ANNOUNCING

MPI Indium DTPA In 111
(Pentetate Indium Disodium In 111)
In Cisternography

Cisternography presents the dynamics of CSF flow

When you need to know *function*—
cisternography is useful in the evaluation of:

- Patients who may need ventricular shunts
- Shunt patency and/or site of blockage
- Patients with symptoms of "normal pressure" hydrocephalus
- Patients with symptoms of "communicating" hydrocephalus
- CSF rhinorrhea patients

CLINICAL CRITERIA

"An ideal radiopharmaceutical for cisternography would satisfy the following criteria: (I) physiologically governed by CSF flow, (II) adequate half-life for desirable period of study, (III) photons suitable for scanning, (IV) low radiation dose, (V) least probable chemical toxicity, and (VI) controlled pharmaceutical quality. Chelated ^{111}In satisfies all these conditions."[1]

COMPARISON OF TWO RADIOPHARMACEUTICALS USED IN EVALUATION OF CEREBROSPINAL FLUID PATHWAYS[2]

	^{169}Yb DTPA	^{111}In DTPA
Physical Half-Life	32 days	2.8 days
Biological Half-Life	12 hours	10 hours
Useful Photons (energy MeV)	0.177, 0.198	0.173, 0.247
Useful Photons (% disintegration)	0.57	1.85
Whole Body Dose	0.069/500 μCi	0.039/500 μCi
Spinal Cord Surface Dose (rads)	8.0/500 μCi*	1.9/500 μCi*

*Dose to spinal cord and brain surface

[1] Chelated ^{111}In: An ideal radiopharmaceutical for cisternography, F. Hosain, D. Phil., and P. Som, D.V.M.M.S. British Journal of Radiology, 45:677-679, Sept. 1972.

[2] Preparation, Physiology and Dosimetry of ^{111}In Labeled Radiopharmaceuticals for Cisternography, David Goodwin, M.D., Chung Hun Song, B.S., Roland Finston, Ph.D. and Philip Matin, M.D., Radiology, 109:91-98, July 1973.

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FOR COMPLETE PRESCRIBING INFORMATION PLEASE CONSULT PACKAGE INSERT, A SUMMARY OF WHICH FOLLOWS:

MPI Indium DTPA In 111

(Pentetate Indium Disodium In 111)

DESCRIPTION: MPI Indium DTPA In 111 is a diagnostic drug for intrathecal use. It is available as a sterile, apyrogenic, isotonic, aqueous solution, buffered to pH 7 to 8. At calibration time each milliliter contains 1 millicurie of Pentetate Indium Disodium In 111 (no-carrier-added), 20 to 50 micrograms of pentetic acid, and sodium bicarbonate for pH adjustment. *The drug is to be discarded after single use.* Radionuclidic purity at calibration time is at least 99.0% with less than 0.1% Indium In 114m and 0.1% Zinc Zn 65. The concentration of each radionuclidic contaminant changes with time. Graph 1 shows maximum concentration of each radionuclidic impurity as a function of time.

INDICATIONS AND USAGE: Pentetate Indium Disodium In 111 is recommended for use in radionuclide cisternography.

CONTRAINDICATIONS: None known.

WARNINGS: The contents of the vial are radioactive. Adequate shielding of the preparation must be maintained at all times.

Since the drug is excreted by the kidneys, caution should be exercised in patients with severely impaired renal function.

PRECAUTIONS:
Pentetate Indium Disodium In 111, as well as other radioactive drugs, must be handled with care and appropriate safety measures should be used to minimize external radiation exposure to clinical personnel, and to minimize radiation exposure to the patients consistent with proper patient management.

Do not use after the expiration time and date (7 days after calibration time) stated on the label.

Discard vial after a single use. Do not use if contents are turbid.

Carcinogenesis, Mutagenesis, Impairment of Fertility

No long-term animal studies have been performed to evaluate carcinogenic potential, or whether Pentetate Indium Disodium In 111 affects fertility in males or females.

Pregnancy Category C

Animal reproductive studies have not been conducted with MPI Indium DTPA In 111. It is also not known whether Pentetate Indium Disodium In 111 can cause fetal harm when administered to a pregnant woman or can affect reproductive capacity. Pentetate Indium Disodium In 111 should be given to a pregnant woman only if clearly needed.

PRECAUTIONS: 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.

Nursing Mothers

It is not known whether this drug is excreted in human milk. Because many drugs are excreted in human milk, caution should be exercised when Pentetate Indium Disodium In 111 is administered to a nursing mother.

Pediatric Use

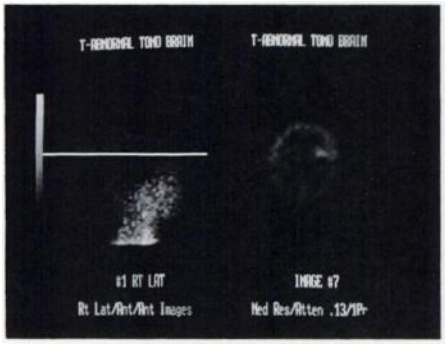
Safety and effectiveness in children have not been established.

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.

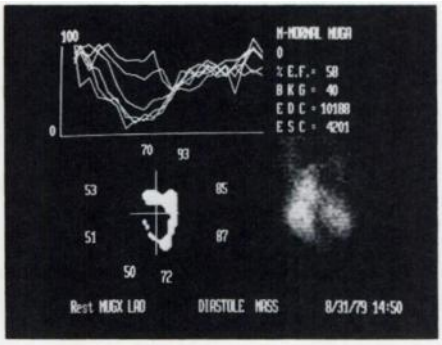
ADVERSE REACTIONS: Aseptic meningitis and pyrogenic reactions have been rarely (less than 0.4%) observed following cisternography with Pentetate Indium Disodium In 111.

HOW SUPPLIED: Pentetate Indium Disodium In 111 (no-carrier-added) is supplied in single dose glass vials, each containing 1.5 ml of solution with a concentration of 1 millicurie per ml and a total activity of 1.5 millicurie per vial at calibration time.

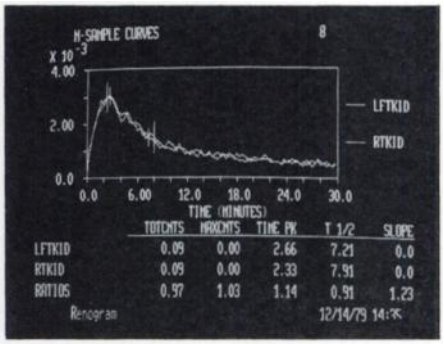
At your fingertips are these results.



These results from Emission Computed Tomography studies.



These results from Gated Blood Pool studies.



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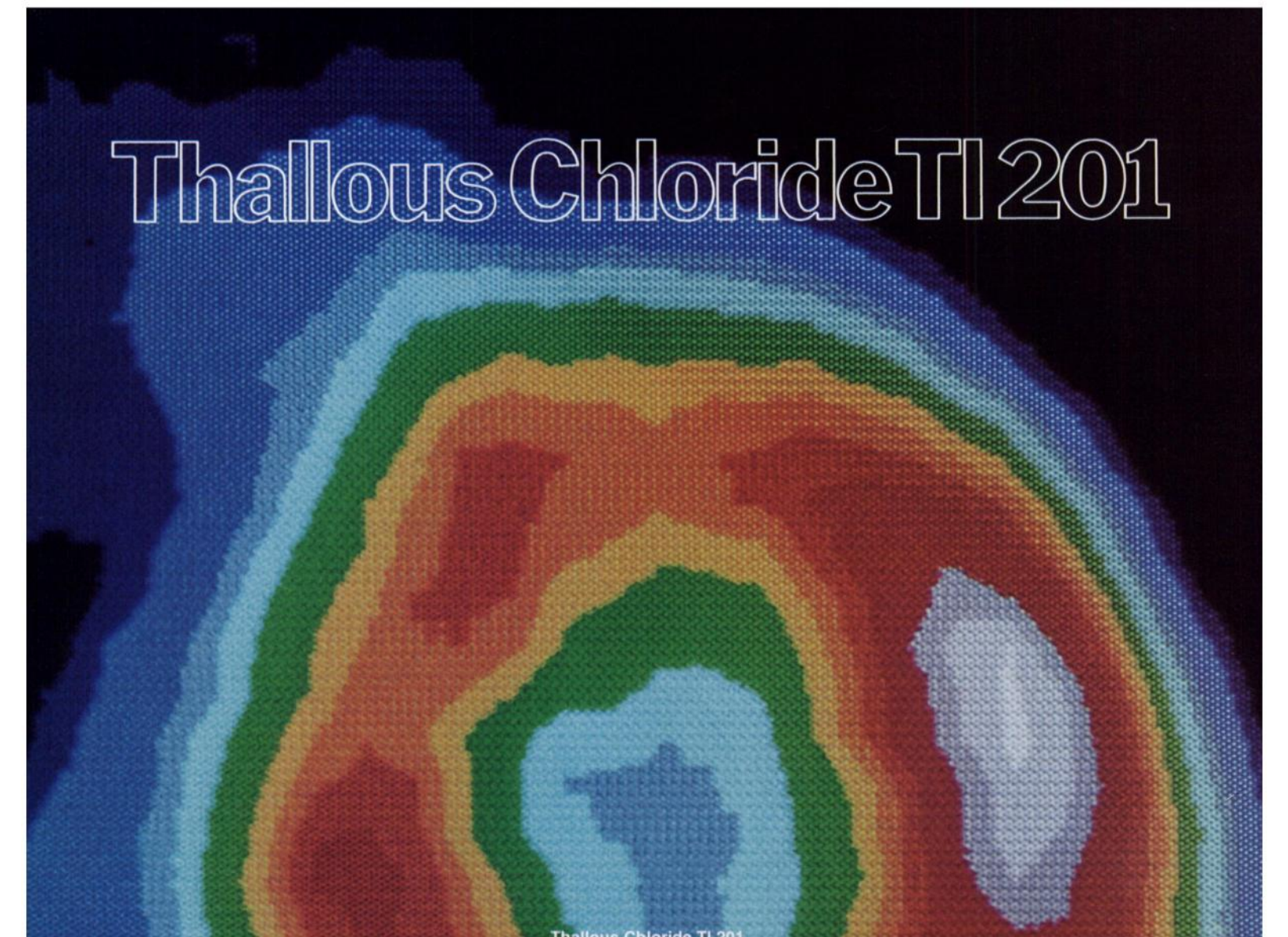
Thallous Chloride Tl 201



Thallous Chloride Tl 201
For complete prescribing information consult package insert, a brief summary of which follows:

DESCRIPTION: Thallous Chloride Tl 201 is supplied in isotonic solution as a sterile, nonpyrogenic diagnostic radiopharmaceutical for intravenous administration. Each unit dose contains 1 milliliter and each milliliter contains 2 millicuries of Thallous Chloride Tl 201 at calibration time. pH adjusted to 5.0–8.0 with hydrochloric acid and or sodium hydroxide. Contains no bacteriostatic preservative. Thallium Tl 201 is cyclotron produced and is essentially carrier-free. Radionuclidic purity at calibration time is at least 98.0% with less than 1.0% Thallium Tl 200,1.0% Thallium 202 and 0.2% Lead Pb 203. The concentration of each radionuclidic contaminant changes with time.

INDICATION AND USAGE: Thallous Chloride Tl 201 may be used in cardiac imaging to define the extent of myocardial infarction.

It may also be useful in conjunction with exercise stress testing as an adjunct in the diagnosis of ischemic heart disease (atherosclerotic coronary artery disease).

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.

PRECAUTIONS

General

Do not use after the expiration time and date (4 days after calibration time) stated on the label.

Discard vial after single use. Do not use if contents are turbid.

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

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

Thallous Chloride Tl 201 as well as other radioactive drugs must be handled with care, and appropriate safety measures should be used to minimize radiation exposure to clinical personnel. Also, care should be taken to minimize radiation exposure to the patient consistent with proper patient management.

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.

Carcinogenesis, Mutagenesis, Impairment of Fertility

No long-term animal studies have been performed to evaluate carcinogenic potential, mutagenicity potential, or whether Thallous Chloride Tl 201 affects fertility in males or females.

Pregnancy Category C

Animal reproduction studies have not been conducted with Thallous Chloride Tl 201. It is also not known whether Thallous Chloride Tl 201 can cause fetal harm when administered to a pregnant woman or can affect reproduction capacity. Thallous Chloride Tl 201 should be given to a pregnant woman only if clearly needed.

Nursing Mothers

It is not known whether this drug is excreted in human milk. Because many drugs are excreted in human milk, caution should be exercised when Thallous Chloride Tl 201 is administered to a nursing woman.

Pediatric Use

Safety and effectiveness in children have not been established.

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

HOW SUPPLIED: Thallous Chloride Tl 201 is supplied as a sterile, nonpyrogenic, isotonic solution in unit dose vials containing 1 milliliter. Each milliliter contains 2 millicuries of Thallous Chloride Tl 201 at calibration time. Contains no bacteriostatic preservative.

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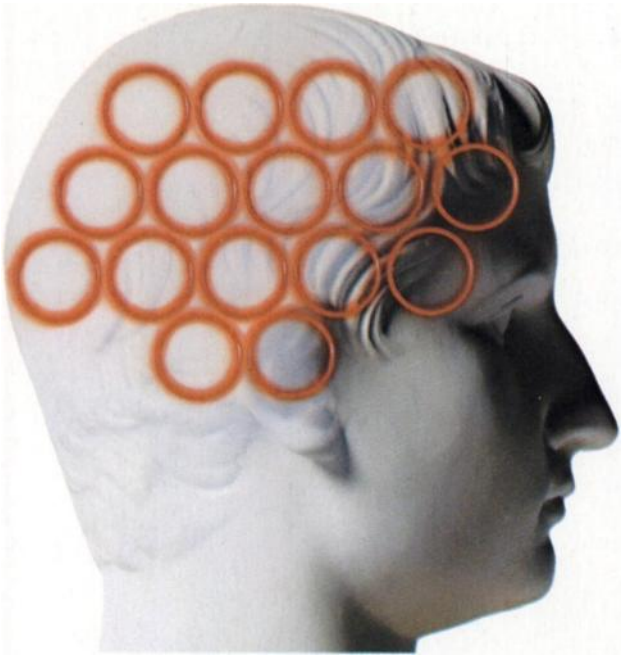
The Novo Cerebrograph™: The State of the Art

From the world leader...A multidetector system for measurement of regional Cerebral Blood Flow by ^{133}Xenon clearance



Broad Clinical Applications

The Novo Cerebrograph quantifies data on various functional and hemodynamic changes within the brain through measurement of regional Cerebral Blood Flow (rCBF). This multidetector system yields results frequently unobtainable by other methods. The rCBF technique is used to study a broad range of pathological conditions, including cerebrovascular disease, head trauma, and dementia states. It is also used in neuropsychology to quantify changes in cortical activation during higher mental functions.

☐ **Inhalation Method.** Especially accurate for fast (gray matter) flow. Allows simultaneous bilateral measurement. Noninvasive, it can be performed repeatedly with virtually no risk and provides a high degree of correlation with overall IA results.

☐ **Intra-arterial Injection Method.** Offers higher spatial resolution and accurate measurement of slow (white matter) perfusion.

☐ **Intravenous Method.** An alternative when the inhalation method is not appropriate.

State of the Art

The Novo Cerebrograph is the finest system available for measurement of rCBF by ^{133}Xenon clearance. It includes a pushbutton microprocessor-controlled automated Xenon administration system with a Xenon trap, a data collection system with air detector and up to 32 brain detectors with exchangeable collimators. It offers a choice of on-line and off-line data calculation and presentation format. In addition to the Obrist calculation model, only Novo offers the Fourier and 6-Unknown alternative models, both developed by Novo research. Modular design facilitates easy system expansion.

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E.C.A.T.

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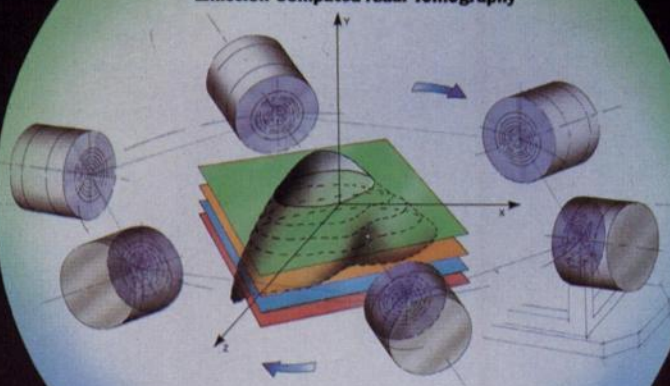
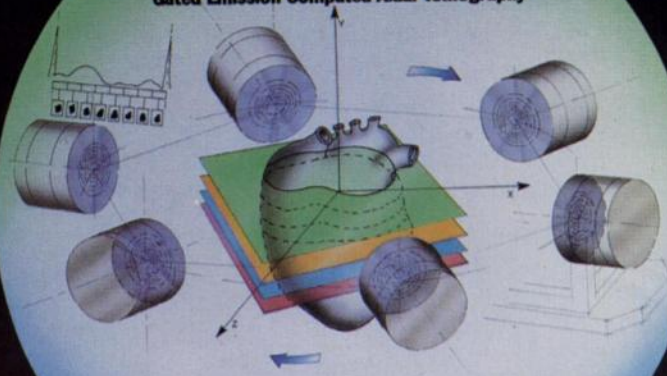


G.E.C.A.T.

Gated Emission Computed Axial Tomography



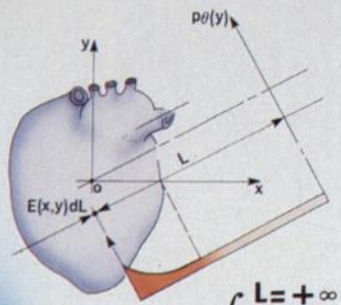
S.T.E.P.S.* TOMOGRAPHY

*Software Tomography Emission and Planar Scintigraphy

ARRAY PROCESSOR

NEW ANALYTIC METHOD OF ABSORPTION CORRECTION

Avoids Image Distorsion Allows Proper Quantification



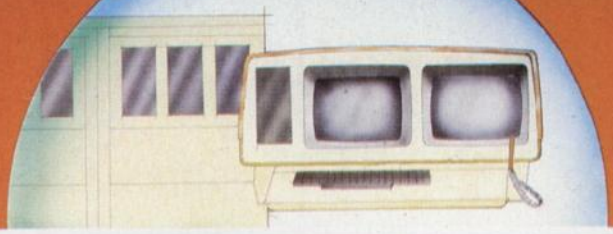
$$p_\theta(y) = \int_{L=-\infty}^{L=+\infty} E(x,y)\, e^{-\int_0^L \mu(x,y)\,dl}\, .dL$$

REAL TIME PROCESSING

Parametric Images Creation During Aquisition

GATED ACQUISITION	PHASE HISTOGRAMME
PHASE IMAGE	AMPLITUDE IMAGE

IMAC



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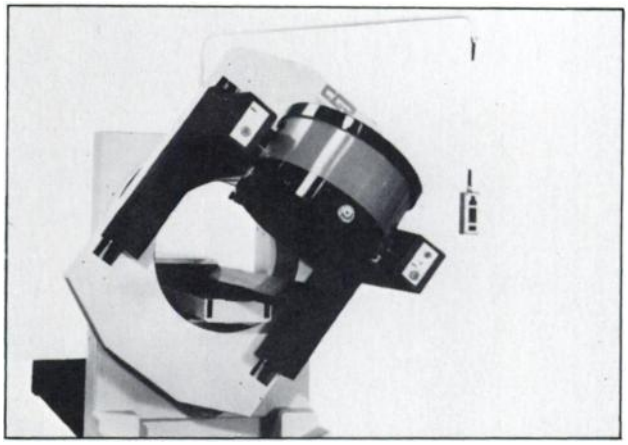
- a data acquisition and processing system: IMAC 7600 series.

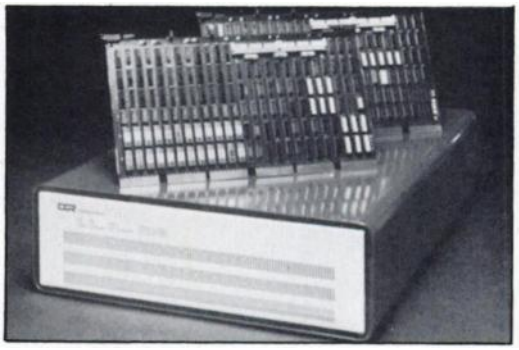


• FIP 3 : FAST IMAGE PROCESSOR

CGR introduces the break through in image processing : the array processor. The processing speed for complex tomographic algorithm is illustrated by the table below.

Processor	ECAT	GECAT
General purpose computer IMAC type(*)	18 sec./slice	3 hours for 16 slices
Array processor FIP 3(*)	3 sec./slice	6 minutes for 16 slices

(*) with CGR-APU



• STEPS : SOFTWARE - TOMOGRAPHY - EMISSION - PLANAR-SCINTIGRAPHY

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- Powerful absorption correction.
- Others...

• QUANTIFICATION

- STEPS offers possibilities of quantification of images.
- Volume regions of interets.
- Organes volumes.

• REAL TIME

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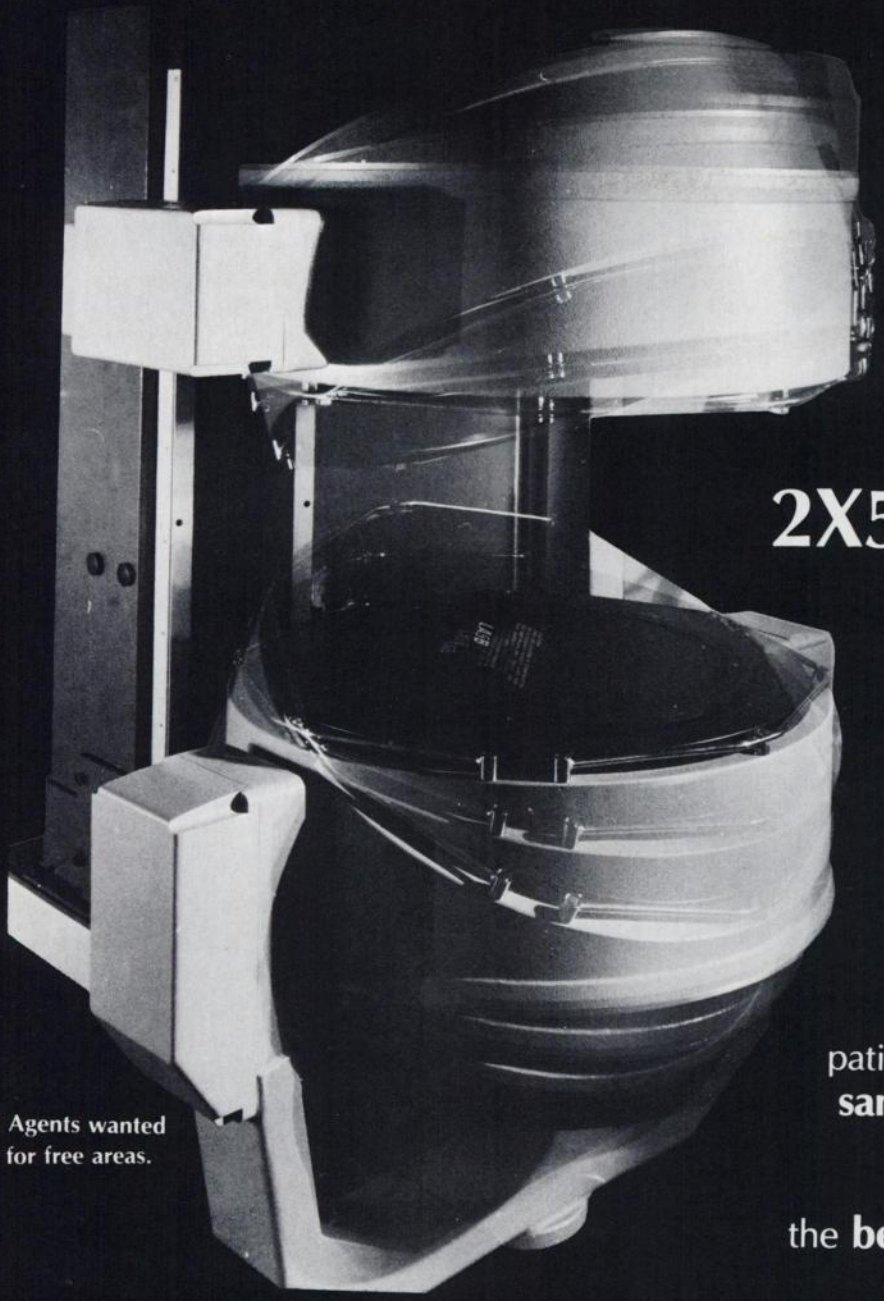

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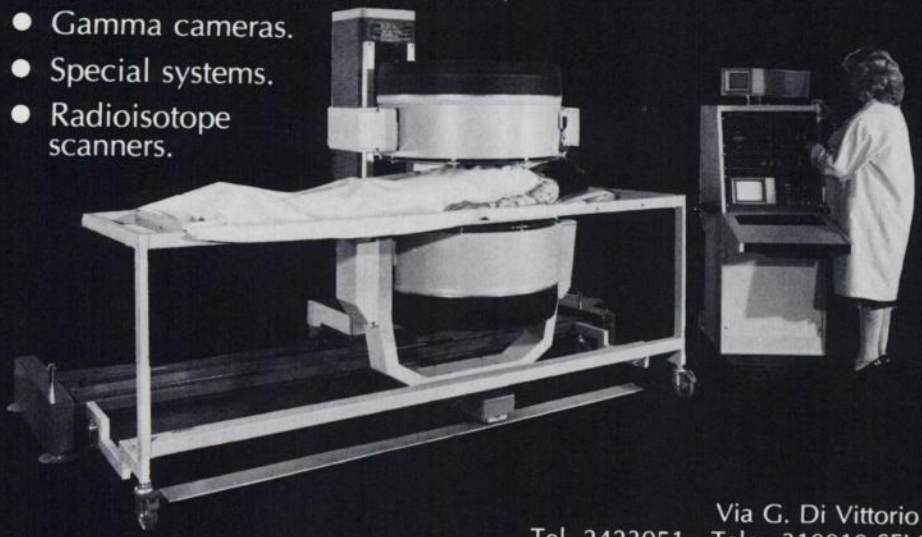

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Space/time quantitative thallium imaging

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Cedars-Sinai Medical Center
Adjunct Assistant Instructor of Radiology
University of California, Los Angeles
School of Medicine

Jamshid Maddahi, MD
Director, Nuclear Cardiac Stress Testing
Cedars-Sinai Medical Center
Assistant Professor of Medicine
University of California, Los Angeles
School of Medicine

At Cedars-Sinai Medical Center, we have developed a computerized technique for analyzing both the regional myocardial distribution and the washout of thallium-201. The technique combines some of the most useful aspects of previously described quantitative approaches to thallium imaging with certain unique display features. Our studies so far[1,2] have convinced us that the method yields objective, highly accurate results and, more important, provides valuable information that often cannot be obtained by visual inspection alone of thallium-201 scintigrams.

Space/time quantitation

The method we have developed for simultaneous spatial and temporal quantitation of myocardial thallium distribution uses a computer to

- perform interpolative background subtraction of the images. This approach to myocardial background subtraction—as first described by Goris and colleagues,[3] and modified by Watson et al[4]—appears to provide the most satisfactory approximation of the true background contribution.
- generate and display maximal circumferential profiles representing the myocardial distribution of thallium in the immediate-postexercise and 4-hour delayed images. Following the approach suggested by Burow et al[5] and Vogel and associates,[6] the profiles are constructed by the computer for the post-exercise images from the maximal-count-per-pixel values along 60 radii spaced at 6° intervals.
- generate and display washout circumferential profiles. These profiles are computer-constructed by subtracting, point for point, the 4-hour distribution profile from the initial postexercise profile, and then dividing by the initial profile. This yields a percent washout rate for each region around the myocardium.
- compare both the initial distribution profile and the percent washout profile with previously established normal profiles. Our normal profiles are drawn from a population of patients with less than a 1% likelihood of coronary disease on the basis of Bayesian analysis. This approach avoids the pitfalls inherent in defining as normals either patients with normal coronary arteriography (who, in fact, may have nonatherosclerotic ischemic disease) or "normal volunteers" (who may have occult coronary disease).

Operator interaction is confined to selecting the ventricular region of interest for background subtraction; visual determination of the center of the ventricle (and thus the maximum radius to which the computer will search); and locating the apex. Of these three operator-dependent steps, location of the apex is most critical. The computer automatically assigns the selected apex to the 90° position for comparison of the curves for washout calculation and for comparison of patient results with our normal values.

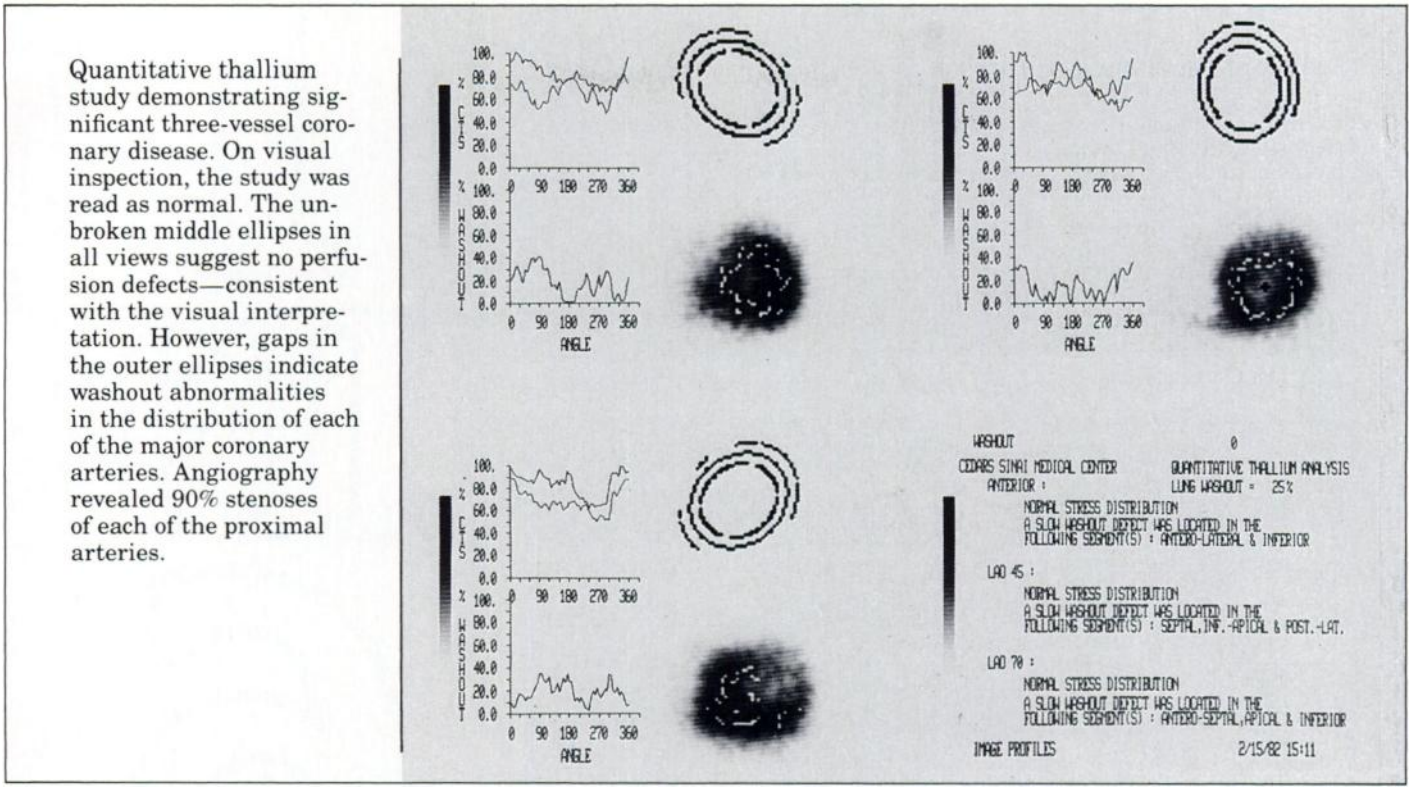
Displaying the data

Finally, the computer displays the quantitative data in a way that is very easy to comprehend and interpret. In addition to curves of initial distribution, 4-hour distribution and percent washout for the anterior, 45° LAO and 70° LAO views, the display shows a series of three concentric ellipses that permits immediate identification of segments with abnormal perfusion and/or washout.

The innermost of these three ellipses is a reference indicating the position of the myocardium. The middle ellipse corresponds to initial postexercise thallium distribution, and the outer ellipse to the percent washout for each region. Consecutive unbroken ellipses in each view suggest a normal study—with no regions of perfusion deficit or abnormal washout. Gaps in the middle ellipse represent abnormal regional perfusion; gaps in the outer ellipse represent abnormal regional washout. Regional abnormalities are determined by the computer by comparison with the lower limits of normal established for both perfusion and washout from our normal population.

Improved thallium imaging

We believe that our program overcomes some of the limitations associated with reliance on visual interpretation of thallium-201 images. The first of these, as most experienced observers would admit, is the *subjectivity* of visual analysis and the consequent variability of reported sensitivity and specificity values. In our recently reported study,[2] the sensitivity



Quantitative thallium study demonstrating significant three-vessel coronary disease. On visual inspection, the study was read as normal. The unbroken middle ellipses in all views suggest no perfusion defects—consistent with the visual interpretation. However, gaps in the outer ellipses indicate washout abnormalities in the distribution of each of the major coronary arteries. Angiography revealed 90% stenoses of each of the proximal arteries.

and specificity for detection of coronary artery disease were 93% and 90%, respectively—compared to 91% and 86% for visual interpretation. More important, interobserver agreement was 93% with the quantitative technique—higher than reported for visual interpretation, and suggesting that high sensitivity and specificity values could be routinely obtained in every nuclear cardiology laboratory.

Another reported problem is the relative insensitivity of visual analysis for identifying individual-vessel coronary lesions. Visual reading relies on the fact that the initial myocardial distribution of thallium reflects relative, not absolute, differences in uptake between ischemic and nonischemic regions. Thus, in a patient with multivessel disease, some areas with diminished perfusion may appear relatively normal compared with a more severely hypoperfused region. In the worst case, significant three-vessel disease with balanced reduction in blood flow may not be seen as abnormal by visual inspection of the images.

Our technique overcomes this limitation by quantifying regional thallium washout, thus permitting us to compare each region with itself over time rather than with other regions. Because ischemic regions demonstrate altered washout, we can thus identify areas supplied by stenosed vessels which might be undetected by visual region-to-region comparison alone.

How successful have we been in identifying individual diseased vessels? In our recent study,[2] we detected left anterior descending disease with a sensitivity of 80% (compared to 56% for visual inspection), left circumflex disease with a sensitivity of 63% (compared to 34%) and right coronary disease with a sensitivity of 94% (compared to 65%). In addition, our sensitivity for distinguishing coronary arteries with moderate disease was 70%, compared to 35% by visual inspection.

Clinical implications

The increased sensitivity and specificity of our program, and the enhanced interobserver agreement, have important implications not only for detection of coronary disease, but also for patient prognosis. We know from angiographic studies that the likelihood of major cardiac events may be related to the location and extent of a patient's coronary disease. The ability to identify individual-vessel disease—especially in patients with multiple-vessel involvement—that we have demonstrated with our quantitative approach to thallium imaging suggests that such potentially prognostic information can now be obtained noninvasively, with the attendant advantages of reduced patient inconvenience and lower cost.

References

1. Garcia E, Maddahi J, Berman D, et al: *J Nucl Med* 22:309, 1981.
2. Maddahi J, Garcia EV, Berman D, et al: *Circulation* 64:924, 1981.
3. Goris ML, Daspit SG, McLaughlin P, et al: *J Nucl Med* 17:744, 1976.
4. Watson DD, Beller GA, Berger BC, et al: *Software* 6:4, 1979.
5. Burow RD, Pond M, Schafer AW, et al: *J Nucl Med* 20:771, 1979.
6. Vogel RA, Kirch DL, LeFree MT, et al: *J Nucl Med* 19:730, 1978 (abst).

Please see following page for brief summary of prescribing information.

Thallous Chloride Tl 201

INDICATIONS AND USAGE: Thallous Chloride Tl 201 may be useful in myocardial perfusion imaging for the diagnosis and localization of myocardial infarction.

It may also be useful in conjunction with exercise stress testing as an adjunct in the diagnosis of ischemic heart disease (atherosclerotic coronary artery disease).

CONTRAINDICATIONS: None known.

WARNINGS: In studying patients in whom myocardial infarction or ischemia is known or suspected, 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.

PRECAUTIONS: Data are not available concerning the effect of marked alterations in blood glucose, insulin, or pH (such as is found in diabetes mellitus) on the quality of thallium Tl 201 scans. 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.

Thallous Chloride Tl 201, as all radioactive materials, must be handled with care and used with appropriate safety measures 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.

Carcinogenesis, Mutagenesis, Impairment of Fertility. No long-term animal studies have been performed to evaluate carcinogenic potential or whether Thallous Chloride Tl 201 affects fertility in males or females.

Pregnancy Category C. Animal reproductive studies have not been conducted with Thallous Chloride Tl 201. It is also not known whether Thallous Chloride Tl 201 can cause fetal harm when administered to a pregnant woman or can affect reproduction capacity. Thallous Chloride Tl 201 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 (approximately 10) days following the onset of menses.

Nursing Mothers. 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.

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

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.

The expiration date for Thallous Chloride Tl 201 is a maximum of five days post-calibration.

ADVERSE REACTIONS: A single adverse reaction to the administration of Thallous Chloride Tl 201 has been reported consisting of hypotension accompanied by pruritus and a diffuse rash which responded to antihistamines and steroids within one hour.

DOSAGE AND ADMINISTRATION: The recommended adult (70kg) dose of Thallous Chloride Tl 201 is 1–2mCi. Thallous Chloride Tl 201 is intended for intravenous administration only.

For patients undergoing resting thallium studies, imaging is optimally begun within 10-20 minutes after injection. Several investigators have reported improved myocardial-to-background ratios when patients are injected in the fasting state, in an upright posture, or after briefly ambulating.

Best results with thallium imaging performed in conjunction with exercise stress testing appear to be obtained if the thallium is administered when the patient reaches maximum stress and when the stress is continued for 30 seconds to one minute after injection. Imaging should begin within ten minutes post-injection since target-to-background ratio is optimum by that time. Several investigators have reported significant decreases in the target-to-background ratios of lesions attributable to transient ischemia by two hours after the completion of stress testing.

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

HOW SUPPLIED: Thallous Chloride Tl 201 for intravenous administration is supplied as a sterile, non-pyrogenic solution containing at calibration time, 1mCi/ml of Thallous Tl 201, 9mg/ml sodium chloride, and 9mg/ml of benzyl alcohol. The pH is adjusted to between 5-7 with hydrochloric acid and/or sodium hydroxide solution. Vials are available in the following quantities of radioactivity: 2.2, 4.4 and 6.6 millicuries of Thallous Tl 201.

The contents of the vial are radioactive. Adequate shielding and handling precautions must be maintained.

Catalog Number NRP-427 January 1982

New England Nuclear

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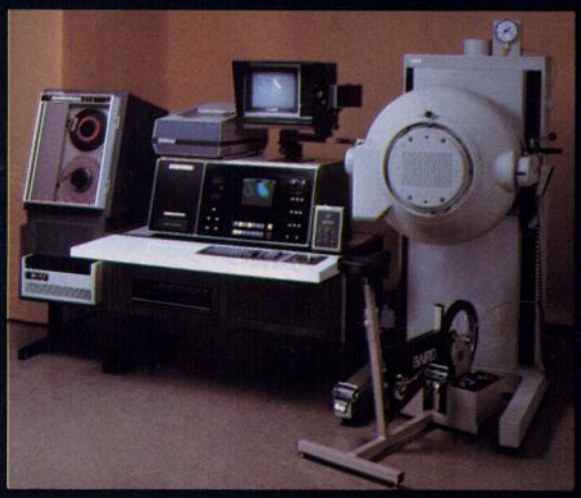
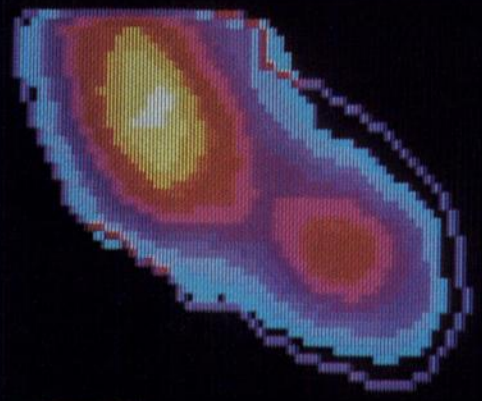
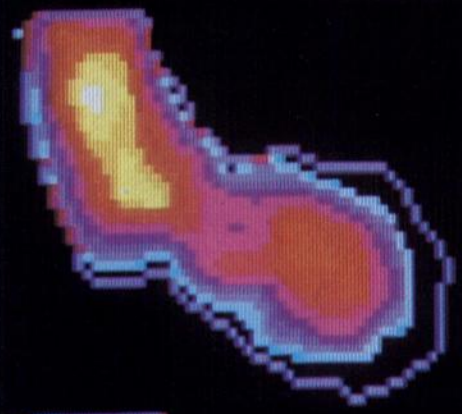
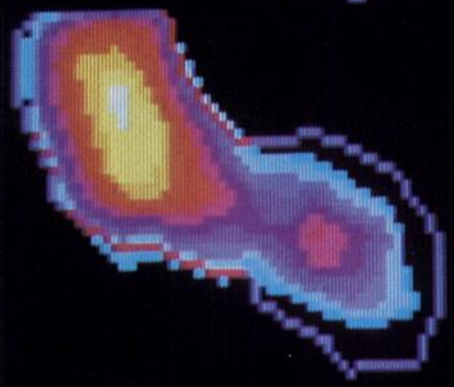




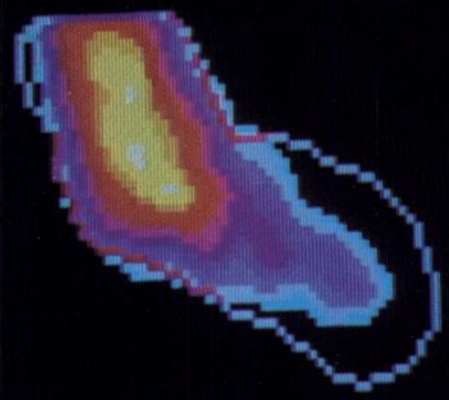
Before valve replacement surgery
EF = 22%
EDV = 253 ml



Immediately after surgery EF = 28%
EDV = 202 ml



6 months after surgery
EF = 45%
EDV = 135 ml



14 months after surgery EF = 65%
EDV = 160 ml

Examples of data from the Baird multicrystal gamma camera, System Seventy Seven. Aortic valve replacement. Exercise images of end systolic blood pool, with end diastolic perimeter superimposed. Provided by R. H. Jones, M.D., Associate Professor of Surgery, Duke University Medical Center.

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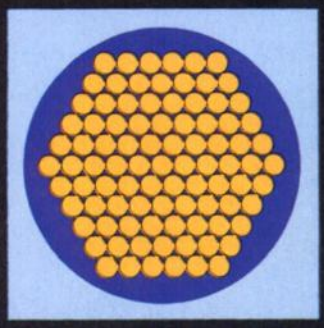

"Honeycomb" 91-tube detector array provides edge-to-edge LFOV resolution, detail and speed.

You've heard a lot of talk about improvements in linearity . . . or uniformity . . . or resolution.

But the gain in one parameter is usually at the expense of others. In short—a compromise.

With Raytheon nuclear systems, there is no such compromise. All factors are optimized in a superbly balanced, thoroughly proven system. One that gives you a closer, more detailed view of every patient.

A good head for numbers.

Performance is, ultimately, a function of the detector head. And in our Step One gamma camera, Raytheon's technological expertise comes to the fore.

In the largest useful field of view, Raytheon uses a "honeycomb" array of 91 two-inch tubes. And couples it to a specially-designed ½-inch receptor crystal and 8-stage dynode PMT. Thus, your Raytheon nuclear system can record the *full* spectrum of static and dynamic studies . . . with optimized efficiency.

What's more, the system is ultra sensitive, extremely fast. A 1-million count image takes about one minute. That's up to 50% faster than other systems. And represents a considerable time savings for you.

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The exclusive Raytheon detector head is interfaced with a specialized triple-pulse height detector. This advanced electronic system accepts peak pulses only and analyzes each one separately. So you can study up to three Ga^{67} photo peaks at one time . . . and know you've captured the most significant detail.

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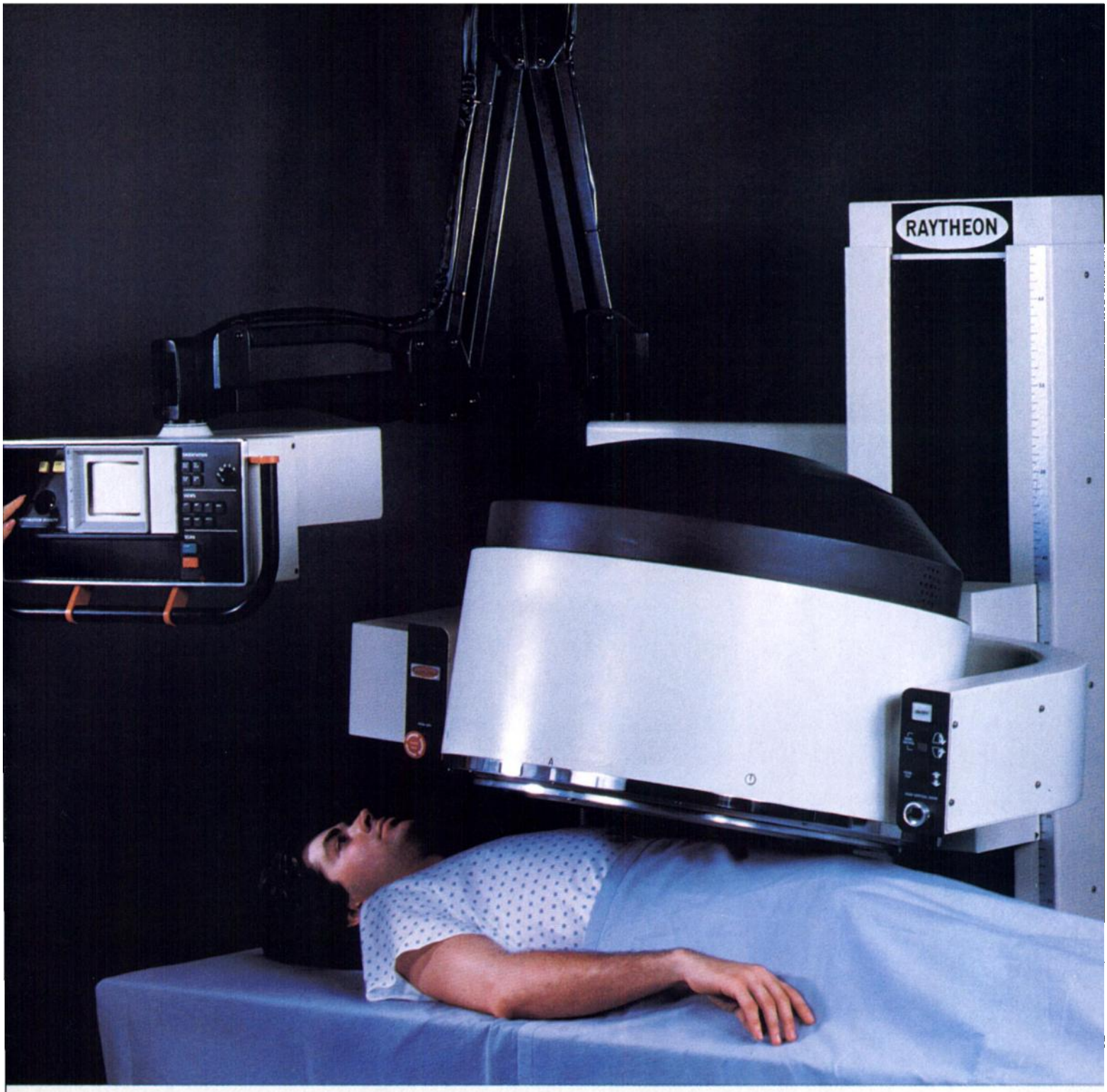
The basic Raytheon nuclear system includes the Step One gamma camera and Step Two digital image format-



ter with remote control, patient data entry and exceptional information density.

Raytheon also offers the unique Micro-Blend TBI. With an image window far larger than other systems, each scanned sector is electronically blended with the others. The result is virtually distortion-free imaging—head to foot.

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RAYTHEON

In myocardial imaging with technetium Tc 99m pyrophosphate

Once is not enough...

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Scintigram is only faintly positive shortly after suspected MI.

3 days/Ant.
Intensified activity clearly indicates anterolateral and apical MI.

7 days/Ant.
Markedly decreased activity, probably due to constantly changing pathophysiology of infarcted tissue.

"...SERIAL MYOCARDIAL IMAGES MUST BE OBTAINED in order to derive maximal information from the test."[1]

After performing technetium Tc 99m pyrophosphate myocardial scintigraphy on more than 3,000 patients, a group of clinicians has reported that *"Our rewarding experience utilizing this particular imaging technique has been almost certainly the result of our utilization of serial myocardial imaging..."*[1]

The accuracy of serial myocardial imaging as an adjunct in the diagnosis of acute myocardial infarction is well-established. In another recent study, researchers *"...have found less than 4% false negative scintigrams when imaging is performed during optimal timing postinfarction and serial ^{99m}Tc-PYP myocardial imaging is performed. Other groups have reported 5%-10% false negative results, but this is often without the benefit of serial myocardial imaging."*[2]

For a reprint of the papers cited here plus more information about TechneScan PYP, just call your Mallinckrodt sales representative or call 800-325-8181 toll free. (In Missouri, 314-895-2405 collect)

For brief summary see opposite page.

TechneScan® PYP®
Technetium Tc 99m Pyrophosphate Ki

THE MALLINCKRODT COMMITMENT
to Nuclear Cardiology

Mallinckrodt

TechneScan® PYP*

Technetium Tc 99m Pyrophosphate Kit

BRIEF SUMMARY

CLINICAL PHARMACOLOGY

When injected intravenously **TechneScan PYP Tc 99m** has a specific affinity for areas of altered osteogenesis. It is also concentrated in the injured myocardium, primarily in areas of irreversibly damaged myocardial cells.

One to two hours after intravenous injection of **TechneScan PYP Tc 99m**, an estimated 40 to 50 percent of the injected dose has been taken up by the skeleton and approximately 0.01 to 0.02 percent per gram by acutely infarcted myocardium. Within a period of one hour, 10 to 11 percent remains in the vascular system, declining to approximately 2 to 3 percent twenty-four hours post-injection. The average urinary excretion was observed to be about 40 percent of the administered dose after 24 hours.

TechneScan PYP also has an affinity for red blood cells. When administered 30 minutes prior to the intravenous administration of sodium pertechnetate Tc 99m approximately 76 percent of the injected activity remains in the blood pool providing excellent images of the cardiac chambers.

INDICATIONS AND USAGE

TechneScan PYP Tc 99m is a skeletal imaging agent used to demonstrate areas of altered osteogenesis, and a cardiac imaging agent used as an adjunct in the diagnosis of acute myocardial infarction.

As an adjunct in the diagnosis of confirmed myocardial infarction (ECG and serum enzymes positive), the incidence of false negative images has been found to be 6 percent. False negative images can also occur if made too early in the evolutionary phase of the infarct or too late in the resolution phase. In a limited study involving 22 patients in whom the ECG was positive and serum enzymes questionable or negative, but in whom the final diagnosis of acute myocardial infarction was made, the incidence of false negative images was 23 percent. The incidence of false positive images has been found to be 7 to 9 percent. False positive images have also been reported following coronary by-pass graft surgery, in unstable angina pectoris, old myocardial infarcts and in cardiac contusions.

TechneScan PYP is a blood pool imaging agent which may be used for gated cardiac blood pool imaging. When administered intravenously 30 minutes prior to the intravenous administration of sodium pertechnetate Tc 99m approximately 76 percent of the injected activity remains in the blood pool.

CONTRAINDICATIONS

None.

WARNINGS

This radiopharmaceutical should not be administered to patients who are pregnant or lactating unless the information to be gained outweighs 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.

Warning: Preliminary reports indicate impairment of brain scans using pertechnetate Tc 99m which have been preceded by bone scan. The impairment may result in false positives or false negatives. It is recommended, where feasible, that brain scans precede bone imaging procedures.

Radiopharmaceuticals should be used only by physicians 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 government agency authorized to license the use of radionuclides.

The **TechneScan PYP Kit** must be maintained at refrigerator temperature until use.

The contents of the **TechneScan PYP** reaction vial are intended for use in the preparation of Technetium Tc 99m Pyrophosphate Injection. **TechneScan PYP** may also be reconstituted with sterile pyrogen-free normal saline containing no preservatives and injected intravenously prior to the administration of sodium pertechnetate Tc 99m.

Sodium pertechnetate Tc 99m solutions containing an oxidizing agent are not suitable for use with the **TechneScan PYP Kit.**

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

TechneScan PYP Tc 99m should not be used more than six hours after preparation.

PRECAUTIONS

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

Bone Imaging

Both prior to and following **TechneScan PYP Tc 99m** administration, patients should be encouraged to drink fluids. Patients should void as often as possible after the TechneScan PYP Tc 99m injection to minimize background interference from accumulation in the bladder and unnecessary exposure to radiation.

Cardiac Imaging

Patient's cardiac condition should be stable before beginning the cardiac imaging procedure.

If not contraindicated by the cardiac status, patients should be encouraged to ingest fluids and to void frequently in order to reduce unnecessary radiation exposure.

Interference from chest wall lesions such as breast tumors and healing rib fractures can be minimized by employing the three recommended projections.

Blood Pool Imaging

TechneScan PYP should be injected by direct venipuncture. Heparinized catheter systems should be avoided.

ADVERSE REACTIONS

None.

HOW SUPPLIED

Catalog Number—*094*

TechneScan PYP

Technetium Tc 99m Pyrophosphate Kit.

Kit Contains:

5—Stannous Pyrophosphate Reaction Vials for the preparation of Technetium Tc 99m Pyrophosphate Injection.

Reaction Vial Contains in lyophilized form:

12.0 mg sodium pyrophosphate and 3.4 mg stannous chloride (anhydrous). Hydrochloric acid is added for pH adjustment prior to lyophilization.

5—Radioassay Information String Tags.

FOOTNOTES:

1 Willerson JT, Parkey RW, Buja LM, Bonte FJ: Are ^{99m}Tc-stannous pyrophosphate myocardial scintigrams clinically useful? Clin Nucl Med 2:161, 1977.

2 Parkey RW, Bonte FJ, Buja LM, Stokely EM, Willerson JT: Myocardial infarct imaging with Technetium-99m phosphates. Sem Nucl Med 7:1, 1977.

Heart chamber illustration inspired by photos by Lennart Nilsson.

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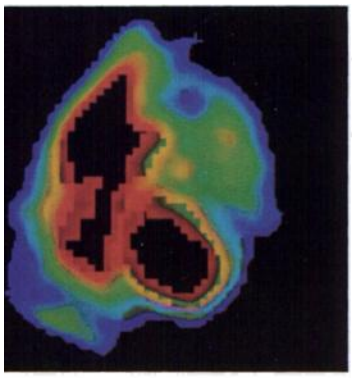

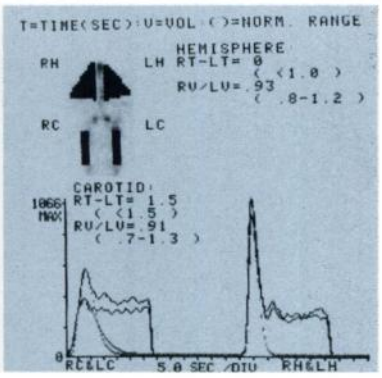

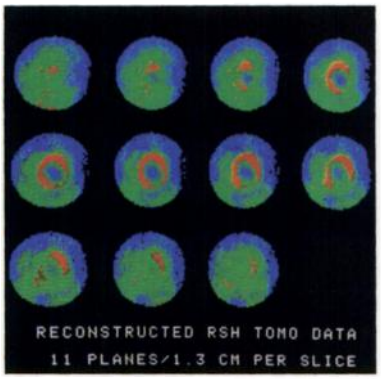

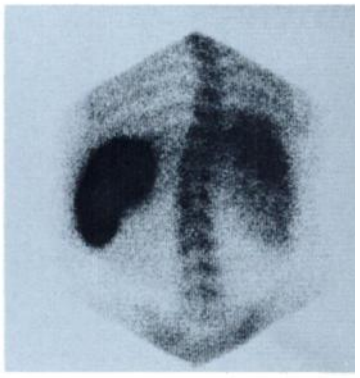

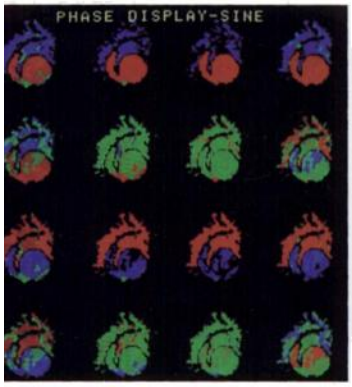

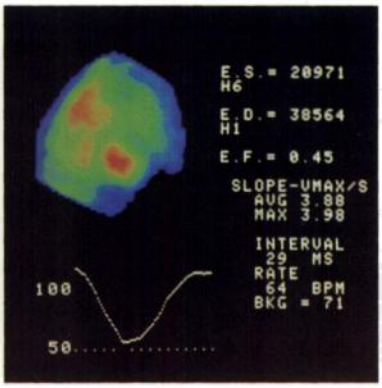

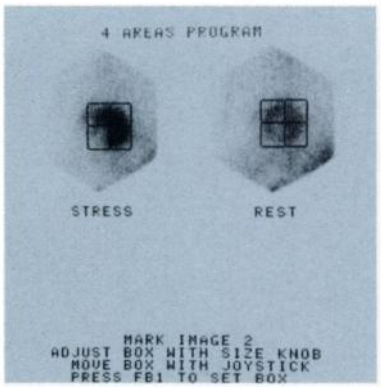

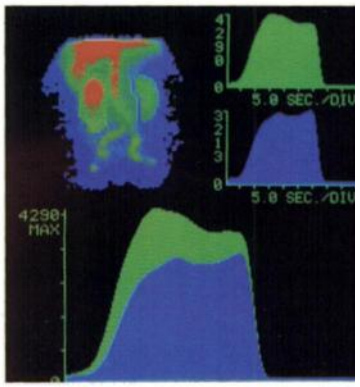

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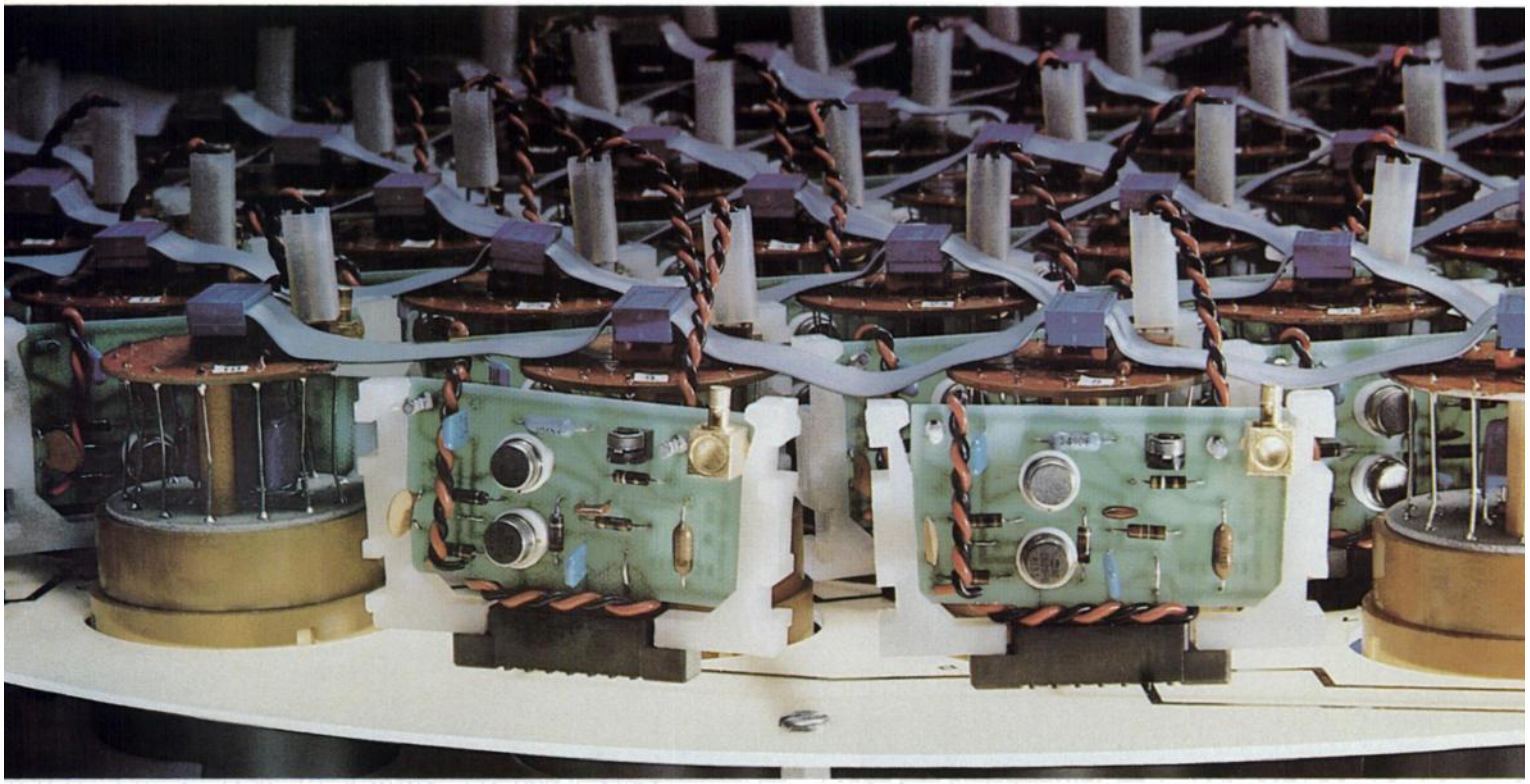

From enhanced Quantum Detection Efficiency (QDE) tubes to refined Z-CORR PLUS™ circuitry, Technicare's 438HR (High Resolution) gamma camera is the result of new design concepts leading to significantly improved performance.

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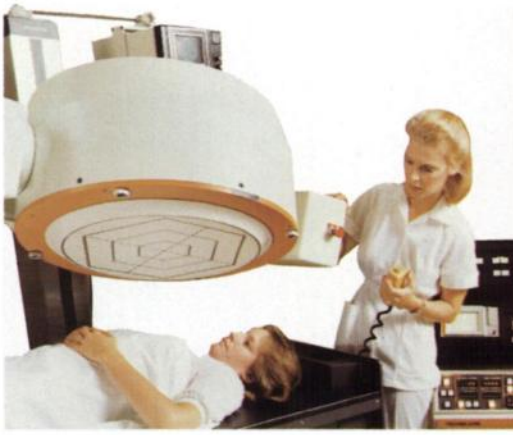

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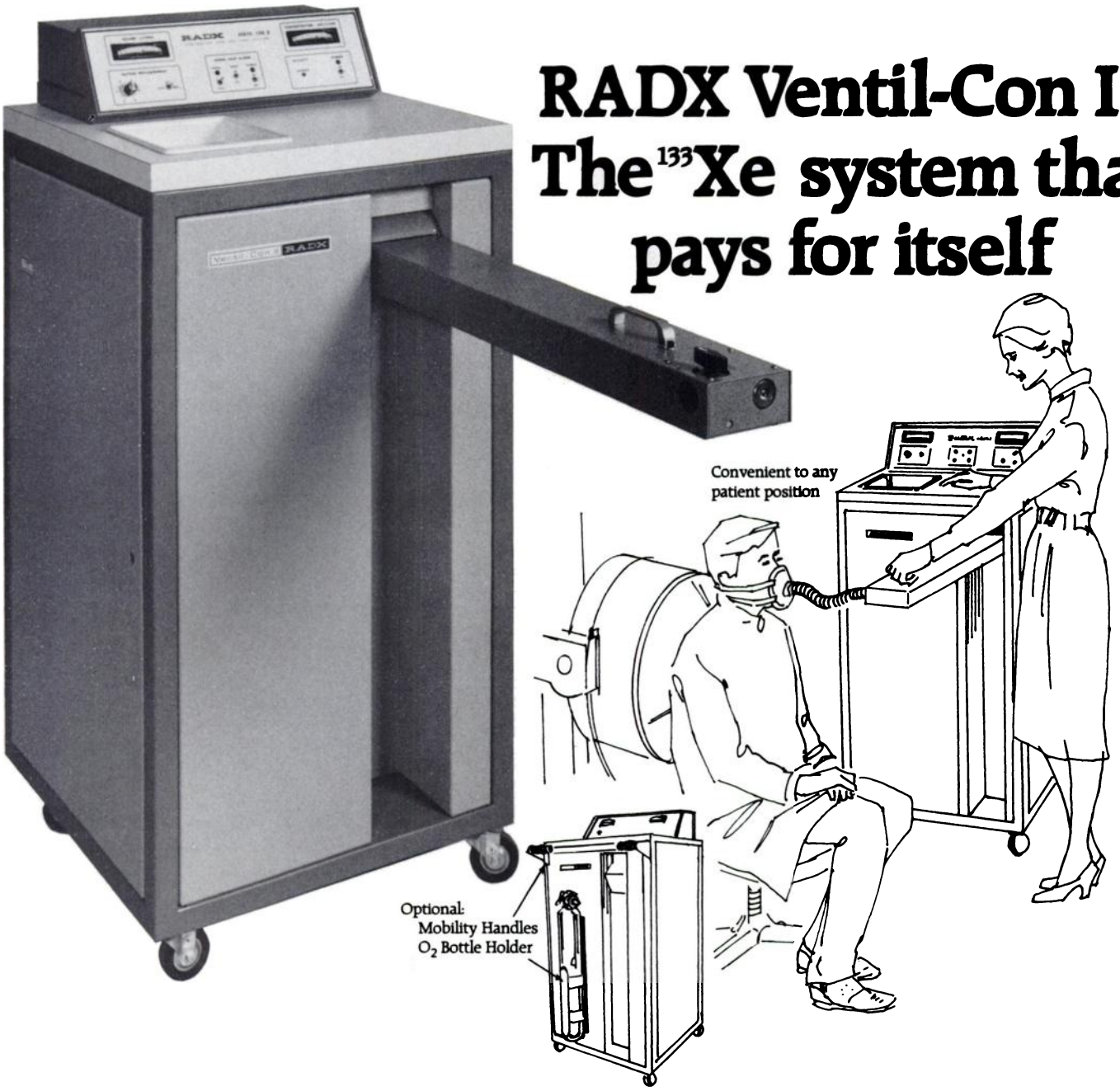

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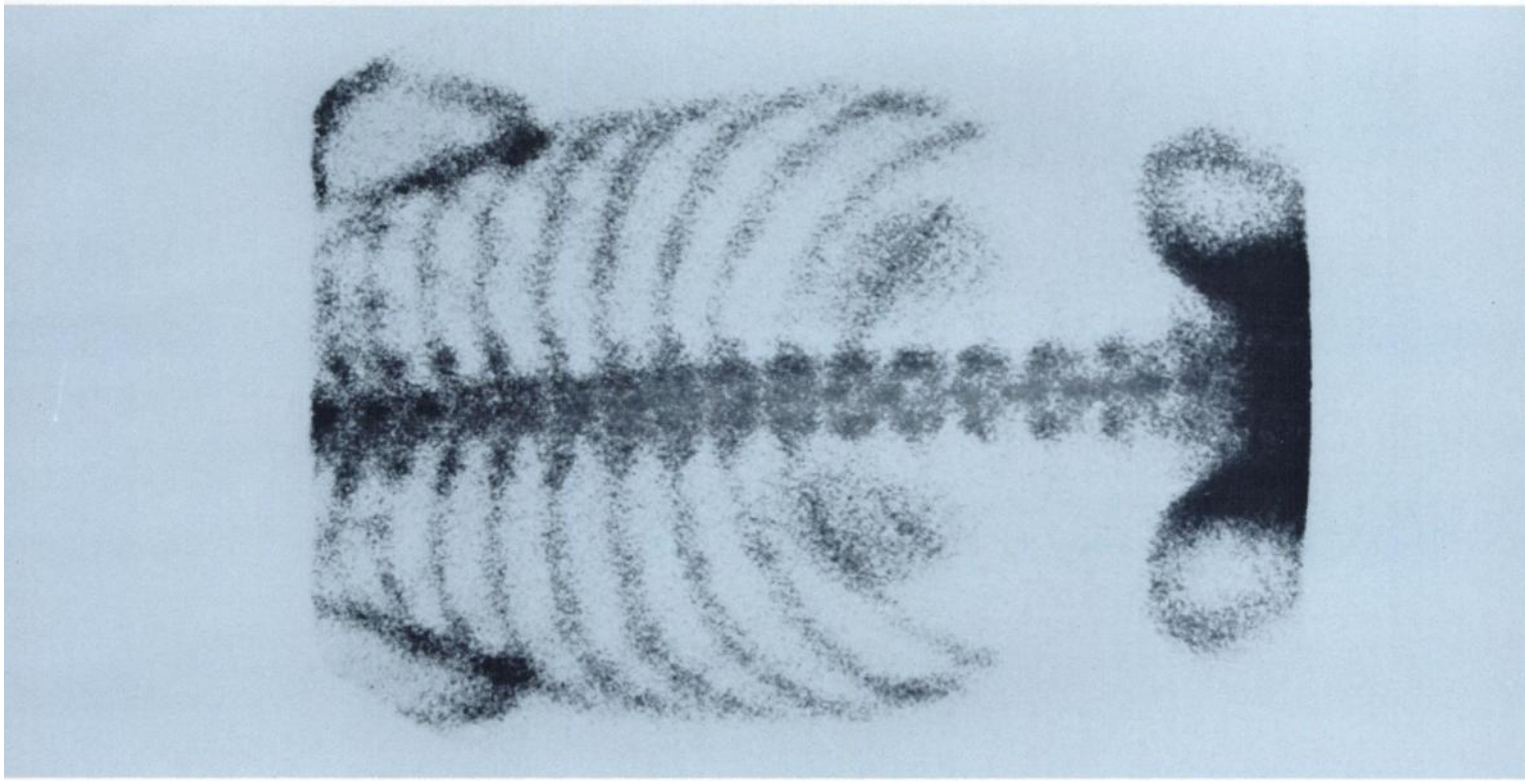
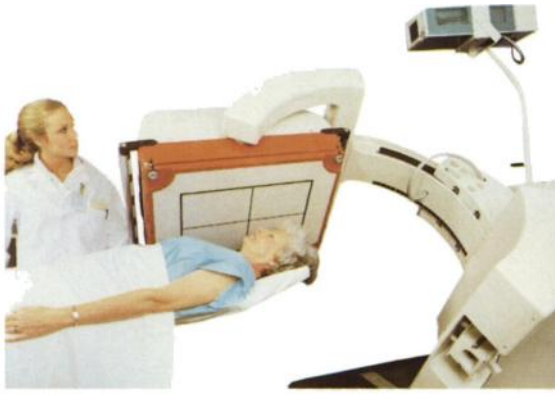
The Omega™ 500: The more you see, the more you know.



The 14.5" x 20" detector is the largest of any gamma camera available. The Omega 500's rectangular field of view is designed for maximum clinical versatility. Its far-reaching C-arm permits the curvilinear travel and full head rotation required in ECAT scanning. The arm is easily positioned and fully secured through fingertip control of magnetic disc brakes.

Designed with parallel hole collimation, the Omega 500 is a natural for single pass, whole body scans. In fact, the Omega 500 is a natural for all your nuclear medicine needs, including ECAT, for which its special characteristics are intended.

Technicare's Omega 500 is unique. Its field of view and design concepts are meant to give the user maximum clinical versatility. The beneficiaries are you, the diagnostician, and your patient.



TECHNICARE

Exploring through digital imaging.

Technicare Corporation
29100 Aurora Road
Cleveland, Ohio 44139
(216) 248-1800

A Johnson & Johnson Company

DOSE CALIBRATOR

Activity Linearity Testing the easy way

Fast

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.

Accurate and Reliable

The new Calicheck kit is designed to attenuate ^{99m}Tc by known values — accurate using a high yield generator eluant or a unit dose.

A Calicheck kit provides for seven successive measurements simulating the decay of ^{99m}Tc at approximately 0, 6, 12, 20, 30, 40 and 50 hours from the initial assay.

Complete Yet Reusable

Your Calicheck kit comes to you complete with its own storage container, a unique arrangement of seven color-coded lead-wrapped tubes, work/record keeping sheets, instructions for use and a license amendment form (if needed.)

Your Calicheck kit is completely reusable for an indefinite period of time. There is nothing to wear out or use up. If damage should cause a tube to malfunction, individual replacements are available.

Safe

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.

Lowers Department Cost

When you test with a Calicheck kit, both the source activity and dose calibrator can be returned to active service in just minutes. This savings alone can pay for a Calicheck kit in just three to four linearity tests. A Calicheck kit lets you return to active service too!

Can Improve Patient Care

A Calicheck kit is so fast, efficient and easy to use, you may wish to check dose calibrator linearity more frequently. Lets you spot trouble before it becomes serious.

Low Price

A Calicheck dose calibrator activity linearity test kit is just $375.00 shipping included.

Just call (216) 663-1773 or write: Calcorp, Inc., P.O. Box 25589, Cleveland, Ohio 44125–0589.

Just four minutes

As simple as 1, 2, 3, 4, 5, 6, 7. Place central tube in the dose calibrator. Place the source in this tube and take a reading. Then sequentially place color-coded tubes over the central tube. Additional readings are taken immediately, converted with a predetermined factor and you can see the degree of linearity virtually at a glance.

May require approval of the Agency issuing your radioactive materials license.

Calicheck™

• DOSE CALIBRATOR ACTIVITY LINEARITY TEST KIT •

Patent pending

The sensitive searcher

MDP-SQUIBB™

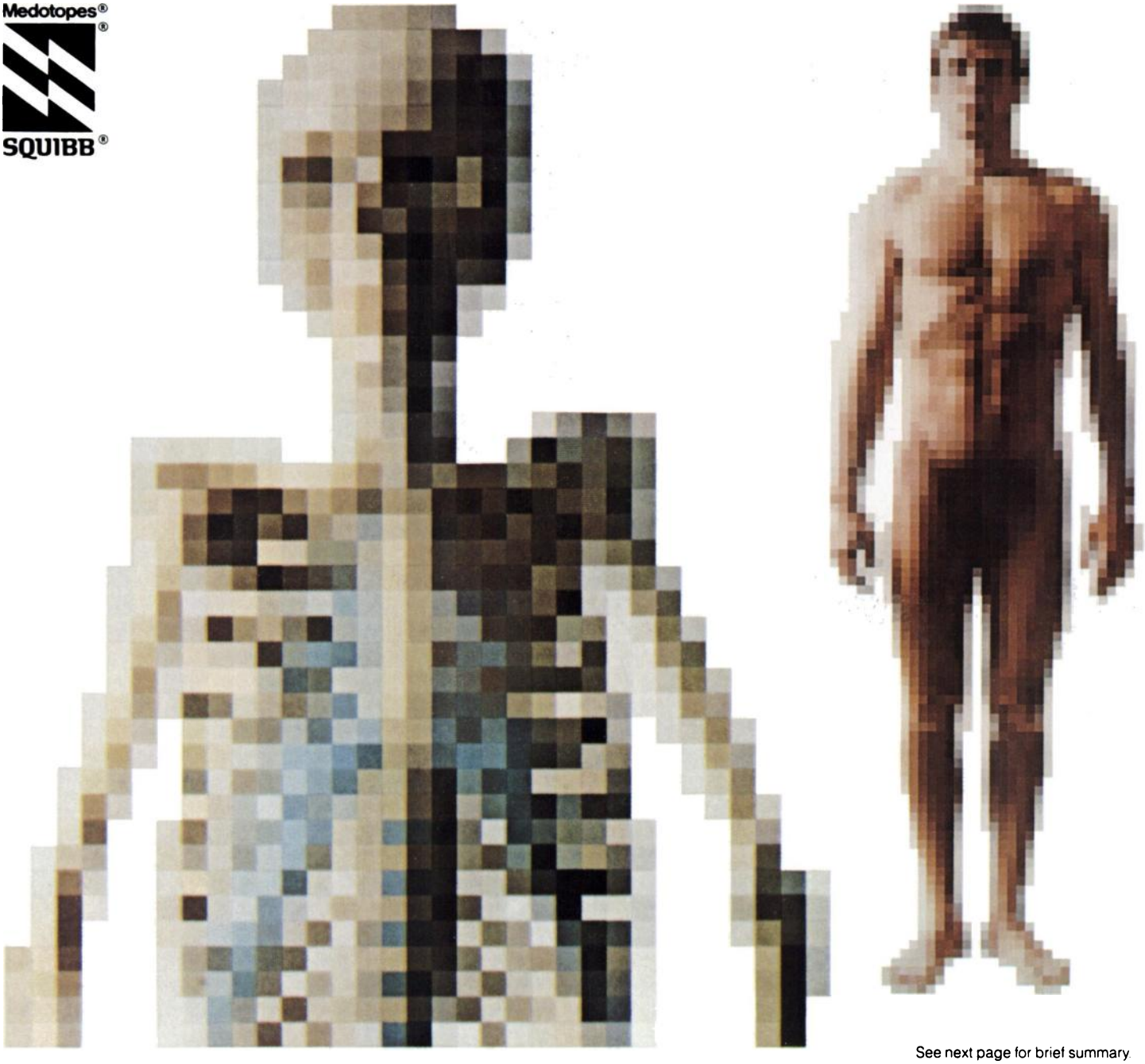
Technetium Tc 99m Medronate Kit

Produces high resolution bone images

■ Excellent target to non-target ratio ■ Low soft tissue uptake ■ Optimal results as early as 1 to 4 hours after administration ■ Clears from the blood rapidly ■ Highly stable—solution may be used up to 6 hours after preparation ■ Active ingredient: 20 mg medronic acid in each 10 ml capacity reaction vial. Kit of 10 reaction vials. ■ Easy two-step procedure

* An example of new vial shield available late 1982.

Medotopes®
SQUIBB®



See next page for brief summary.

THE SQUIBB PLUS IS SERVICE

Squibb Health Physics Service	Technical Associates aid laboratory pre-inspection to help ensure compliance.
Customtec®	Computerized report of a laboratory's daily technetium Tc 99m needs.
Technical Associates	Specialists aid in license procurement and renewal, laboratory design, technologist training, trouble-shooting, instrument accuracy check, etc.
Squibb National Nuclear Medicine Management Seminars	The 2½-day seminar provides opportunity, ideas and techniques for nuclear medicine and clinical laboratory supervisors to enhance their managerial skills.
Technologist Education Plan	When spent Minitec® (Technetium Tc 99m) Generators are returned, Squibb puts money into customers' accounts for educational purposes.
Squibb National Nuclear Medicine Seminars	Education for technologists: 2½ days on *in vivo* procedures, 1½ days on *in vitro* procedures. Accredited by the Society of Nuclear Medicine Technologist Section, American Society of Radiologic Technologists, and American Society for Medical Technology for continuing education credit.
Toll-Free Technical Customer Service	800-257-5181 In New Jersey, 800-582-5913

MDP-SQUIBB™
Technetium Tc 99m Medronate Kit
For Diagnostic Use

DESCRIPTION: Each 10 ml capacity reaction vial contains a sterile, nonpyrogenic lyophilized powder prepared from 20 mg medronic acid, 11 mg sodium hydroxide, and 0.25 mg tin as fluoride; the product does not contain a preservative. When sterile, nonpyrogenic sodium pertechnetate Tc 99m is added to the vial, technetium Tc 99m medronate is formed.

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).

Preliminary reports indicate impairment of brain scans using sodium pertechnetate Tc 99m injection which have been preceded by a bone scan using an agent containing stannous ions. The impairment may result in false-positive or false-negative brain scans. It is recommended, where feasible, that brain scans precede bone imaging procedures. Alternatively, a brain-imaging agent such as technetium Tc 99m pentetate may be employed.

PRECAUTIONS: General — Contents of the reaction vial are not radioactive and are intended only for use in the preparation of technetium Tc 99m medronate and are **NOT** to be administered directly to the patient.

Technetium Tc 99m medronate 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 and occupational workers consistent with proper patient management.

To minimize radiation exposure to the bladder, the patient 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.

Technetium Tc 99m medronate should be formulated within 6 hours prior to clinical use. Optimal imaging results are obtained one to four hours after 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.

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

Pregnancy Category C — Animal reproduction studies have not been conducted with technetium Tc 99m medronate. It is also not known whether technetium Tc 99m medronate can cause fetal harm when administered to a pregnant woman or can affect reproduction capacity. Technetium Tc 99m medronate 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 (approximately 10) days following the onset of menses.

Nursing Mothers — Technetium Tc 99m 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 specifically attributable to the use of technetium Tc 99m medronate have not been reported, allergic dermatological manifestations (erythema) have been infrequently reported with similar agents.

For full prescribing information, consult package insert.

HOW SUPPLIED: In packages of 10 reaction vials.

SQUIBB® Princeton, N.J. 08540

 602-502 Issued: August 1982

Techneplex®
(Technetium Tc 99m Pentetate Kit) from Squibb

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

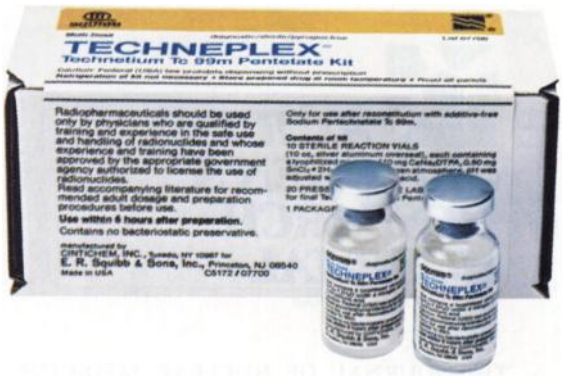
Does not accumulate in choroid plexus
Rapid clearance rate of DTPA allows:
- brain imaging in less time than with sodium pertechnetate Tc 99m
- delayed brain imaging in 30-40 minutes, as compared with 3-4 hours with technetium Tc 99m pertechnetate

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.



Medotopes®
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There are 32 reasons why Apex Processors are better than any other Nuclear Medicine Data Systems. This is reason Number

6

Our competition gives up image quality for high frame rates: a fruitless trade-off. Apex doesn't: it provides both.

elscint's **apex line**

Techneplex®
(Technetium Tc 99m Pentetate Kit) 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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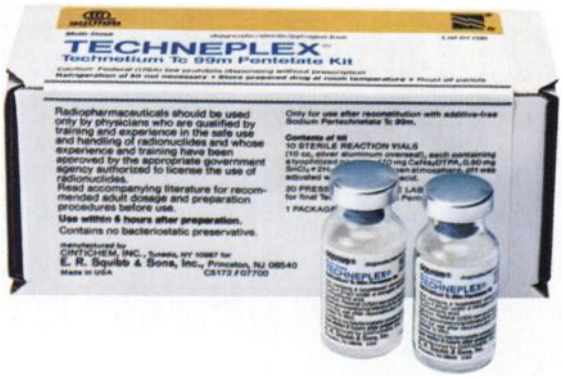
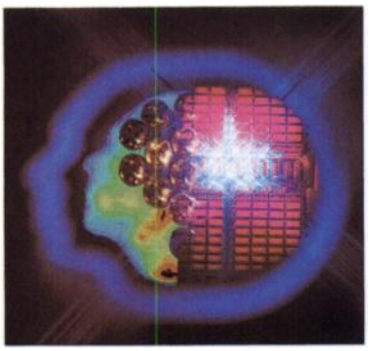


Medotopes®
SQUIBB®



There are 32 reasons why Apex Processors are better than any other Nuclear Medicine Data Systems. This is reason Number

6

Our competition gives up image quality for high frame rates: a fruitless trade-off. Apex doesn't: it provides both.

elscint's **apex line**

Elscint has prepared a full-color booklet detailing all 32 reasons. Contact us today for your personal copy.

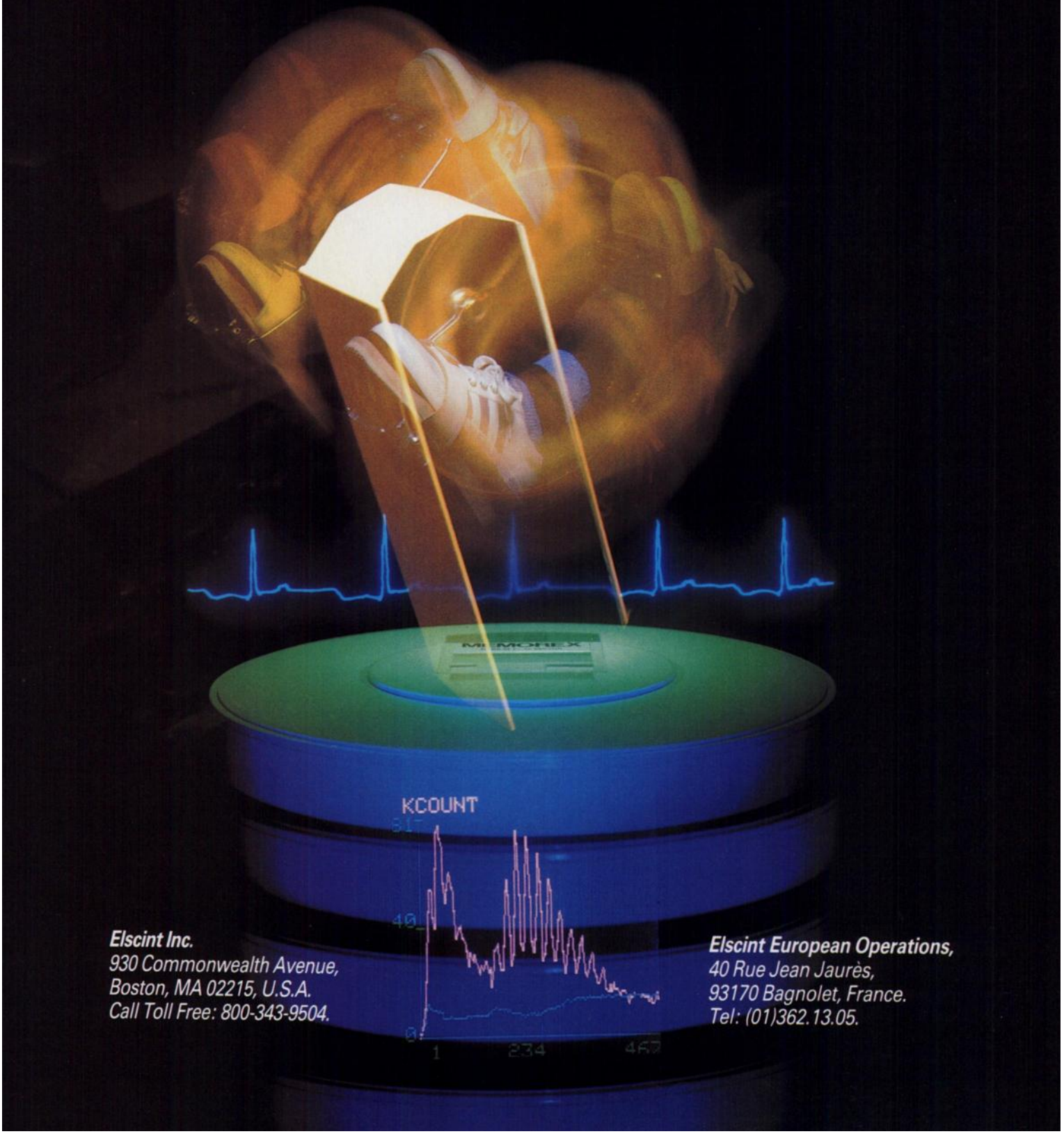
6

Some of our competitors achieve high frame rates – but with poor resolution. If they opt for image quality, the frame rates are too low for meaningful cardiac studies.

Apex makes no trade-offs. Apex systems accommodate high count rate studies – up to 500,000 cps – acquiring frames sized 64×64, at 64 frames per second.

Consequently, Apex First Pass Studies display superior wall motion images with fine time definition – essential for accurate diagnoses in coronary artery disease.

Apex Processors: 32 Ways Better!



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Elscint European Operations,
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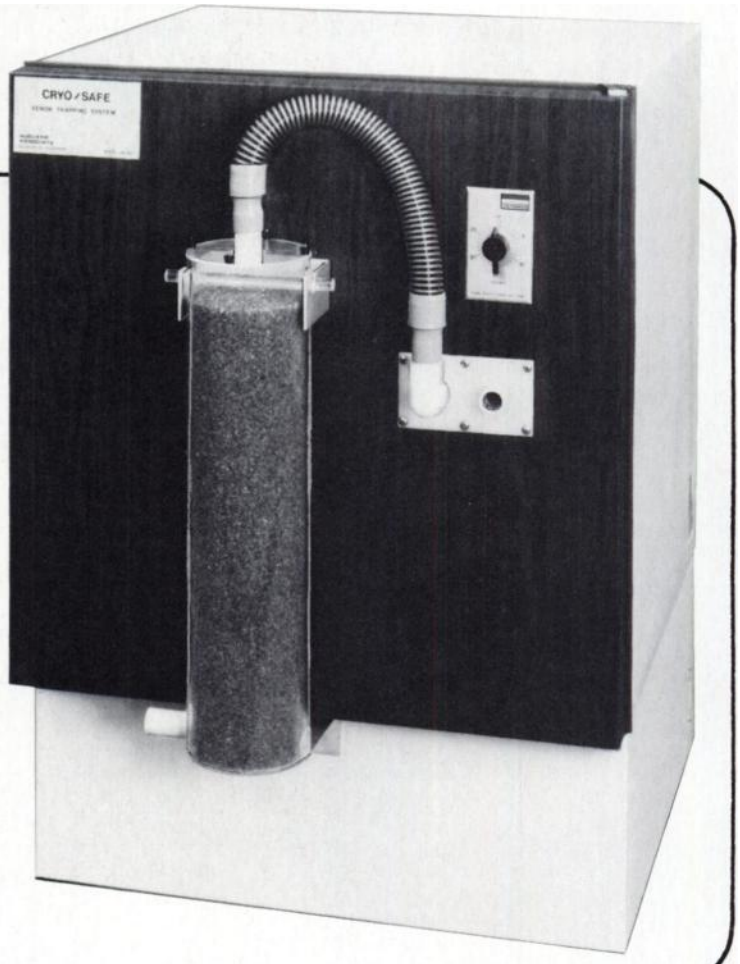
93170 Bagnolet, France.
Tel: (01)362.13.05.

Xenon Gas Guzzler

Ultra-Efficient, Refrigerated Cryo/Safe™ Xenon Trap



100 times more effective than standard gas traps

- *Reduces frequency of charcoal cartridge replacement.*
- *Recommended for high-volume xenon gas users.*
- *Ideal for xenon-127.*

The low-temperature (−20°C) "Cryo/Safe" offers high-volume xenon users an excellent means of decreasing trap effluent concentrations. At −20°C, the xenon adsorption capacity of activated charcoal is about five times greater than at 20°C because xenon atoms remain adsorbed on the charcoal surface for a longer period at lower temperatures. This greatly slows the xenon bolus migration through a charcoal cartridge when carried by a steady air flow. These factors give the xenon more time to decay and thus greatly reduce the xenon concentration in the effluent. In fact, the long-term, steady-state, effluent xenon concentration of this freezer trap is less than 1% of that for a room-temperature trap (assuming a typical use for about 10 patients per week).

For detailed information, see Technical Notes: "Refrigerated Charcoal Trap For Xe-133", in the Nov./Dec. 1981 issue of *Medical Physics*.

Or, contact us and ask for Bulletin 300-B.

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PRESENTING THE DOSE CALIBRATOR WITH A GREAT FUTURE.

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. Lets 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 ^{99}MO 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. ☐ Why wait? Now's the time to replace your department's radioisotope dose calibration system (or upgrade your Capintec system) with the best selling, most respected, most capable equipment, from Capintec.

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With this Dosecalibrator you will always be up-to-date.

The RADX Assayer I isotope dosecalibrator is the heart of the RADX system. It is the **only** dosecalibrator with an atmospheric ionization chamber for high activity linearity. It also incorporates an optical scanner for isotope selection — no moving parts, no contacts to corrode. Other standard features include a remote chamber, automatic monitoring of background with subtraction, automatic ranging and much more. Unchallenged for reliability, accuracy and linearity.

The RADX Isotron is the only control unit which qualifies as a nuclear medicine inventory control computer. It keeps track of up to 20 radio pharmaceuticals in different chemical forms — simultaneously and independently, and provides constant inventory information on each radio pharmaceutical. It also performs dose volume calculations in real and totally variable future time. Computer programming skills not required.

The RADX Isocord produces a hard copy print out in triplicate for all of your record keeping needs, by patient name, and selected isotope. Addition of the Isocord completes the most advanced dosecalibration system available from anyone. RADX is the first to offer anything like it at anywhere near its price.

The RADX dosecalibration system meets all radiopharmaceutical inventory control and NRC or State accountability requirements. To get the complete story on staying completely up-to-date, call RADX. 713/468-9628.

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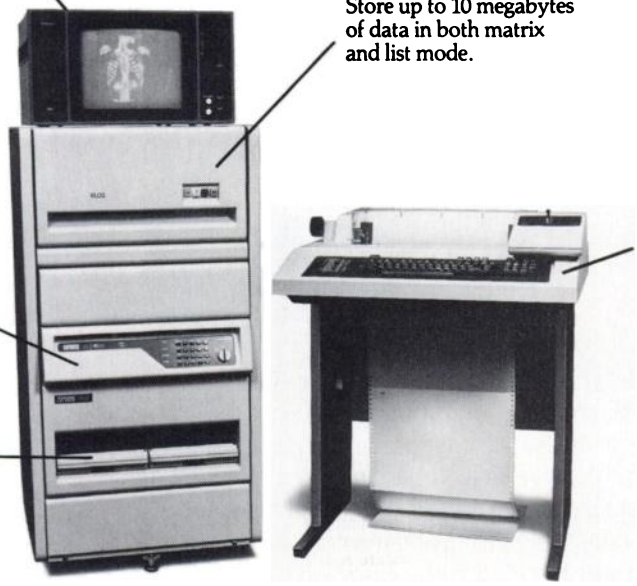
Color Monitor
Make dynamic or static images of single or multiple studies in color, monochrome or black and white.

Disk Drive
Store up to 10 megabytes of data in both matrix and list mode.

Extra Memory
Get up to 256 Kb—more than any other system provides without paying extra.

Floppies
Create permanent patient files for quick access to vital data.



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Make crisp, permanent copies for ready reference.

Digital's new Gamma-11 delivers five essential features you can get from our competitors.

And one you can't. $49,900.*

Digital's new Gamma-11 offers by far the most complete imaging system available. And at a price no one else can touch.

Because everything you see here, and some things you don't see, are standard equipment. So while you may be able to get the same features from other companies as options, we don't surprise you with their option prices.

Plus Gamma-11 has all the reliability, ease of use and full support that have made Digital's Medical Systems Group the leading supplier of imaging systems for hospitals and research centers throughout the world.

And that's another feature you can't get from the other guys.

For complete details, write **Digital Equipment Corporation,** Medical Systems Group, 428 Main Street, Hudson, MA 01749.

*U.S. price only

digital

POSITIONS OPEN

NUCLEAR MEDICAL TECHNOLOGIST. Full-time, dayshift position, currently open at 552-bed teaching hospital. Use of three computers, portable gamma camera, emmission tomography, active cardiology program, in vivo procedures only. For information contact: Employment Interviewer, Sacred Heart Medical Center, W. 101 Eighth Avenue, TAF-C9, Spokane, Washington 99220, or call, (509)455-3191. EOE.

NUCLEAR MEDICINE TECHNOLOGIST. Immediate opening. 426-bed medical center with full range of Nuclear Medicine procedures including Nuclear Cardiology. Applicant must be registered or registry eligible. Facility is located 75 miles south of Atlanta on beautiful West Point Lake. For more information write or call collect: Personnel Department, West Georgia Medical Center, 1514 Vernon Rd., LaGrange, GA 30240. Phone (404)882-1411, ext. 5707. M-F/EOE

PHYSICIST. MAJOR TEACHING HOSpital requires a physicist for Nuclear Medicine Department. Experience in mini-computers, image processing and pattern recognition programming desirable. Experience in digital electronics a plus. Duties will include teaching, quality control and evaluation of nuclear medicine equipment, and data base management and analysis. Send resume to Human Resources Division. New York Hospital, 525 East 68th Street, New York, NY 10021.

NUCLEAR MEDICINE PHYSICIAN. Full-time junior staff position available at Children's Hospital Medical Center, Harvard Medical School. Clinical, research, and teaching responsibilities. Board certification or eligibility in Nuclear Medicine or Nuclear Radiology required. Respond with curriculum vitae to S. Treves, MD, Department of Radiology, Children's Hospital Medical Center, 300 Longwook Avenue, Boston, MA 02115. An Affirmative Action/Equal Opportunity Employer.

NUCLEAR RADIOLOGIST AT THE Asst. or Assoc. Professor level is sought for position of Assoc. Director, Division of Nuclear Medicine, Dept. of Radiology, Georgetown Univ. Hosp. Please contact John Harbert, M.D., 3800 Reservoir Rd. N.W., Washington, DC 20007.

NUCLEAR MEDICINE TECHNOLOGIST. Join one of NW Iowa's most advanced Nuclear Medicine Departments. St. Luke's Regional Medical Center, a 338-bed critical care facility, in Sioux City, Iowa is seeking a Nuclear Medicine Technologist who is registered (eligible) to perform diagnostic examinations. Equipment includes: Dyna Camera 2 C with Omniview, Picker Microview Small Parts Ultrasound, Dyna Mo Portable Imaging Camera, System I and Cam II Computers, 8OLDI Contact "B" Scanner, Picker Sector view Realtime, Picker Magnascanner 500, Portable Realtime Ultrasound. For additional information about employment opportunities at St. Luke's contact: Personnel Department, St. Luke's Regional Medical Center, Sioux City, IA 51104 (712) 279-3782.

NUCLEAR MEDICINE TECHNOLOgists. Staff and supervisory positions available in hospitals nationwide. Tell us your geographic preferences, career objectives, and personal needs. Our health care consultants will work with you to find your next position. All positions fee paid. Contact: Cathy Waas, Dunhill of Orlando, Inc., 2699 Lee Road, Suite 270, Winter Park, FL 32789; (305)628-4227.

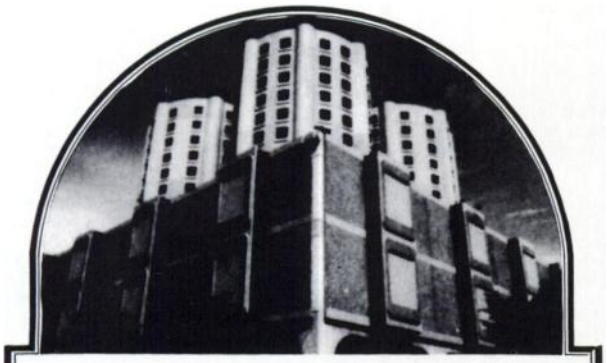
PHARMACEUTICAL SCIENTIST—NUclear Pharmacy, University of Oklahoma Health Sciences Center, College of Pharmacy. Applications are invited for a faculty tenure track position as Assistant/Associate Professor in Nuclear Pharmacy. Appointment to begin September 1, 1982 or soon thereafter. Applicants should possess a Ph.D. degree in Pharmaceutical or related sciences with expertise in Nuclear Pharmacy/Radioisotope Methodology/Radiochemistry. A strong background in animal handling and Nuclear Medicine instrumentation use is desirable. The successful applicant is expected to participate in undergraduate and graduate education programs and establish an independent research program. Eligibility for licensure in Oklahoma is desirable. Salary will be commensurate with qualifications and experience. Interested applicants should send a letter of application accompanied by a Curriculum Vitae prior to August 15, 1982 to: Garo P. Basmadjian, Ph.D., Chairman, Search Committee, College of Pharmacy, University of Oklahoma Health Sciences Center, P.O. Box 26901, Oklahoma City, OK 73190. The University of Oklahoma Health Sciences Center is an Equal Opportunity/Affirmative Action Employer.

NUCLEAR MEDICINE TECHNOLOGIST. Permanent, full-time position at VA Medical Center, Spokane, WA, a 213-bed general medical and surgical hospital. Starting salary $19,477 PA. Forward resume to reach Personnel Serice, N. 4815 Assembly, Spokane, WA 99208 by 7/16/82 or call Mrs. Ross, (509)328-4521, ext. 242. Equal Employment Opportunity Employer.

NUCLEAR MEDICINE RESIDENCY. 699-bed VA general hospital offers AMA approved comprehensive two year program. Two positions available July 1983. Located in the San Fernando Valley area of Los Angeles, 15 minutes from affiliated hospitals (UCLA and Wadsworth VA). Program covers isotope and ultrasound imaging, in vivo and in vitro procedures, including RIA, isotope therapy and all recent computer and cardiology procedures. Prerequisite: two years post graduate training in medicine, radiology, or pathology. Minimum stipend: $27,103.00. Contact: Marvin B. Cohen, M.D., Chief, Nuclear Medicine Service. Nondiscrimination in employment. V.A. Medical Center, 16111 Plummer Street, Sepulveda, CA 91343.

NUCLEAR MEDICINE TECHNOLOGIST. Immediate opening for a Registered Nuclear Medicine Technologist to work full-time days with some call. Maryview Hospital has a full service Radiology Dept. with Radiation Therapy and is situated in the center of Virginia's scenic Tidewater area. Excellent benefits and salary commensurate with experience. Contact Personnel Dept., Maryview Hospital, 3636 High Street, Portsmouth, VA 23707, (804)398-2241. EOE

NUCLEAR MEDICINE TECHNOLOGISTS needed NATIONWIDE! Attractive locations, excellent salaries, career opportunities. No cost to you. Contact Ruth Knight, NATIONWIDE RECRUITERS, 3710 Landmark Dr., Suite 111, Columbia, SC 29204. (800)845-0992 or (803)738-1790.



NUCLEAR MEDICINE TECHNOLOGIST

Opportunity exists in our active, modern Department of Nuclear Medicine for a Registered or registry-eligible Technologist. Our Department offers the professional a progressive, stimulating atmosphere and a close association with Harvard Medical School.

Please call Richard Wallace at (617) 732-5790 or send resume in confidence.

an equal opportunity employer, M/F

Brigham and Women's Hospital
A Teaching Affiliate of Harvard Medical School
10 Vining Street, Boston, Massachusetts 02115

Physician Wanted Immediately

Must be Board qualified or certified in Nuclear Medicine and highly competent in both nuclear medicine and Visceral Ultrasonography.

For busy Department in 450-bed teaching hospital in Newark, NJ. (St. Michael's Medical Center) with good number of suburban referrals. Opportunity for research, if desired. Radiology or Internal Medicine background acceptable.

Department is equipped with a trinary A^2 MDS computer and is highly active in cardiac and the entire gamut of nuclear medicine studies. Over 250 Ultrasound studies a month and 500 nuclear medicine.

American graduate preferred. Realistic starting salary depending on training and experience.

Contact: Martin F. Sturman, MD, Director of Nuclear Medicine, (201)622-5348; Home: (215)635-6820.

KUWAIT

University of Kuwait Health Science Centre
Faculty of Medicine

CHIEF TECHNICIAN IN NUCLEAR MEDICINE

Applications are invited for the appointment of Chief Technician in Nuclear Medicine in the newly established Department of Radiology and Nuclear Medicine. The Department's services cover most aspects of diagnostic imaging including conventional radiography, C.T., ultrasonography and digital radiography. It is actively involved in undergraduate and postgraduate teaching, and basic and clinical research.

Candidates should be graduates of a recognized program in nuclear medicine and have fifteen years' experience including training. They should also be familiar with operating computers and data processors.

Salary will be in the range KD 450–512 per month, (KD 1=£1.8, US $3.5, approx.). There is no income tax in Kuwait and currency is transferable without restriction. Free, furnished, air-conditioned accommodation is provided, and electricty and water supplied free of charge. Sixty days paid annual leave for each completed year of employment, and annual economy class return air tickets to the country of citizenship or permanent residence are provided for the appointee, spouse and three dependent children. Free medical treatment is available under the State Health Service.

Applications should be submitted to: The Dean, Faculty of Medicine, University of Kuwait Health Science Centre, PO Box 24923 Safat, Kuwait, with detailed curriculum vitae in duplicate, recent passport photograph, and the names of three referees, to arrive not later than October 30th, 1982.

KUWAIT

University of Kuwait Health Science Centre
Faculty of Medicine

APPOINTMENTS IN NUCLEAR MEDICINE

Applications are invited for the following appointments in the Division of Nuclear Medicine in the newly established Department of Radiology and Nuclear Medicine. The Department's services cover all aspects of diagnostic imaging, including conventional radiography, C.T., ultrasonagraphy and digital radiography. It is also actively involved in undergraduate and postgraduate teaching, and basic and clinical research.

- Assistant and Associate Professors in Clinical Nuclear Medicine (3 posts). Candidates should have experience in radionuclide imaging.
- Assistant Professor in Radiopharmacy.
- Assistant Professor in Radiation Physics. Candidates should have a special interest in nuclear medicine.

Requirements for Appointment

Applicants should possess a Ph.D., or equivalent higher professional qualification, in their respective specialty, and have conducted and published research in their field. Associate professors should have 9 years' experience, 4 as an assistant professor or its equivalent, i.e. lecturer.

Conditions of Appointment

Salaries: Total monthly salaries will be within the following scales according to qualifications and experience (1 KD=£1.8, US $3.5 approx.).

- Associate Professors with clinical appointments: KD 969–1129 (8 increments).
- Associate Professors non-medically qualified: KD 855–1015 (8 increments).
- Assistant Professors with clinical appointments: KD 748–908 (8 increments).
- Assistant Professors non-medically qualified: KD 660–820 (8 increments).

Clinical supplements: In addition to the above University salaries there will be a monthly supplement paid by the Ministry of Public Health for ten months' a year to medical school staff with clinical service commitments. These are:

- Associate Professor: KD 150
- Assistant Professor: KD 100

Gratuity: There is a gratuity of one month's basic salary for each year employed payable on termination of contract.

Housing: Suitably furnished, air-conditioned accommodation, electricity and water are provided free of charge.

Medical care: Free, comprehensive treatment is available in Kuwait under the State Health Service.

Travel: Air tickets are provided from the country of recruitment for the appointee, spouse and up to three dependent children under 20 years. Thereafter, return air tickets are issued annually to the country of citizenship or permanent residence. On termination of contract, air tickets are provided to the country of recruitment. A baggage and freight allowance is also provided. In addition, travel expenses for attending one scientific meeting a year are paid by the University.

Vacation: Sixty days paid annual leave and various national holidays.

Education: This is provided free in state schools where the instruction is in Arabic. Staff who have to send their children to non-Arabic schools in Kuwait will have the tuition fees of up to a maximum of three met by the University.

Taxation: There is no income tax in Kuwait. Currency is transferable without restriction.

Method of Application

Curriculum vitae in duplicate, which should include the names of three referees, personal particulars, qualifications with dates, career history, teaching experience, research accomplishments and, where appropriate, clinical experience should be sent to the Dean, Faculty of Medicine, University of Kuwait Health Science Centre, PO Box 24923 Safat, Kuwait to arrive no later than October 30th, 1982.

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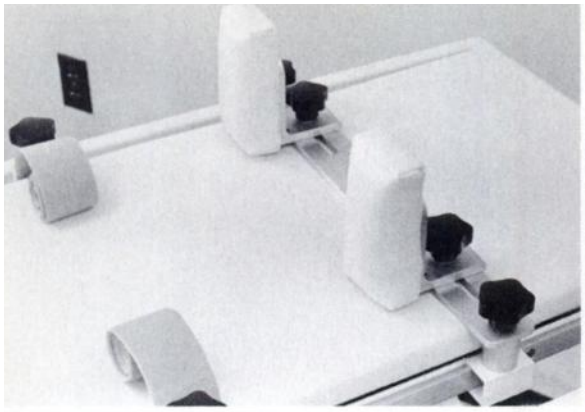

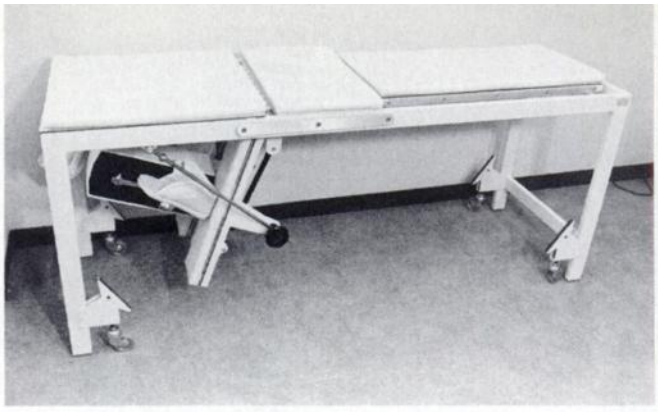

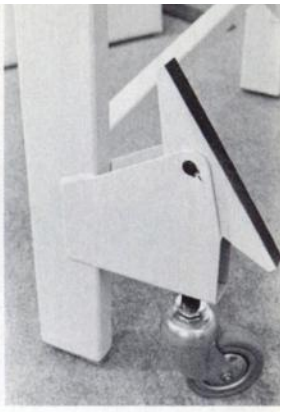

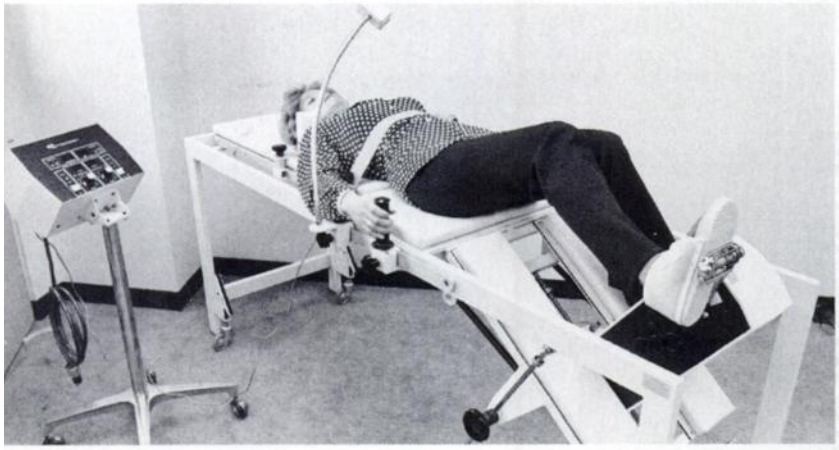

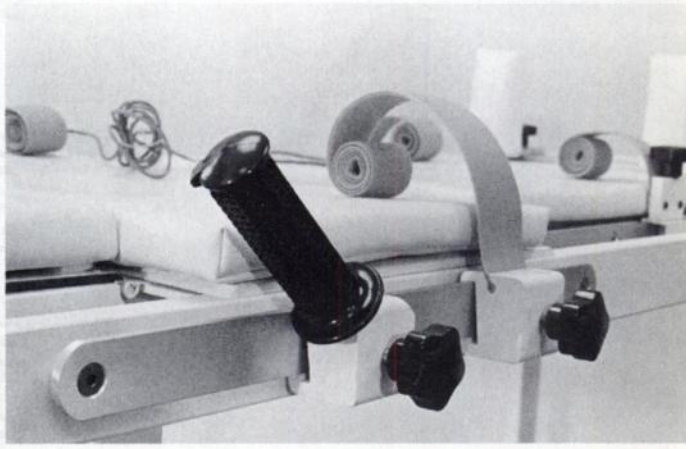

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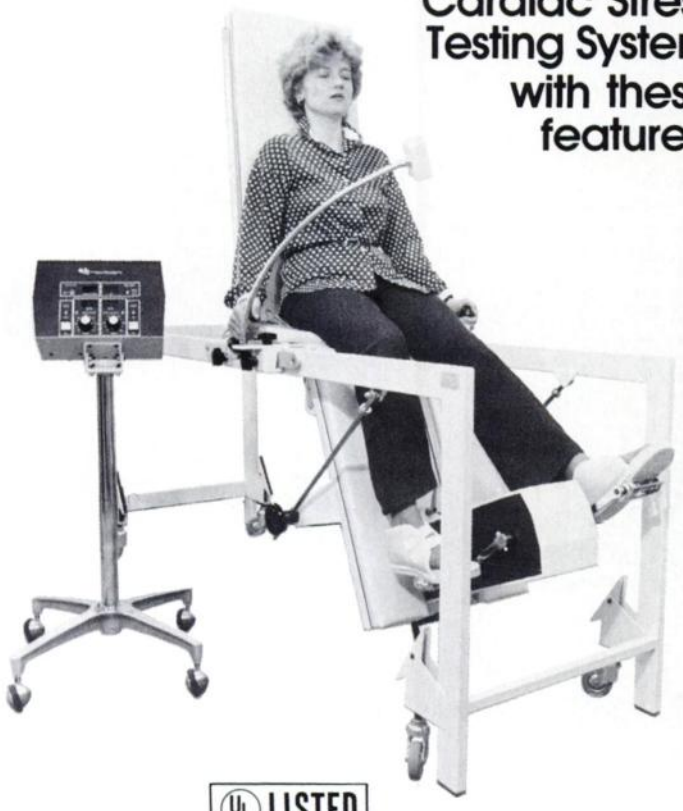

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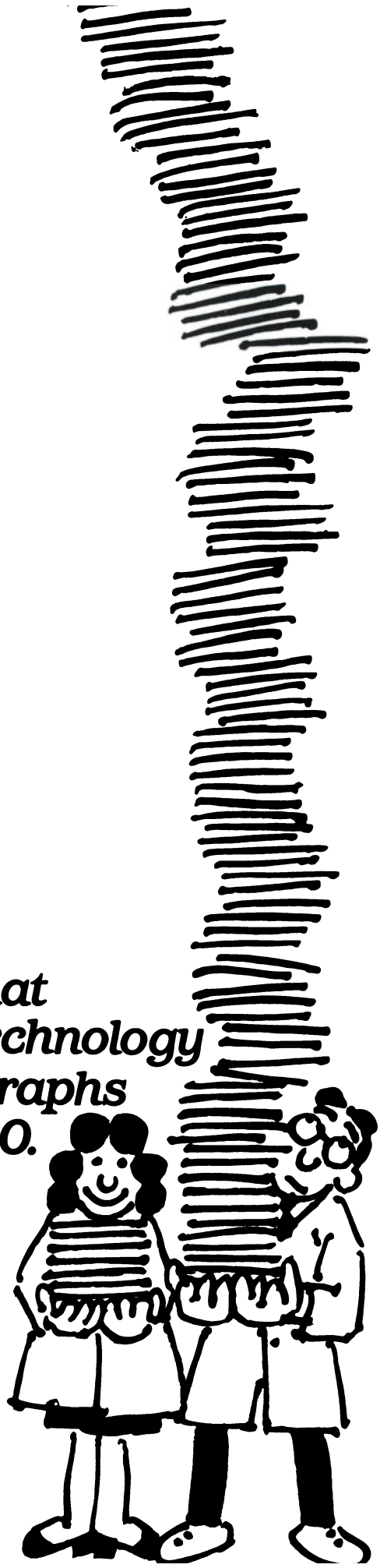

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