded vial should be stored at 2° to 8°C.

Included in each five (5) vial kit is one (1) package insert and six (6) radiation labels.

Included in each thirty (30) vial kit is one (1) package insert and thirty-six (36) radiation labels.

This reagent kit is approved for use by persons licensed by the U.S. Nuclear Regulatory Commission pursuant to Section 35.14 and 35.100 Group III of 10CFR 30 or under licenses of Agreement States.
Diagnosis: hypertrophic pulmonary osteoarthropathy

Imaging information:
- Instrument: GE MaxiCamera™ 525
- Dose: 20 mCi OSTEOLITE
- Scan time: 2.5-3.0 hours postinjection
- Acquisition time: 6 minutes/view

OSTEOLITE™
Technetium Tc 99m Medronate Sodium Kit (MDP)

New England Nuclear®

Please see following page for brief prescribing information.
OSTEOLITE™
Technetium Tc 99m Medronate Sodium Kit (MDP)

INDICATIONS AND USAGE: Technetium Tc 99m OSTEOLITE may be used as a bone imaging agent to delineate areas of altered osteogenesis.

CONTRAINDICATIONS: None known.

WARNINGS: The contents of the OSTEOLITE vial are intended only for use in the preparation of Technetium Tc 99m medronate sodium and are NOT to be directly administered to the patient. Ideally, examinations using radiopharmaceuticals — especially those elective in nature — of women of childbearing capability should be performed during the first ten days following the onset of menses.

PRECAUTIONS: A thorough knowledge of the normal distribution of intravenously administered Technetium Tc 99m medronate sodium is essential in order to accurately interpret pathologic studies. Technetium Tc 99m medronate sodium, as well as any radioactive agent, must be handled with care. Once sodium pertechnetate Tc 99m is added to the kit, appropriate safety measures should be used to minimize external radiation exposure to clinical personnel. Care should also be taken to minimize radiation exposure to patients in a manner consistent with proper patient management. Since 50—75% of the administered dose is renally excreted, good patient hydration and frequent voiding for 4—6 hours post-injection will significantly reduce the bladder wall dose.

The technetium Tc 99m labeling reaction involved in preparing Technetium Tc 99m medronate sodium depends on the maintenance of lip in the divalent state. Any oxidant present in the sodium pertechnetate Tc 99m employed may adversely affect the quality of the prepared agent. Thus, sodium pertechnetate Tc 99m containing oxidants should not be used without first demonstrating that it is without adverse effect on the properties of the resulting agent.

The use of bacteriostatic sodium chlorobenzoic acid as a diluent for sodium pertechnetate Tc 99m may adversely affect the biologic distribution of the prepared agent, and its use is not recommended.

Adverse reactions studies have not been performed in animals to determine whether this drug affects fertility in males or females, has teratogenic potential, or has other adverse effects on the fetus. Technetium Tc 99m medronate sodium should be used in pregnant women only when clearly needed. It is not known whether this drug is excreted in human milk. As a general rule, nursing should not be undertaken when a patient is administered radioactive material.

ADVERSE REACTIONS: None reported.

DOSAGE AND ADMINISTRATION: The recommended dose for the average 70kg adult patient is 15mCi with a range of 10—20mCi. The patient dose should be measured by a suitable radioactivity calibration system immediately prior to administration.

Optimal imaging results are obtained within one to four hours after administration.

OSTEOLITE should be used within six hours after aseptic reconstitution with sodium pertechnetate Tc 99m. For optimal results this time should be minimized.

The vial contains no bacteriostat.

Radiopharmaceuticals should be used by persons who are qualified by specific training in the safe use and handling of radionuclides produced by nuclear reactor or particle accelerator and whose experience and training have been approved by the appropriate governmental agencies authorized to license the use of radionuclides.

HOW SUPPLIED: NEN’s OSTEOLITE™ Technetium Tc 99m Medronate Sodium Kit is supplied as a set of five or thirty vials, sterile and non-pyrogenic. Each nitrogen-flushed vial contains in lyophilized form:

Medronate Disodium — 10mg
Stannous Chloride Dihydrate — 0.85mg

The pH is adjusted to between 7.0—7.5 with hydrochloric acid and/or sodium hydroxide solution. The contents of the vial were lyophilized under nitrogen.

Store at room temperature (15—30°C). Included in each five (5) vial kit is one (1) package insert and six (6) radiation labels. Included in each thirty (30) vial kit is one (1) package insert and thirty-six (36) radiation labels.

The contents of the kit vials are not radioactive. However, after reconstitution with sodium pertechnetate Tc 99m the contents are radioactive and adequate shielding and handling precautions must be maintained.

Do not use if there is a vacuum in the immediate drug container or if air is injected into the container when the dose is withdrawn.

Catalog Number NRP-420 (5 vial kit)
April 1978
Catalog Number NRP-428C (30 vial kit)

Glucoscan™
Technetium Tc 99m Glucoplate Sodium Kit

INDICATIONS AND USAGE: Technetium Tc 99m Glucoplate Sodium is used for brain imaging studies.

Technetium Tc 99m Glucoplate Sodium is indicated for renal perfusion imaging as an adjunct in the diagnosis, localization and evaluation of kidney disease. It may provide useful information about renal size, shape, and position and may delineate lesions affecting renal blood flow.

CONTRAINDICATIONS: None known.

WARNINGS: The contents of the GLUCOSCAN vial are intended only for use in the preparation of Technetium Tc 99m Glucoplate Sodium and are NOT to be directly administered to the patient. Ideally, examinations using radiopharmaceuticals — especially those elective in nature — of a woman of child-bearing capability should be performed during the first ten days following the onset of the menses.

Dehydration and/or patient positioning may result in failure to visualize urinary excretory structures in the presence of normal function. Adequate patient fluid intake and repositioning may reduce the incidence of such false positive studies.

PRECAUTIONS: Technetium Tc 99m Glucoplate Sodium, as well as any radioactive agent, must be handled with care. Once sodium pertechnetate Tc 99m is added to the kit, appropriate safety measures should be used to minimize external radiation exposure to clinical personnel.

Care should also be taken to minimize radiation exposure to patients in a manner consistent with proper patient management.

The Technetium Tc 99m labeling reaction involved in preparing Technetium Tc 99m Glucoplate Sodium depends on the maintenance of lip in the divalent state. Any oxidant present in the sodium pertechnetate Tc 99m employed may adversely affect the quality of the prepared agent. Thus, sodium pertechnetate Tc 99m containing oxidants should not be used without first demonstrating that it is without adverse effect on the properties of the resulting agent.

The use of bacteriostatic sodium chlorobenzoic acid as a diluent for sodium pertechnetate Tc 99m may adversely affect the biologic distribution of the prepared agent, and its use is not recommended.

Adverse reactions studies have not been performed in animals to determine whether this drug affects fertility in males or females, has teratogenic potential, or has other adverse effects on the fetus. Technetium Tc 99m Glucoplate Sodium should be used in pregnant women only when clearly needed. It is not known whether this drug is excreted in human milk. As a general rule, nursing should not be undertaken when a patient is administered radioactive material.

ADVERSE REACTIONS: Although infrequent, erythema has been reported in association with the use of Technetium Tc 99m Glucoplate Sodium.

DOSAGE AND ADMINISTRATION: The recommended dose for the average (70kg) adult patient is 15—20 milliequivalents for both renal and brain imaging: Technetium Tc 99m Glucoplate Sodium is intended for intravenous administration only.

Technetium Tc 99m Glucoplate Sodium should be used within six hours after aseptic reconstitution with sodium pertechnetate Tc 99m. For optimal results, this time should be minimized. The reaction vials contain no bacteriostat.

Optimal results for both renal and brain imaging are obtained one hour after administration. Studies have shown that although optimal target-to-background ratios for brain lesions are obtained at two hours post-injection, there is no improvement in diagnostic efficacy after one hour.

Radiopharmaceuticals should be used by persons with specific training in the safe use and handling of radionuclides produced by nuclear reactor or particle accelerator and whose experience and training have been approved by the appropriate governmental agencies authorized to license the use of radionuclides.

The components of the New England Nuclear GLUCOSCAN Kit are supplied sterile and non-pyrogenic. Aseptic procedures normally employed in making additions and withdrawals from sterile, non-pyrogenic containers should be used during addition of pertechnetate solution and the withdrawal of doses for patient administration.

HOW SUPPLIED: NEN’s GLUCOSCAN Technetium Tc 99m Glucoplate Sodium Kit is supplied as a set of five or thirty vials, sterile and non-pyrogenic. Each vial contains in lyophilized form:

Glucoplate Sodium — 200mg
Maximum Tin — 0.07mg
Stannous Chloride (min.) — 0.06mg

Prior to lyophilization the pH is adjusted with hydrochloric acid and/or sodium hydroxide solution. Store at room temperature (15—30°C). Included in each five (5) vial kit is one package insert and six radiation labels. Included in each thirty (30) vial kit is one package insert and thirty-six radiation labels.

The contents of the kit vials are not radioactive; however, after reconstitution with sodium pertechnetate Tc 99m the contents are radioactive and adequate shielding and handling precautions must be maintained.

This reagent kit is approved for use by persons licensed by the U. S. Nuclear Regulatory Commission pursuant to Section 35 54 and 35.100 Group III of 10 CFR or under equivalent licenses of Agreement States.

Catalog Number NRP-180 (5 vial kit)
August 1978
Catalog Number NRP-180C (30 vial kit)
Kidney

Imaging information: Instrument: Ohio Nuclear Sigma 410 Gamma Camera
Counts/image: 800 K for first postflow images, then same time for succeeding images

GLUCOScan
Technetium Tc 99m Gluceptate Sodium Kit

Diagnosis: pyelonephritis of right upper pole

New England Nuclear

Please see preceding page for brief prescribing information.
INDICATIONS AND USAGE: Technetium Tc 99m Glucoplate Sodium is used for
brain imaging. Technetium Tc 99m Glucoplate Sodium is indicated for renal perfusion imag-
ing as an adjunct in the diagnosis, localization and evaluation of kidney dis-
ease. It may provide useful information about renal size, shape, and position and
may delineate lesions affecting renal blood flow.

CONTRAINDICATIONS: None known.

WARNINGS: The contents of the GLUCOSCAN vial are intended only for use in
the preparation of Technetium Tc 99m Glucoplate Sodium and are NOT to be di-
rectly administered to the patient.

Ideally examinations using radiopharmaceuticals — especially those elective in
nature — of a woman of childbearing capability should be performed during the
first ten days following the onset of the menses.

Dehydration and/or patient positioning may result in failure to visualize uri-
inary excretory structures in the presence of normal function. Adequate patient
fluid intake and repositioning may reduce the incidence of such false positive
studies.

PRECAUTIONS: Technetium Tc 99m Glucoplate Sodium, as well as any radioac-
tive agent, must be handled with care. Once sodium pertechnetate Tc 99m is
added to the kit, appropriate safety measures should be used to minimize ex-
ternal radiation exposure to clinical personnel.

Care should also be taken to minimize radiation exposure to patients in a
manner consistent with proper patient management.

The Technetium Tc 99m labeling reaction involved in preparing Technetium
Tc 99m Glucoplate Sodium depends on the maintenance of tin in the divalent
state. Any oxidant present in the sodium pertechnetate Tc 99m employed may
adversely affect the quality of the prepared agent. Thus, sodium pertechnetate
Tc 99m containing oxidants should not be used without first demonstrating that
it is without adverse effect on the properties of the resulting agent.

The use of bacteriostatic sodium chloride as a diluent for sodium pertechnete-
tate Tc 99m may adversely affect the biologic distribution of the prepared
agent, and its use is not recommended.

No long-term animal studies have been performed to evaluate carcinogenic
potential.

Adequate reproduction studies have not been performed in animals to de-
termine whether this drug affects fertility in males or females, has teratogenic
potential, or has other adverse effects on the fetus. Technetium Tc 99m Glucop-
late Sodium should be used in pregnant women only when clearly needed.

It is not known whether this drug is excreted in human milk. As a general
rule, nursing should not be undertaken when a patient is administered radioac-
tive material.

Safety and effectiveness in children have not been established.

ADVERSE REACTIONS: Although infrequent, erythema has been reported in as-
sociation with the use of Technetium Tc 99m Glucoplate Sodium.

DOSE AND ADMINISTRATION: The recommended dose for the average
(70kg) adult patient is 10-20 millicuries for both renal and brain imaging.

Technetium Tc 99m Glucoplate Sodium is intended for intravenous administra-
tion only.

Technetium Tc 99m Glucoplate Sodium should be used within six hours after
aspecific reconstitution with sodium pertechnetate Tc 99m. For optimal results,
this time should be minimized. The reaction vial contains no bacteriostat.

Optimal results for both renal and brain imaging are obtained one hour after
administration. Studies have shown that although optimal target-to-background
ratios for brain lesions are obtained at two hours post-injection, there is no im-
provement in diagnostic efficacy after one hour.

Radiopharmaceuticals should be used by persons with specific training in the
safe use and handling of radionuclides produced by nuclear reactor or particle
accelerator and whose experience and training have been approved by the ap-
propriate governmental agencies authorized to license the use of radionuclides.

The components of the New England Nuclear GLUCOSCAN Kit are supplied
sterile and non-pyrogenic. Aseptic procedures normally employed in making
additions and withdrawals from sterile, non-pyrogenic containers should be
used during addition of pertechnetate solution and the withdrawal of doses for
patient administration.

HOW SUPPLIED: NEN's GLUCOSCAN Technetium Tc 99m Glucoplate Sodium
Kit is supplied as a set of five or thirty vials. sterile and non-pyrogenic. Each
vial contains in hypoallergenic form:

Glucoplate Sodium — 200mg
Maximum Tn — 0.07mg
Stannous Chloride (min.) — 0.06mg
Prior to lyophilization the pH is adjusted with hydrochloric acid and/or
sodium hydroxide solution. Store at room temperature (15-30°C). Included in
each five vial kit is one package insert and six radiation labels. Included in each
ten vial kit is one package insert and thirty-six radiation labels.

The contents of the kit vials are non-radioactive; however, after reconstitu-
tion with sodium pertechnetate Tc 99m the contents are radioactive and
adequate shielding and handling precautions must be maintained.

This reagent kit is approved for use by persons licensed by the U.S. Nuclear
Regulatory Commission pursuant to Section 32 14 and 35.100 Group III of 10
CFR or under equivalent licenses of Agreement States.

Catalog Number NRP-180 (5 vial kit)
Catalog Number NRP-180C (30 vial kit)

SNM BOOKS

SINGLE PHOTON EMISSION COMPUTED TOMOGRAPHY and Other Selected Computer
Aspects, Ron R. Price, David L. Gilday, and Barbara Y. Croft, Eds. This volume, which was published in 1980, includes
an overview of single photon emission computed tomography and numerous papers that describe and evaluate spe-
cific systems and techniques. Papers cover such topics as Anger Cameras; seven-pinhole and slit-hole collimators;
brain, cardiac, and gated blood-pool studies; and the BICLET and SPECT systems. (SNM members: $18.00 + $2.50
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NUCLEAR MEDICINE REVIEW SYLLABUS. Peter T. Kirchner, Ed. This well-indexed volume is a comprehen-
sive review of the major scientific and clinical advances that have occurred since the early 1970's. The chapter's
include Radiopharmacology, Instrumentation, Radiation Effects and Radiation Protection, Cardiovascular, Central
Nervous System, Endocrinology, Gastroenterology, Genito-Urinary System, Hematology-Oncology, Pulmonary,
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RADIOPHARMACEUTICALS II. PROCEEDINGS OF THE 2nd INTERNATIONAL
SYMPOSIUM ON RADIOPHARMACEUTICALS. Vincent J. Sodd, David R. Allen, Dennis R. Hoogland, and
Rodney D. Ice, Eds. This 800 page volume is a complete compilation of papers from the 1979 International Symposium,
including a Keynote Address by former AEC Chairperson Dixy Lee Ray and a panel discussion entitled "International
Regulatory Affairs Relating to Radiopharmaceuticals." Chapters cover such topics as quality control, organic and
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IN NUCLEAR MEDICINE ($12.00), and the NUCLEAR MEDICINE SCIENCE SYLLABUS ($30.00). For ordering and
additional information please contact: Book Order Department, Society of Nuclear Medicine, 475 Park Avenue South,
New York, NY 10016 or phone (212) 889-0717.
Brain

Diagnosis: arteriovenous malformation

Imaging information: Instrument: Ohio Nuclear Series 100 Gamma Camera
Scan time: 90 minutes postinjection
Counts: 400 K

GLUCOSCAN™
Technetium Tc 99m Gluceptate Sodium Kit

Dose: 15 mCi GLUCOSCAN

Please see preceding page for brief prescribing information.
Quantitative thallium-201 imaging

George A. Beller, MD
Head, Division of Cardiology
Professor of Internal Medicine
University of Virginia Medical Center
Charlottesville, Virginia

Denny D. Watson, PhD
Professor of Radiology
University of Virginia Medical Center
Charlottesville, Virginia

In recent years, myocardial perfusion imaging has improved medicine's ability to noninvasively evaluate patients with suspected or known coronary artery disease, and those with acute or prior myocardial infarction. At the University of Virginia Medical Center, we have been working on a quantitative approach to thallium-201 scintigraphy: a method for assessing myocardial uptake and washout, which is largely operator independent. This method should complement the subjective visual interpretation of thallium images with objective, quantitative data analysis in order to provide a final diagnosis.

The rationale for this quantitative approach is based upon the work of the investigators who showed that the initial distribution of thallium is proportional to blood flow, while the delayed, "redistribution" phase is related primarily to myocardial cellular viability.

An approach to quantitation

The quantitative approach we have developed involves several steps. The first step—which is required for all quantitative techniques—is a method of background subtraction that can be employed on the serial images. Thallium image background activity has been found to be variable among patients and over time, and to be distributed nonuniformly around the myocardial region of interest. For these reasons, we do not consider arbitrary uniform background subtraction to be adequate.

The method we have found most satisfactory is a bilinear interpolation approach, as first described by Goris and coworkers. We have modified this approach and have applied slightly different weighting functions. These functions provide proximity weighting near the edges of the background defining region. They also cause a more rapid falloff of the generated background beneath the myocardial rim in the proximity of intense background regions, such as the liver and stomach. This method of background subtraction has proved to be highly reproducible and independent of the computer operator.

Count collection. The image matrix we routinely use is 64 by 64 pixels. After the background subtraction procedure, we utilize computer processing to obtain regional counts above background in different myocardial segments on the anterior and 45° LAO images. The segments typically chosen are in the inferior, anteropapal, and anterolateral regions on the anterior image; and the upper and lower septum, upper and lower posterolateral wall, and inferopapal region on the LAO image. The counts in each of these segments are measured by computing the peak profile counts crossing each preselected region.

Multiple views. The immediate postexercise images are obtained in the consecutive sequence: anterior, 45° LAO, 70° LAO, repeat anterior, and repeat 45° LAO. Delayed redistribution images in the anterior and 45° LAO projections are obtained from 2 to 3 hours postinjection. Each image is recorded for an identical preset time interval.

Abnormal study. From our experience so far, we have derived three criteria for an abnormal study:

- A myocardial segment in the initial postexercise image is considered abnormal if its thallium activity is reduced more than 25% relative to the segment of greatest uptake—except for the inferior wall on the anterior view, which is considered abnormal if its uptake is reduced by more than 35%.
- A segment is considered abnormal if it demonstrates relative redistribution—that is, a relative decrease in thallium activity on the initial images that tends to normalize on the delayed images.
- A segment is considered abnormal if it demonstrates increasing thallium activity in the delayed images. If a segment has a flat time-activity curve—that is, it shows neither increase nor decrease in its net thallium activity—it is considered abnormal only if a comparable myocardial segment demonstrates a normal washout pattern.

Clinical utility

We recently completed a study of 140 patients referred for evaluation of chest pain. For each of these patients, we performed an exercise/redis-
Quantitative stress thallium study in a 55-year-old male recently admitted to "rule out MI," following an episode of pallor and diaphoresis. Admission ECG showed right bundle branch block. Serial enzymes were normal. On exercise, patient reached 96% of his age-predicted maximum heart rate. The initial thallium-201 images demonstrated uniform uptake. As seen by the regional count profiles below the images, the delayed images demonstrated uniform and normal thallium washout in all myocardial segments. It was concluded that the patient's symptoms were not related to coronary insufficiency.

distribution thallium study with conventional stress electrocardiography and—usually within 1 week of the stress test—coronary arteriography.

Of the 110 patients who had arteriographically demonstrated significant coronary artery disease, 100 had abnormal quantitative thallium studies. Of the 30 patients with angiographically normal coronary arteries, 27 had normal thallium scintigrams. Thus, the procedure yielded a 91% sensitivity, 90% specificity, and 97% predictive accuracy.

Of particular interest: The sensitivity and specificity did not differ significantly when studies of patients with diagnostic and nondiagnostic exercise tests were compared. Of the 46 patients who were unable to achieve 85% or more of their maximum predicted heart rate, 28 later shown on angiography to have coronary disease had no ST changes on exercise ECG. However, 96% of these 46 patients had abnormal thallium studies. Thus, the sensitivity of exercise electrocardiography was markedly decreased when patients were not able to achieve a high level of stress, even though symptom-limited end points were used. In contrast, with quantitative thallium imaging, a significant percentage of patients with nondiagnostic exercise tests still demonstrated perfusion abnormalities.

Similarly, patients who were receiving propranolol were exercised without prior withdrawal of the drug, and the sensitivity of the quantitative thallium study did not appear to be affected.

A routine procedure

In our institution today, we routinely employ quantitative thallium-201 imaging for every myocardial perfusion study we perform. Our experience to date includes more than 3,000 patients. In addition to those evaluated in conjunction with routine stress testing, this series also includes patients studied at rest who appear to demonstrate resting hypoperfusion in the distribution of severely stenotic coronary vessels as well as post-MI patients studied predischarge following submaximal stress testing. In this latter group, in particular, we feel that quantitative thallium imaging may disclose important prognostic information by distinguishing single- from multivessel disease as well as areas at jeopardy for infarction.

The technique can be developed with commercially available software. Operator variability is minimal, and intraobserver agreement in interpreting the studies has been good.


Please see following page for brief summary of prescribing information.
MIRD PAMPHLETS AVAILABLE
(Medical Internal Radiation Dose)

1 (Revised) A revised schema for calculating the absorbed dose from biologically distributed radionuclides ($5.25)

2 (Revised) Estimates of specific absorbed fractions for photon sources uniformly distributed in various organs of a heterogeneous phantom. ($7.75)

10 Radionuclide decay schemes and nuclear parameters for use in radiation-dose estimation. ($8.00)

11 'S absorbed dose-per-unit cumulative activity for selected radionuclides and organs. ($11.00)

12 Kinetic models for absorbed dose calculations. ($5.25)

SUPPLEMENTS

3 Includes the original pamphlet #5: "Estimates of absorbed fractions for monoenergetic photon sources uniformly distributed in various organs of a heterogeneous phantom." ($1.50)

5 Includes two pamphlets: "Distribution of absorbed dose around point sources of electrons and beta particles in water and other media"; and "Absorbed fractions for small volumes containing photon-emitting radioactivity." ($1.50)

6 Includes pamphlet #9: "Radiation dose to humans from 'Se-Selenomethionine." ($3.00)

SPECIAL OFFER

All available MIRD pamphlets and supplements for only $25.00 plus $4.00 for shipping and handling.

MIRD Pamphlet and supplements may be ordered from: Book Order Department, Society of Nuclear Medicine, 475 Park Avenue South, New York, NY 10016. All orders must be prepaid or accompanied by a purchase order. Checks must be in U.S. funds only, please.

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Catalog Number NRP-427 March 1981

NEN New England Nuclear
Medical Diagnostics Division
601 Treble Cove Rd., North Billerica, MA 01862
Call Toll-Free: 800-225-1572/Telex 94-0996
(In Mass. and International 617-482-9595)

Canada: NEN Canada 2453 46th Avenue, Lachine, Que H8L 3C9
Tel: 514-636-4971
Europe: NEN Chemicals GmbH, D 6072 Düsseldorf, W. Germany, Postfach 401240 Tel: (06103) 85034 Order Entry: (06103) 81011

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Ann Arbor, Mi. 48106 London WIN 7RA
USA.

TECHNETIUM 99m GENERATOR

TECHNETIUM Tc 99m GENERATOR
FOR THE PRODUCTION OF SODIUM PERTECHNETATE Tc 99m

description

The CINTICHEM* TECHNETIU M Tc 99m GENERATOR provides a means of obtaining a sterile, pyrogen-free solution of Sodium Pertechnetate Tc 99m in isotonic saline from solution of the generator containing Molybdenum Mo 99. Hydrochloric acid and/or sodium hydroxide may have been used for pH adjustment. Over the life of the generator, an aliquot will contain a yield of 80% to 100% of the theoretical amount of Technetium Tc 99m available from the Molybdenum Mo 99 on the generator column.

clinical pharmacology

Following intravenous administration, the pertechnetate ion distributes in the body similarly to the iodide ion, but it is not organified when trapped in the thyroid gland. Sodium Pertechnetate Tc 99m tends to accumulate in intracranial lesions with exsanguination or an altered blood-brain barrier. It also concentrates in the thyroid gland, stomach and choroid plexus.

After intravascular administration, it remains in the circulatory system for sufficient time to permit blood pool, organ perfusion, and major vessel studies. It gradually equilibrates with the extracellular space. A fraction is promptly excreted via the kidneys.

indications and usage

Sodium Pertechnetate Tc 99m is used in ADULTS as an agent for: brain imaging including cerebral radionuclide angiography; thyroid imaging; salivary gland imaging; placenta localization; and blood pool imaging including radionuclide angiography.

Sodium Pertechnetate Tc 99m is used in CHILDREN as an agent for: brain imaging including cerebral radionuclide angiography; thyroid imaging; and blood pool imaging including radionuclide angiography.

contraindications

None known.

warnings

Radiation risks associated with the use of Sodium Pertechnetate Tc 99m are greater in children than in adults and, in general, the younger the child the greater the risk owing to greater absorbed radiation doses and longer life expectancy. These greater risks should be taken firmly into account in all benefit-risk assessments involving children.

This radiopharmaceutical preparation should not be administered to patients who are pregnant or nursing mothers unless the expected benefits to be gained outweigh the potential hazards.

Ideally, examinations using radiopharmaceuticals, especially those elective in nature, of a woman of childbearing capability should be performed during the first few (approximately 10) days following the onset of menses.

precautions

Sodium Pertechnetate Tc 99m, as well as other radiopharmaceuticals, must be handled with care and appropriate safety measures should be used to minimize external radiation exposure to clinical personnel. Also, care should be taken to minimize radiation exposure to patients consistent with proper patient management.

Pregnancy Category C. Animal reproductive studies have not been conducted with Sodium Pertechnetate Tc 99m. It is also not known whether Sodium Pertechnetate Tc 99m can cause fetal harm when administered to a pregnant woman or can affect reproductive capacity. Sodium Pertechnetate Tc 99m should be given to a pregnant woman only if clearly needed.

It is not known whether this drug is excreted in human milk. As a general rule, nursing should not be undertaken while a patient is on a drug since many drugs are excreted in human milk.

The generator should not be used after 16 days from the date and time of calibration.

At time of administration, the solution should be crystal clear.

adverse reactions

No adverse reactions have been reported with the use of this radiopharmaceutical.

dosage and administration

Sodium Pertechnetate Tc 99m is usually administered by intravascular injection, but can be given orally. The dosage employed varies with each diagnostic procedure.

The suggested intravenous dose range employed for various diagnostic indications are as follows:

IN AVERAGE ADULT (70kg) PATIENTS:

Brain Imaging: 10 to 20 millicuries
Thyroid Gland Imaging: 1 to 10 millicuries
Salivary Gland Imaging: 1 to 5 millicuries
Placenta Localization: 1 to 3 millicuries
Blood Pool Imaging: 10 to 30 millicuries

IN PEDIATRIC PATIENTS:

brain imaging: 140-280 microroies/kg body weight. A minimum dose of 3-5 millicuries should be employed if cerebral radionuclide angiography is performed as part of the brain imaging procedure.

thyroid gland imaging: 60-80 microroies/kg body weight.

blood pool imaging: 140-280 microroies/kg body weight.

A minimum dose of 3-5 millicuries should be employed if radionuclide angiography is performed as part of the blood pool imaging procedure.

NOTE: Up to 1 gram of pharmaceutical grade potassium perchlorate in a suitable base or capsule may be given orally prior to administration of Sodium Pertechnetate Tc 99m for brain imaging. When Sodium Pertechnetate Tc 99m is used in children for brain or blood pool imaging, administration of potassium perchlorate is especially important to minimize the absorbed radiation dose to the thyroid gland.

The patient dose should be measured by a suitable radioactivity calibration system immediately prior to administration.

Radiopharmaceuticals should be used only by physicians who are qualified by training and experience in the safe use and handling of radionuclides and whose experience and training have been approved by the appropriate government agency authorized to license the use of radionuclides.

Parenteral drug products should be inspected visually for particulate matter and discoloration prior to administration whenever the solution and container permit.

how supplied

Sodium Pertechnetate Tc 99m is supplied as a Molybdenum Mo 99/Tc 99m generator in sizes from 830 millicuries up to 15,600 millicuries (in approximately 830 millicurie increments) of Molybdenum Mo 99 as of noon of the day of calibration. The TECHNETIUM Tc 99m GENERATOR consists of:

1) sterile generator,
2) Sodium Chloride Injection source,
3) 10 cc sterile evacuated vials,
4) sterile needles,
5) elution vial shield,
6) finished drug labels. Eulation vials in 5 cc and 30 cc sizes are available upon request.

*Initial order only.

CINTICHEM, INC. P.O. BOX 861, TUXEDO, NEW YORK 10987

CINTICHEM® TECHNOITEM Tc 99m GENERATORS are jointly manufactured by Union Carbide Corporation and CINTICHEM INC., a wholly owned subsidiary of Mediphysics, Inc.
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The speed to nip dot blooms in the bud.

Increasing the brightness of the image on your nuclear medicine monitor can result in undesirable dot “blooming” which diminishes the diagnostic value of the image. The new Kodak ortho M film has the high speed necessary to reduce the need for increasing brightness levels, thus minimizing dot blooming. Kodak ortho M film is a single-emulsion film with high contrast and halation control which delivers crisp, sharp dots and clearly defined edges of dot concentration patterns. The film’s orthochromatic sensitivity matches the phosphor emissions of blue and green cathode-ray tubes. Could you ask for more? Perhaps processing in 90 seconds? New ortho M film offers that, too.

Ask your Kodak Technical Sales Representative for a demonstration, or write Eastman Kodak Company, Department 740-B, Rochester, New York 14650.

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Techneplex
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from Squibb

For kidney imaging, brain imaging, to assess renal perfusion, and to estimate glomerular filtration rate

Does not accumulate in choroid plexus
Rapid clearance rate of DTPA allows:
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Easy two-step procedure

Kit contains 10 multidose reaction vials.

For further information, call Technical Customer Service, 609-921-4100.

See next page for brief summary.
TECHNEPLEX®
Technetium Tc 99m Pentetate Kit
DIAGNOSTIC—FOR INTRAVENOUS USE

DESCRIPTION: The kit consists of 10 multidose reaction vials, each containing a sterile, pyrogen-free 1:3 pyrophosphate mixture of 10 mg technetium chloride trisodium, 0.50 mg sodium stannous chloride, and nitrogen atmosphere. When sterile, pyrogen-free sodium pentetate Tc 99m in isotonic saline is added to the vial, a chelated technetium Tc 99m pentetate is formed. The product as supplied is sterile and pyrogen-free.

INDICATIONS AND USAGE: Technetium Tc 99m pentetate may be used to perform kidney imaging, brain imaging, to assess renal perfusion, and to estimate glomerular filtration rate.

CONTRAINDICATIONS: None known.

WARNINGS: None known.

PRECAUTIONS: Contents of the vial are intended only for use in the preparation of technetium Tc 99m pentetate and are not to be administered directly to the patient except after the addition of sodium pentetate Tc 99m. The contents of the kit are not radioactive. However, after the sodium pentetate Tc 99m is added, adequate shielding of the final preparation must be maintained. Technetium Tc 99m pentetate as well as other radioactive drugs, must be handled with care, and appropriate safety measures should be used to minimize radiation exposure to the patients consistent with proper patient management and to insure minimum radiation exposure to occupational workers.

To minimize radiation dose to the bladder, the patients should be encouraged to drink fluids and to void immediately before the examination, and for the next 4 to 6 hours thereafter, as often as possible.

Technetium Tc 99m pentetate should be formulated within 6 hours prior to clinical use for brain and kidney imaging, and for assessing renal perfusion. For estimating glomerular filtration rates Tc 99m pentetate should be used within 1 hour after formulation.

The components of the Technetium Tc 99m Pentetate Kit (Chelate) are supplied sterile and non-pyrogenic. Aspic procedures normally employed in making additions and withdrawals from sterile, non-pyrogenic containers should be used during addition of pentetate solution and the withdrawal of doses for patient administration.

The labeling reactions involved in preparing the agent depend on maintaining the tin in the reduced state. Any oxidant present in the sodium pentetate Tc 99m supply may thus adversely affect the quality of the prepared agent. Hence, sodium pentetate Tc 99m containing oxidants, or other additives, should not be employed without first demonstrating that it is without adverse effect on the properties of the resulting agent.

Carcinogenesis, Mutagenesis, Impairment of Fertility: No long-term animal studies have been performed to evaluate carcinogenic potential or whether technetium Tc 99m pentetate affects fertility in males or females.

Pregnancy Category C: Animal reproductive studies have not been conducted with technetium Tc 99m pentetate. It is also not known whether technetium Tc 99m pentetate can cause fetal harm or affect reproduction capacity when administered to a pregnant woman. Technetium Tc 99m pentetate should be given to a pregnant woman only if clearly needed. Ideally, examinations using radiopharmaceuticals, especially those elective in nature, of a woman of childbearing capability should be performed during the first few (approx. 10) days following the onset of menses.

Nursing Mothers: Since Tc 99m is excreted in human milk during lactation, formula feedings should be substituted for breast feedings.

Pediatric Use: Safety and effectiveness in children below the age of 18 have not yet been established.

Radiopharmaceuticals should be used only by physicians who are qualified by training and experience in the sole use and handling of radionuclides and whose experience and training have been approved by the appropriate government agency authorized to license the use of radiocides.

ADVERSE REACTIONS: None specifically attributable to the use of technetium Tc 99m pentetate have been reported.

Drug Abuse and Dependence: There is no report of any drug abuse or dependence with this diagnostic agent.

Overdosage: Increased radiation exposure would be expected if an overdosage of the diagnostic agent occurred.

For complete prescribing information, consult package insert.

HOW SUPPLIED: Technetium (Technetium Tc 99m Pentetate Kit) is supplied as a sterile, pyrogen-free kit containing 10 sterile multidose reaction vials and 20 pressure-sensitive labels.

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NUCLEAR MEDICINE REVIEW SYLLABUS
Peter T. Kirchner, M.D., Editor

The rapid growth of clinical nuclear medicine poses a formidable challenge to the physician who wants to maintain a high level of competence in all areas of nuclear medicine. To help the physician meet this challenge, the Society of Nuclear Medicine has prepared the NUCLEAR MEDICINE REVIEW SYLLABUS, a comprehensive review of the major scientific and clinical advances that have occurred in the Society since the early 1970s.

The 619-page NUCLEAR MEDICINE REVIEW SYLLABUS offers a detailed overview of 12 major topical areas in nuclear medicine. With each chapter there is a clear, timely review of the subject and a substantial bibliography locating additional information. A 32-page index makes all of the volume's data instantly accessible.

The NUCLEAR MEDICINE REVIEW SYLLABUS has chapters on:
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- Endocrinology

The highly readable guide to current practice was prepared by more than 50 recognized authorities, with each chapter written by acknowledged experts in the field.

The NUCLEAR MEDICINE REVIEW SYLLABUS will prove valuable to the practicing physician who wants to keep in touch with current clinical practice in all aspects of nuclear medicine. Those seeking certification will find the SYLLABUS extremely useful as a tool for final review.

Copies are available now at $30.00 each (plus $2.50 per copy for postage and handling). All orders must be prepaid or accompanied by a purchase order. Checks must be in U.S. funds only. Order from: Book Order Dept., Society of Nuclear Medicine, 475 Park Avenue South, New York, NY 10016.

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SNM BOOKS . . .

SINGLE PHOTON EMISSION COMPUTED TOMOGRAPHY and Other Selected Computer Topics
Ronald R. Price, David L. Gilday, and Barbara Y. Croft, Eds. This volume, which was published in 1980, includes an overview of single photon emission computed tomography and numerous papers that describe and evaluate specific systems and techniques. Papers cover such topics as Anger cameras; seven-pinhole and slant-hole collimators; brain, cardiac, and gated blood-pool studies; and the BICLET and SPECT systems. (SNM members: $18.00 + $2.50 postage and handling; list price $27.00.)

NUCLEAR MEDICINE REVIEW SYLLABUS
Peter T. Kirchner, Ed. This well-indexed volume is a comprehensive review of the major scientific and clinical advances that have occurred in nuclear medicine since the early 1970s. The chapters include Radiopharmaceuticals, Instrumentation, Radiation Effects and Radiation Protection, Cardiovascular, Central Nervous System, Endocrinology, Gastroenterology, Genito-Urinary System, Hematology-Oncology, Pulmonary, Radioassay, and the Skeletal System. ($30.00 + $2.50 postage and handling.) The second printing of this publication is now on sale. An Errata page for the first printing may be obtained by sending a stamped, self-addressed envelope to the national office.

RADIOPHARMACEUTICALS II: Proceedings of the 2nd International Symposium on Radiopharmaceuticals
Vincent J. Sodd, David R. Allen, Dennis R. Hoogland, and Rodney D. Ice, Eds. This 809-page volume is a complete compilation of papers from the 1979 International Symposium, including a keynote address by former AEC Chairperson Dixy Lee Ray and a panel discussion entitled "International Regulatory Affairs Relating to Radiopharmaceuticals." Chapters cover such topics as quality control, organic and inorganic radiopharmaceuticals, functional imaging, RIA, pharmacokinetics, and various body systems. ($40.00 + $2.50 postage and handling. Special Offer! Buy Radiopharmaceuticals II for $40.00 and get Radiopharmaceuticals for only $10.00 + $2.50 each postage and handling.) $7.50 additional for all foreign orders.

Other books available from the Society are: The Heritage of Nuclear Medicine ($14.50); Nuclear Cardiology: Selected Computer Aspects ($12.50); Nuclear Medicine in Clinical Pediatrics ($22.50); Semiconductor Detectors in the Future of Nuclear Medicine ($7.50); Tomographic Imaging in Nuclear Medicine ($12.00); and the Nuclear Medicine Science Syllabus ($30.00).

For ordering and additional information please contact:
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MPI Thallous Chloride TI 201 Injection
Thallous Chloride TI 201
Diagnostic—For Intravenous Use
For Imaging Myocardial Perfusion

DESCRIPTION MPI Thallous Chloride TI 201, Thallous Chloride TI 201, is supplied in isotonic solution as a sterile, nonpyrogenic diagnostic radiopharmaceutical for intravenous administration. Each ml contains 1 mCi Thallous Chloride TI 201 at calibration time made isotonic with 8 mg sodium chloride and preserved with 0.9% (v/v) benzyl alcohol. The pH is adjusted to between 5.7-7.0 with hydrochloric acid and/or sodium hydroxide. Thallous TI 201 is cyclotron produced. It is essentially carrier-free and contains no more than 1% Thallous TI 200 and no more than 1% Thallous TI 202.

CONTRAINDICATIONS None known

WARNINGS When studying patients suspected or known to have myocardial infarction or ischemia, care should be taken to assure continuous clinical monitoring and treatment in accordance with safe, accepted procedure. Exercise stress testing should be performed only under the supervision of a qualified physician and in a laboratory equipped with appropriate resuscitation and support apparatus.

Pregnancy Category C

Adequate reproduction studies have not been performed in animals to determine whether this drug affects fertility in males or females, has teratogenic potential, or has other adverse effects on the fetus. Thallous Chloride TI 201 should not be used in pregnant women except when benefits clearly outweigh the potential risks.

PRECAUTIONS Ideally, examinations using radiopharmaceutical drug products—especially those elective in nature—of women of childbearing capability should be performed during the first ten days following the onset of menses.

Nursing Mothers
It is not known whether this drug is excreted in human milk. Because many drugs are excreted in human milk as a general rule nursing should not be undertaken when a patient is administered radiopharmaceutical material.

Safety and effectiveness in children have not been established.

Carcinogenesis

No long-term animal studies have been performed to evaluate carcinogenic potential. Data are not available concerning the effect on the quality of Thallium TI 201 scans of marked alterations in blood glucose, insulin or pH (such as is found in diabetes mellitus). Attention is directed to the fact that thallium is a potassium analog, and since the transport of potassium is affected by these factors, the possibility exists that the thallium may likewise be affected.

As in the use of any radioactive material, care should be taken to minimize radiation exposure to the patient consistent with proper management and to insure minimum radiation exposure to occupational workers.

Radiopharmaceuticals should be used only by physicians who are qualified by training and experience in the safe use and handling of radionuclides and whose experience and training have been approved by the appropriate governmental agency authorized to license the use of radionuclides.

This drug should not be used six (6) days after the calibration date.

ADVERSE REACTIONS Adverse reactions related to use of this agent have not been reported to date.

HOW SUPPLIED MPI Thallous Chloride TI 201, Thallous Chloride TI 201 is available in 2.0 mCi vials.

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Now there’s another innovation in our CRC-30 radioisotope calibrator. Capintec’s FUTURE-DOSE adds a new dimension to calibration technology. It lets you supply precalibrated doses for specific injection times. Let’s you plan injection schedules a week in advance or calculate dose requirements for seven radioisotopes scheduled up to six months in advance. Naturally, a printed record is made available for all these calculations. With the addition of this new Capintec technology, you have a complete picture of every phase of dose calibration. What’s more, with a CRC-30 calibrator or a CRC-U upgrade you can enjoy the most advanced automated assay capabilities — dose computation, isotope inventory control, radiochemical purity analysis. You’ll have complete permanent printed records including 99Mo assay records and injection site records. In addition, you’ll be able to meet NRC or state requirements for accountability. Important in keeping your department operating as controls get tighter.

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Now with the newly developed Calicheck™ dose calibrator activity linearity test kit you can meet N.R.C. Regulatory Guide 10.8, appendix D, Section 2E or your state’s equivalent requirement in just 4 minutes — not days. You can complete the test in one short sitting and check for linearity virtually at a glance. Plus you eliminate the frustration of having to start the test all over simply because you forgot to take a reading on time. *Patent pending

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Your use of a Calicheck kit eliminates the need to fractionate eluants or decay the elution for several days while periodically collecting data to determine linearity. Time of potential exposure to radiation is drastically reduced, thereby maintaining exposures ALARA.

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*May require approval of the agency issuing the radioactive materials license.
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The Cyclotron Corporation’s PCT 4600

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PCT 4600 systems are currently being built for a number of leading research institutions. Although the specific programs of research to be carried out at these institutions vary in focus, the PCT 4600 system may be used to quantitate the concentration of any suitably labeled compound in an area of study. This research capability may be extremely valuable in the measurement of flow, metabolism, and other biological processes in tissue. Research studies using The Cyclotron Corporation’s PCT 4600 should help define the therapeutic efficacy of anticonvulsants in the brain.

NEW RESEARCH POSSIBLE

For the first time it may be possible to map in human subjects the response of specific brain receptors and transmitters to drugs with specified binding characteris-

ics. This type of research may clarify the action of psychotrope agents on conditions such as schizophrenia and Parkinson’s Disease. Studies of the permeability of tissues and research into the physiology of psychoses may now be possible. The PCT 4600 system provides the research tool necessary to view pathological conditions that have been difficult or impossible to obtain through other means. It moves diagnostic research to a new level of capability.

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The PCT 4600 system is one of a family of high performance, research grade instruments designed for maximum effective countrate, optimum sensitivity, and rejection of unwanted background due to scatter and random events.

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A RESPECTED LEADER IN NUCLEAR MEDICINE

The same technical expertise and commitment to developing state-of-the-art equipment that gained The Cyclotron Corporation its leading position in the manufacturing of cyclotrons and neutron therapy systems can be found in the design of the PCT 4600. It is a valuable and powerful diagnostic research tool of unparalleled capability. In addition to the PCT 4600, the Cyclotron Corporation also manufactures a family of whole body, multi-slice PCT systems. Also available is a complete line of compact medical cyclotrons and accessories, including state-of-the-art targety and processing systems for the production of the short-lived positron emitting isotopes used in positron imaging. We invite the opportunity to discuss your research interests and to configure a complete system to meet those specific requirements.
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MEDICINE

TECHNOLOGY

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SECTION

This section in the Journal of Nuclear Medicine contains "Positions Open," "Positions Wanted," "For Sale," and "Equipment Wanted" listings. Nondisplay "Positions Wanted" ads by members of the Society are billed at 70¢ per word for each insertion with no minimum rate. Nondisplay "Positions Wanted" ads by nonmembers and all nondisplay "Positions Open," "For Sale" and "Equipment Wanted" ads by members and nonmembers are charged at 90¢ per word. Display advertisements are accepted at $150 for ¼ page, $205 for ½ page, $325 for ¾ page, and $560 for a full page.

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Requests for further information should be directed to: John A. Burdine, M.D., Chief, or Paul H. Murphy, Ph.D., Residency and Fellowship Coordinator, Nuclear Medicine Section, Department of Radiology, Baylor College of Medicine, Houston, TX 77030.
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