45TH ANNUAL MEETING

TECHNOLOGIST SECTION PROGRAM

Proceedings of the 45th Annual Meeting of The Society of Nuclear Medicine June 7–11, 1998—Toronto, Ontario, Canada

TECHNOLOGIST SECTION OFFICERS: 1997–1998

Kathy S. Thomas, MHA, CNMT, FSNMTS
President

Lynne T. Roy, MBA, CNMT, FSNMTS
President-Elect

Frances L. Neagley, CNMT
Acting Treasurer

Frances L. Neagley, CNMT
Finance Committee Chair

Mark H. Crosthwaite, CNMT
Secretary/Historian

Martha W. Pickett, CNMT, FSNMTS
Immediate Past President

CONTENTS

1998 SCIENTIFIC AND TEACHING SESSIONS COMMITTEE

Patti L. Corrigan, CNMT
Program Chair

Mary Jo Struttman, CNMT
Program Chair-Elect

Ann M. Alessi, CNMT
Yasmin K. Allidina, CNMT
Albert J. Arroyo, CNMT, FSNMTS
Carol V. Bonanno, CNMT, FSNMTS
Nanci A. Burchell, CNMT
Christina M. Carlson, CNMT, FSNMTS
Mickey T. Clarke, CNMT
Valerie R. Cronin, CNMT
Michele L. Early, CNMT
Jason Ramon Fawbush, CNMT, RT(N)
Sandra L. Ferency, CNMT
Lynnette A. Fulk, CNMT, FSNMTS
Michele A. Ganske, CNMT
Gracia A. Garrido, CNMT
Susan P. Gavel, CNMT
Susan A. Gilbert, CNMT
Richard Gillon, CNMT
Deborah H. Havens, CNMT
Lisa M. Hazen, CNMT
Joni L. Herbst, CNMT
Frances K. Keech, FT(N), MBA
Nellie L. Kelty, CNMT
Kathleen M. Krisak, CNMT
Steven W. McFarland, CNMT
Brenda A. McSherry, CNMT
Abraham Morris
Donna M. Natale, CNMT
Frances L. Neagley, CNMT
Lorie A. Overbey, CNMT
David J. Perry, CNMT
Deborah L. Perry, CNMT
Janice S. Preslar, CNMT
Carol J. Schutz-Ferino, CNMT
Vicki J. Sharp, RT(N)
Eileen O. Smith, CNMT
Carole A. South-Winter, CNMT
Howard K. Teng, CNMT
Kristen M. Waterstram-Rich, CNMT

45TH ANNUAL MEETING PROGRAM INFORMATION

GENERAL INFORMATION

Metro Toronto Convention Centre, 255 Front Street West, Toronto, Ontario, Canada M5V 2W6; (416) 585-8000.
Rooms are in the Convention Centre unless otherwise noted.

ANNUAL MEETING HIGHLIGHTS

For the 21st consecutive year, Henry N. Wagner, Jr., MD, of the Johns Hopkins Medical Institutions will share his views of the presented papers at the Annual Meeting. As in prior years, Dr. Wagner will relate current advances to previous work and to future directions in the field of nuclear medicine. Dr. Wagner's presentation is Thursday, June 11, at 11:30 am in Hall G.

AUDIO–VIDEO SALES BOOTH

Audio cassettes and videotapes of many of the sessions can be purchased at the SNM Marketplace in the Exhibit Hall.

BUSINESS MEETING

The Annual Business Meeting is now combined with the Welcome Reception on Sunday evening. Reports from SNM's President, H. William Strauss, MD, and SNM–TS President, Kathy Thomas, MHA, CNMT, FSNMT, will precede the installation of James W. Fletcher, MD, as SNM's new president.

Sunday, June 7
7:00 pm–7:30 pm
Sheraton Grand Ballroom

CAR RENTAL

SNM has made arrangements with Hertz Rent-A-Car for special convention rates in Toronto. Rates are for one week prior to and after the Annual Meeting. A five-day minimum stay is required for weekly rates. Call Hertz directly at 1-800-654-2210, 24 hours a day. Use code #17975.

CHAPTER BOWL

Tuesday, June 9, from 4:00 pm–5:30 pm, in the North Building, Room 206BDF, of the Convention Centre. Cheer on teams from the Eastern Great Lakes Chapter and the Missouri Valley Chapter as they compete in the biggest challenge at the Annual Meeting.

SOCIETY COMMITTEE MEETINGS (Sheraton)

Board of Directors: Friday, June 5
Saturday, June 6
Committees: Saturday, June 6
House of Delegates: Sunday, June 7
Business Meeting: Sunday, June 7

CONTINUING EDUCATION BOOTH

Physicians, scientists, pharmacists and technologists are encouraged to drop by the Continuing Education booth in the registration area and speak with Continuing Education Manager Marcia Ferg regarding any continuing education issues, especially those regarding adherence to ACCME essentials and guidelines. Reminder: This is where all Evaluations/CE Booklets are to be turned in.

CONVENTION CENTRE

Metro Toronto Convention Centre
255 Front Street West
Toronto, Ontario, Canada M5V 2W6
(416) 585-8000

COPYRIGHT INFRINGEMENT POLICY

Due to copyright restrictions and other legal issues, only the contractor authorized by SNM, which has obtained written permission from the presenters, is permitted to audiotape or videotape scientific sessions. All other audiotaping or videotaping is strictly prohibited.

COUNCIL BUSINESS MEETINGS

Radiopharmaceutical Science Council	Sunday, June 7, 3:30 pm–5:00 pm, Room 703
Academic Council	Monday, June 8, 11:15 am–12:15 pm, Room 708
Cardiovascular Council	Monday, June 8, 5:30 pm–6:30 pm, Room 701B
Pediatric Imaging Council	Tuesday, June 9, 11:30 am–12:30 pm, Room 716
Brain Imaging Council	Tuesday, June 9, 11:15 am–12:15 pm, Room 801B
Computer and Instrumentation Council	Tuesday, June 9, 11:15 am–12:15 pm, Room 717
Clinical Trials Council	Tuesday, June 9, 5:30 pm–6:30 pm, Room 703

DISCLAIMER

The data and opinions appearing in the abstracts and advertisements described herein are the sole responsibility of the contributor or advertiser. The publisher, the Scientific and Teaching Sessions Committee, the reviewers, the SNM staff and their respective employees, officers and agents are not responsible for the consequences of reliance on data, opinion or statements contained herein. It is the responsibility of every practitioner to evaluate the appropriateness of a particular opinion in the context of actual clinical situations and with due consideration to new developments.

EXHIBIT HALL HOURS

Commercial exhibits may be viewed in the Exhibit Hall from 10:30 am–5:00 pm on Monday; 10:00 am–5:00 pm on Tuesday and Wednesday; and from 8:00 am–Noon on Thursday.

Scientific exhibits and posters may be viewed in Hall F and the Swing Space (Room 808) from 10:30 am–7:00 pm on Monday; 7:00 am–7:00 pm on Tuesday and Wednesday; and from 7:00 am–Noon on Thursday.

Admission to the Exhibit Hall is by badge only. Please take time to visit the exhibits and speak with our commercial sponsors.

Note: Exhibits close at noon on Thursday, June 11. Coat and baggage check will be available in the registration area of the Convention Centre until 2:00 pm on Thursday.

EXHIBITOR USER MEETING SCHEDULE

The following exhibitors will be holding User Meetings on Sunday, June 7, from 3:00 pm–7:00 pm:

Crowne Plaza

MDS Nordion—Ontario Room
Picker International—Ballroom A & B

Sheraton

Coulter Pharmaceutical, Inc.—Dominion Ballroom
Cytogen Corporation—Rooms B & C
Elscint, Inc.—Civic Ballroom
Focus Imaging—Wentworth
GE Medical Systems—Grand Ballroom East
SMV—Essex Ballroom
Trionix Research Laboratory—Simcoe & Dufferin

Royal York

ADAC Labs—Canadian Room
DuPont Pharma Radiopharmaceuticals—Imperial Room
Siemens Medical—Concert Hall
U.S. Department of Energy—Tudor 7, 8 & 9

Toronto Colony

Immunomedics, Inc.—Colony Grande Ballroom

HOME PAGE ADDRESS

http://www.snm.org

HOSPITAL INFORMATION

St. Michael's Hospital (5–10 minutes away)
30 Bond Street
Toronto, Ontario, Canada
(416) 360-4000

Sunnybrook Health Sciences Centre (15 minutes away)
2075 Bayview Avenue
Toronto, Ontario, Canada
(416) 480-6100

HOTELS AND PHONE NUMBERS

All phone numbers are area code (416)

Cambridge Suites Hotel	368-1990	(800) 463-1990
Crowne Plaza	597-1400	(800) 422-7969
Delta Chelsea Inn	595-1975	(800) 243-5732
Holiday Inn on King	599-4000	(800) 263-6364
Metropolitan Hotel	977-5000	(800) 668-6600
Royal York Hotel	368-2511	(800) 663-7229
Sheraton Centre Toronto (Headquarters Hotel)	361-1000	(800) 325-3535
Skydome Hotel	341-7100	(800) 341-1161
The Sutton Place Grande Hotel	924-9221	(800) 268-3790
Toronto Colony Hotel	977-0707	(800) 777-1700
Toronto Hilton	869-3456	(800) 445-8667
Toronto Marriott Eaton Centre Hotel	597-9200	(800) 228-9290

JOB EXCHANGE

Information about positions wanted and positions available will be posted in the Swing Space (Room 808) of the Convention Centre.

MEMBERSHIP BOOTH

Members and nonmembers are encouraged to stop by the Membership Booth during registration hours. SNM staff will be available to help current members update their memberships and to offer assistance to nonmembers who wish to join. Nonmember meeting registrants are eligible for our special membership offer, which allows them to apply the difference between the member and nonmember registration fee to cover SNM membership dues for the remainder of 1998. To take advantage of this special offer, nonmember registrants must submit a membership application before the end of the meeting. The membership booth will be open Friday, June 5, through Thursday, June 11, during registration hours in the registration area.

MESSAGE CENTER

Messages for meeting attendees will be posted in the registration area from 8:00 am to 5:00 pm, Monday, June 8, through Wednesday, June 10, and until 12:30 pm on Thursday, June 11.

PRESS OFFICE

The SNM Press Office is located in Room 833. The room is open to all press representatives from 8:00 am–5:30 pm, Monday through Wednesday. An SNM press liaison will be present to arrange for press interviews.

PUBLICATIONS BOOTH

SNM books will be on sale during exhibit hours in SNM's Marketplace in the Exhibit Hall.

REGISTRATION HOURS

Toronto Convention Centre

Registration Level	
Friday, June 5, 1998	3:00 pm–7:00 pm
Saturday, June 6, 1998	6:30 am–6:00 pm
Sunday, June 7, 1998	7:00 am–5:00 pm
Monday, June 8, 1998	7:00 am–5:00 pm
Tuesday, June 9, 1998	7:00 am–5:00 pm
Wednesday, June 10, 1998	7:00 am–5:00 pm
Thursday, June 11, 1998	7:00 am–11:00 am

Note: Name badges are required for admission to the Exhibit Hall, all educational meetings and social events. Children under the age of 16 will not be admitted into the Exhibit Hall.

SHUTTLE BUS SERVICE

SNM has enlisted Seat Planners, Inc. to manage all shuttle transportation service. Signs listing all routes will be placed by the South Ceremonial entrance of the Convention Centre and in each hotel lobby. In addition, hotel front desks will have copies of the shuttle schedule. The front and side windows of the buses will display route signs. Shuttle service to the Convention Centre will not be provided from the Crowne Plaza, Skydome and Royal York hotels.

Shuttle service will be provided Friday, June 5, through Thursday, June 11, to the Convention Centre during the following times:

Friday, June 5, 1998	3:00 pm–7:00 pm
Saturday, June 6, 1998	7:00 am–7:00 pm
Sunday, June 7, 1998	7:00 am–10:00 pm
Monday, June 8, 1998	7:00 am–10:00 pm
Tuesday, June 9, 1998	7:00 am–10:00 pm
Wednesday, June 10, 1998	7:00 am–10:00 pm
Thursday, June 11, 1998	7:00 am–2:00 pm

Note: Designated buses will depart from the Sheraton and proceed directly to the airport on Thursday, June 11.

SNM MARKETPLACE

See SNM's products and services on display in SNM's Marketplace in the Exhibit Hall.

SPEAKER BREAKFAST

A Speaker Breakfast will be held daily in Room 810 at 7:00 am Monday, June 8, through Thursday, June 11. If you are a speaker at any session during the meeting, please plan to attend.

SPEAKER READY ROOM

Program participants may acquire slide trays as well as preview and time their presentations in the Speaker Ready Room located in Room 802 of the Convention Centre. An audiovisual technician will be available during scientific session hours to assist you with your slides. The time required for presentation of scientific papers must not exceed the time allotted, so please be prompt and pace yourself accordingly.

SPONSORSHIPS

The Society of Nuclear Medicine would like to extend a special thanks to the following companies. We appreciate their interest in and support of our Annual Meeting:

DuPont Pharma Radiopharmaceuticals—Registration Bags
GE Medical Systems—Welcome Reception
Hitachi Medical Corporation—Notepads
Mallinckrodt Medical, Inc.—Pens
Picker International—SPECT Brain Imaging Practica Computer, Registration Bags
SMV—Post-It Notes

TAXI CAB SERVICE

(Area code is 416)
Co-Op Cabs 504-4016
Diamond Taxi Cab 366-6868

TECHNOLOGIST SECTION MEETINGS

Committees: Thursday, June 4
National Council: Friday, June 5
Business Meeting: Wednesday, June 10

TECHNOLOGIST SECTION SCIENTIFIC PROGRAM AND BUSINESS MEETING/SCIENTIFIC AWARD CEREMONY

Wednesday, June 10
12:30 pm–2:00 pm
Room 713

SOCIAL ACTIVITIES

Companions' Program

SNM invites the companions of Annual Meeting attendees to experience Toronto in a unique way. A companions' lounge, located in the registration area, will be open on Monday and Wednesday from 8:30 am to 11:00 am with a complimentary continental breakfast. Meet your friends and plan your day's activities in the lounge. Don't forget to sign up on Monday (in the lounge) for Tuesday's breakfast and fashion show.

International Lounge

SNM will provide a lounge for all international visitors attending the Annual Meeting. The lounge will be located in the registration area.

Technologist Party

Wednesday, June 10
Sheraton Grand Ballroom
8:00 pm–Midnight

Join us at the Sheraton for a night of fun and dancing. The party is sponsored by all of our exhibitors. Buses will depart from all SNM hotels beginning at 7:30 pm. The last bus from the Technologist Party to all SNM hotels will depart at 12:15 am.

Please Note: Your badge is your admittance ticket to the Technologist Party. No one will be admitted without a badge.

Technologist Section First-Timers Breakfast

Monday, June 8
7:00 am–8:00 am
Room 708

Tour Booth

"Welcome to the City" will staff a booth in the registration area during registration hours. Stop by and sign up for a unique tour of Toronto.

Welcome Reception

Sunday, June 7
Sheraton Grand Ballroom
7:00 pm–9:30 pm

This year's Welcome Reception will take place in the Grand Ballroom of the Sheraton. The starting time of 7:00 pm will allow us to combine SNM's Business Meeting with the Welcome Reception. SNM cordially invites all members and friends to attend. Buses will run from 6:30 pm–10:00 pm from the Sheraton to all SNM hotels.

CONTINUING EDUCATION

The SNM 45th Annual Meeting is intended for all nuclear medicine physicians, scientists, pharmacists and technologists.

EVALUATION/CONTINUING EDUCATION BOOKLET

We're doing something new this year. In your registration packets you will find an Evaluation/CE Booklet. This booklet contains the Meeting's General Evaluation Form, Evaluation Forms for each session (including poster/paper sessions) and the familiar Continuing Education Reporting Forms.

CRITICAL FOR CONTINUING EDUCATION: PRINT YOUR NAME AND ADDRESS ON THE FIRST PAGE OF THIS BOOKLET. This verifies your participation at the various sessions.

Please note the index at the beginning of the booklet. This index will allow you to easily locate the evaluation forms for the sessions you attend. After attending a session, complete the individual evaluation in the booklet. If you want credit for attending the session, and it has been approved for VOICE, complete the VOICE Credit Reporting Form.

All participants must complete the General and Individual Evaluation Forms for this meeting to receive credit. All the forms are found in the Evaluation/CE Booklet that you receive in your registration packet. When the meeting is over (for you) complete the General Evaluation Form. If you wish to receive Continuing Education, tally your total credits and enter them onto the Backup Documentation Page. Remove that page and keep it for your records. Return the entire completed booklet to the CE Booth in the Lobby or mail the entire booklet to the Reston office by June 26, 1998.

TECHNOLOGIST CE CREDIT INFORMATION

The SNM Technologist Section, through its VOICE program, has approved qualified courses at this meeting for a maximum of 34.75 CEH (continuing education hours). VOICE-approved credit is recognized by most licensure states and by the ARRT (as Category A credit). Report only those lectures at which you were present for 80% of the presentation.

At the end of the meeting, all technologists are to leave their completed Evaluation/CE Booklet at the Continuing Education Booth (located near Registration). SNM-TS members keep the completed Backup Documentation Page only for their records. Non-SNM-TS members keep both the completed Credit Reporting Form and Backup Documentation Page for their records.

PHYSICIANS AND PHARMACISTS—ACCREDITATION STATEMENTS

SNM is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to sponsor continuing medical education for physicians.

SNM designates this educational activity for up to 33.75 hours in Category 1 credit toward the AMA Physician's Recognition Award. Each physician should claim only those hours of credit that he or she actually spent in the educational activity.

The Society of Nuclear Medicine is approved by the American Council on Pharmaceutical Education (ACPE) as a provider of continuing pharmaceutical education.

The ACPE Universal Program Numbers for this meeting are:
210-000-98-003-L04—SNM 45th Annual Meeting—General Pharmacy (31.75 hours)
210-000-98-004-L01—SNM 45th Annual Meeting—Drug Therapy (15 hours).

Many of the Technologist Section CE courses also have been approved for CME and ACPE credit. (Check specific program listings.) All physicians and pharmacists are invited to participate.

PHARMACIST—ACPE-APPROVED LECTURES

Listed below are the Technologist Section courses that have been approved for pharmacy (ACPE) credit. In the Program/Show Directory these courses are identified by CPE.

SNM 45th Annual Meeting—General Pharmacy
210-000-98-003-L04 (31.75 credit hours maximum—3.175 CEUs)

SESSION TITLES (# CREDIT HOURS)

Sat. 6/6: Advanced Cardiac Life Support (ACLS) Provider Initial Training (5.0)
Sun. 6/7: Nuclear Medicine Refresher Course (4.5)
Web Pages with HTML (4.5)
Honing Your Skills for Health Care 2000 (5.75)
Recertification Class for Advanced Cardiac Life Support (ACLS) (5.0)
Nuclear Cardiology—Technologist Program (1.5)
Mon. 6/8:
Practical Radiation Safety in the 90s (3.0)
Imaging with New Radiopharmaceuticals I (3.0)
Tue. 6/9: Brain SPECT from All Angles (4.5)
Nuclear Cardiology I (1.5)
Nuclear Cardiology II (1.5)
Nuclear Cardiology III (1.5)
How Shall I Filter? Let Me Count the Ways (1.5)
Gastrointestinal and Renal Imaging (4.5)
Hot New Ideas and Devices (1.5)
NRC Regulations Update (1.5)
Wed. 6/10: Nuclear Imaging of Musculoskeletal Disorders (3.0)
Clinical Research in Nuclear Medicine (3.0)
All You Wanted to Know About the X, Y, Zs in Management (1.5)
SNM 45th Annual Meeting—Drug Therapy
210-000-98-004-L01 (12 hours maximum—1.2 CEUs):
Imaging with New Radiopharmaceuticals II (3.0)

GRIEVANCE POLICY

The SNM has the following grievance policy in place concerning continuing pharmaceutical education:

If participants are not satisfied with the program, they must submit a complaint no later than 90 days after the program. Participants should state in detail why the program attended was not satisfactory. If participants feel that the program did not meet its objectives, this should be clearly stated. Also, if participants feel that the program was misrepresented, they should state this clearly. (Please note that not meeting the objectives does not always warrant a refund.)

The complaint is then forwarded by the SNM to the course organizer. The organizer then carefully reviews the complaint and, if necessary, contacts the author of the complaint for further details. The organizer then decides whether the complaint is strong enough to deserve a refund. The organizer then reports the results to SNM. If a refund is issued, it excludes the processing fee of the registration.

Marcia F. Ferg, CE Manager
SNM Education Department, 1850 Samuel Morse Drive, Reston, VA 20190-5316
Phone: (703) 708-9000 x210
email: mfergsnm.org

ABSTRACT ACCEPTANCE/REJECTION AND JUDGING CRITERIA

Many have asked to see in writing the criteria on which the decision to accept or reject abstracts is made. In an attempt to standardize the criteria and make the process as objective as possible, the Scientific and Teaching and Awards Committees of the Technologist Section offer the criteria used this year.

Basic Requirements

1. Abstracts must be an original idea, a new concept or an improvement of an old idea. Case studies are not acceptable.
2. Abstracts could not represent works in progress.
3. All abstracts would be considered, but only those abstracts whose primary author and presenter is a technologist would be considered for technologist awards.

Judging Acceptance

1. Each abstract was sent to five reviewers for scoring.
2. Scoring was 1 through 5, with 5 the highest score. Tenths of points could be used.
3. Abstracts had to receive an overall average score of 3.0 to be considered for oral or poster presentation.
4. The judging categories for acceptance/rejection are the same as for final judging of awards as below:

   A. Scientific merit
   B. Organization
   C. Practicality
   D. Presentation
   E. Technical quality

5. Each category above was given a numerical score, the total score summed and the average calculated. This average score was recorded for each abstract for each of the five reviewers. The abstract was deemed acceptable if the average of the five reviewers was 3 or above.
6. If the abstract was accepted, then the decision of presentation as an oral or poster was made by majority decision of the five reviewers. In case of a tie, the final decision was at the discretion of the Scientific and Teaching Chair.

	Room 705	Room 713 A/B Videotaped Courses	Room 707	Room 709	Room 703	Room 706	Room 708
	SATURDAY, June 6						
8:30-2:30	Advanced Cardiac Life Support Initial Training (ACLS)						
	SUNDAY, June 7						
8:30-2:30	ACLS Recertification Class / Nuclear Medicine Refresher Course / Health Care 2000 / Internet / Nuclear Cardiology - Technologist Program / JRCNMT Workshop						
	MONDAY, June 8						
8:00-10:15	**PLENARY SESSION**						
10:15-11:30	Exhibit Hall Is Open						
11:30-12:30	Lunch						
12:30-2:00	**Radiation Safety in the 90's**	**How to Market Your Department**	**Legislative / Government**	**Update on New Cancer Imaging Agents**	**Papers**	**NMTCB - Where We've Been**	
2:00-2:15	Exhibits / Break						
2:15-3:45	**Radiation Safety in the 90's**	**Winner's Circle: Marketing Successes**	**Legislative / Government**	**Update on New Cancer Imaging Agents**	**Papers**	**NMTCB - Continuing Competency**	
	TUESDAY, June 9						
8:00-9:30	**Do You Know Filtering?**	**Nuclear Cardiology I**	**Imaging From All Angles**		**Papers**		**Student Papers**
9:30-9:45	Exhibits / Break						
9:45-11:15	**QC Performance and Acceptance Testing**	**Nuclear Cardiology II**	**Imaging From All Angles**	**Gastrointestinal and Renal Imaging**	**Papers**		**Student Papers**
11:15-12:30	Exhibits / Break						
12:30-2:00	**FDG Imaging Considerations**	**Nuclear Cardiology III**	**Imaging From All Angles**	**Gastrointestinal and Renal Imaging**	**Papers**	**Problem-Based Learning Workshop**	**Registry Review**
2:00-2:15	Exhibits / Break						
2:15-3:45	**New Ideas/Devices**	**Reimbursement**	**NRC Update**	**Gastrointestinal and Renal Imaging**	**Papers**	**Problem-Based Learning Workshop**	**Registry Review**
3:45-4:00	Exhibits / Break						
4:00-5:00						**Problem-Based Learning Workshop**	**Registry Review**
	WEDNESDAY, June 10						
8:00-9:30	**Professionalism**	**Radiopharmaceuticals for Cancer Imaging and Therapy**	**Research & Development**	**Bone Scanning in the 90's**	**Item Writer's Workshop I**		
9:30-9:45	Exhibits / Break						
9:45-11:15	**Management**	**Radiopharmaceuticals for Cancer Imaging and Therapy**	**Research & Development**	**Bone Scanning in the 90's**	**Item Writer's Workshop II**		
11:15-12:30	Lunch / Exhibits						
12:30-2:00	**TECHNOLOGIST AWARDS AND BUSINESS MEETING - *ALL INVITED***						

Dates and times are subject to change.

ABSTRACTS OF SCIENTIFIC PAPERS

A Note on Scientific Papers

The Scientific and Teaching Sessions Committee of the Society of Nuclear Medicine–Technologist Section is pleased to present the scientific paper abstracts for the 45th Annual Meeting. The scientific papers will be presented commencing Monday, June 8 in sessions beginning at 12:30 pm.

Monday, June 8, 1998

PLENARY SESSION AND FORMAL OPENING

8:30am–10:15am **Hall G**

A continuous slide/tape presentation of the commercial fellowship winners will be played: DuPont Pharmaceutical Fellowships, Mallinckrodt Research and Development Fellowship.

Welcome Remarks
H. William Strauss, MD
William C. Eckelman, PhD
Kathy Thomas, MHA, CNMT, FSNMT
Patti L. Corrigan, CNMT

Henry Wagner Lectureship
Presentation of lecture by Frans H. Corstens, MD

CE Course Preview
H. William Strauss, MD

Georg de Hevesy Award
Introduction of Nagara Tamaki, MD; and
Heinrich R. Schelbert, MD, PhD
Presented by H. William Strauss, MD

Paul C. Aebersold Award
Introduction of Gerd Muehllehner, PhD
Presented by Stanley J. Goldsmith, MD

Cassen Award
Introduction of Henry N. Wagner, Jr., MD
Presented by Richard C. Reba, MD

Closing
H. William Strauss, MD

Opening of the 1998 Exhibits

Monday, June 8, 1998

Session 201

Brain Imaging Papers

12:30pm–2:00pm **Room 703**
Moderator: Miriam K. Miller, CNMT, FSNMTS
Co-Moderator: Lisa M. Hazen, CNMT

No. 1400

QUANTITATIVE TECHNETIUM-99M BICISATE BRAIN IMAGING IN THE EVALUATION AND FOLLOW-UP OF ISCHEMIC/METABOLIC OR CLOSED HEAD INJURY PATIENTS RECEIVING HYPERBARIC OXYGEN THERAPY. P.M. Bruch MS,CNMT, L.W. Keim, M.D., J.H. Hankins, M.D., J.F. Aita, M.D., T.A. Spethman, R.N., B.S.N., P.A. Shalberg, L.P.N.. Clarkson Hospital, Omaha, NE.

The purpose of this investigation was to determine if quantitative Tc-99m BICISATE (Neurolite) Brain SPECT imaging can be useful to evaluate the cerebral microvascular blood flow changes to the brain of patients undergoing hyperbaric oxygen (HBO) treatments. Ten patients with documented ischemic/metabolic or closed head injury events were imaged utilizing 25mCi Tc-99m BICISATE injected one hour after HBO therapy and scanned one hour after injection. Intervals for SPECT scanning pre- and post-HBO therapy were set which included a pre-HBO SPECT scan followed on the next day by a post-HBO (2-hr p therapy) SPECT scan and subsequent scans after each treatment regimen of 40-HBO treatments. Quantitative, four-quadrant slice regions were evaluated on each SPECT study. Three slices were analyzed on an average count per pixel basis. Brain slices were within 2cm. of each other. Observations to date suggest that clinical improvement in patients with neurologic injuries treated via HBO therapy can be documented by serial quantitative SPECT imaging.

No. 1401

ALTROPANE: AN IMPORTANT LIGAND FOR PET AND SPECT IMAGING OF DOPAMINE TRANSPORTER (DAT) SITES. S.A. Barrow, J.W. Babich, B.K. Madras, A.A. Bonab, A.J. Fischman. Division of Nuclear Medicine, Massachusetts General Hospital, Boston MA.

Parkinson's disease (PD) is associated with reductions in density of presynaptic dopamine transporter (DAT) sites in the striatum and DAT ligands radiolabeled for PET or SPECT are useful for disease detection and progression monitoring. In this investigation, we compared single photon imaging (planar and SPECT) with [I-123] 2ß-carbomethoxy-3ß-(4-fluorophenyl)-N-(1-iodoprop-1-en-3-yl)nortropane (I-123-Altropane) to [I-127, C-11] Altropane PET in monkeys.

Altropane was radiolabeled with [I-123] and [C-11] via tributylstannyl and [I-

127] desmethyl precursors for single photon and PET studies respectively. For planar studies, monkeys (n=2) positioned with the lateral aspect of their heads parallel to the face of a single-headed gamma camera (Siemens, Orbiter) were injected with ~5 mCi of [I-123] Altropane and 1.0 min. images were collected for 80 min. One week later, imaging was repeated with injection of displacement doses of an unlabeled DAT ligand (WIN35,428) at 40 min. In 3 additional animals, SPECT was performed at 45 min. after injection. Sixty-four 45 sec. images were acquired over 360° (128 x 128) matrix and reconstructed with a standard filtered back projection algorithm (Butterworth filter, cutoff = 0.7, order = 7). A 3rd group of monkeys (n=3) was injected with 5 mCi of [I-127, C-11] Altropane and 1.0 min. PET images (PC-4096) were acquired for 90 min. Images were collected in a 128 x 128 matrix and reconstructed with a resolution of 6 mm (Hanning filter).

The planar images showed significant accumulation in the striatum. In early images there was diffuse accumulation of radioactivity throughout the brain, however, by 30 min. there was excellent contrast between striatum and the rest of the brain which washed out slowly. Injection of CFT resulted in complete displacement of the tracer. The SPECT images showed excellent striatal contrast with striatum-to-cerebellar ratios of ~5:1. PET produced superb images of the striatum; accumulation peaked by 5 min. after injection and washed-out slightly over the next 85 min. Striatal-to-cerebellar ratios were 4 to 5. In contrast, tracer accumulation in thalamus, mid-brain, occipital and frontal cortex and cerebellum was lower and decreased much more rapidly.

These results indicate that Altropane has: 1. Rapid and specific striatal accumulation; 2. High selectivity for DAT sites; 3. Reversible binding kinetics; 4. Straight forward and high efficiency labeling with either [C-11] or [I-123] for PET or SPECT. These properties could make Altropane the ligand of choice for both research and clinical studies of DAT density.

No. 1402

COMPARISON OF F-18 FLUORODEOXYGLUCOSE COINCIDENCE SPECT WITH CONVENTIONAL SPECT IN EPILEPSY, TUMOR, PROGRESSIVE APHASIA AND STROKE. H.G. Liu, E.C. San Pedro, J.M. Mountz, T. J. Mahone and M.V. Yester. University of Alabama at Birmingham Medical Center, Birmingham, AL

PET using F-18 FDG is the standard for evaluation of many CNS diseases. However, the availability of PET restricts its widespread use. The development of new coincidence imaging (CI) SPECT cameras capable of imaging F-18 FDG and the availability of F-18 FDG through centralized distributors allows accessibility of PET technology to routine clinical practice. However, CI requires verification before wide spread clinical application is implemented.

It is known that F-18 FDG coincidence SPECT is less sensitive than F-18 FDG standard PET. We therefore conducted comparisons of F-18 FDG coincidence SPECT to Tc-99m HMPAO/Thallium-201/Tc-99m Sestamibi SPECT in diseases routinely diagnosed by conventional SPECT using these tracers to determine which had the greater sensitivity of disease detection.

Two temporal lobe epilepsy patients, five stroke patients, one patient with progressive aphasia, and three patients with tumors were evaluated using both modalities. Coincidence SPECT was performed after the injection of 185 MBq of F-18 FDG and imaged by the ADAC MCD camera. Regional cerebral blood flow SPECT was performed on the Picker Triple Head Camera after the injection of 740 MBq of Tc-99m HMPAO. Images were evaluated both qualitatively and by semiquantitative analysis.

In both cases of temporal lobe epilepsy the inter-ictal Tc-99m HMPAO SPECT scans were normal, however, marked decreases in temporal lobe uptake of F-18 FDG correctly identified the seizure focus. In the five stroke patients the F-18 FDG scan showed defects in metabolism which were comparable in size and location to the Tc-99m HMPAO defects. In one patient with tumor, F-18 FDG showed a focal area of hypermetabolism in the brain stem which was not visualized on either Thallium 201 or Tc-99m sestamibi SPECT. In a case of progressive aphasia there was greater reduction of F-18 FDG in the temporal lobes as compared to Tc-99m HMPAO.

Coincidence Imaging provides greater contrast and sensitivity compared to Thallium-201 or Tc-99m Sestamibi SPECT in cases of cerebral tumor. These preliminary data also support the clinical advantage of F-18 FDG coincidence SPECT in epilepsy when ictal Tc-99m HMPAO SPECT cannot be performed.

No. 1403

SPECT IMAGING OF THE DOPAMINE SYSTEM AND THE USE OF EXTERNAL RADIOACTIVE REFERENCE MARKERS. **D. Vines, F. Tanaka, M. Ichise.** Division of Nuclear Medicine, Tri-Hospital Department of Medical Imaging, and University of Toronto, Toronto, Ontario, Canada.

External radioactive reference markers have been used to localize the canthomeatal (CM) line and correct for head rotation in perfusion brain SPECT. This ensures that in subjects regardless of their head position or rotation under the SPECT camera, reconstructed transaxial slices are reoriented parallel to the CM line.

The purpose of the present study was to evaluate the use of this approach in dopamine brain SPECT. Imaging of normal controls, and patients with Alzheimer's or Parkinson's disease was performed using a triple headed camera and I-123-β-CIT for dopamine transporters and I-123-IBF for dopamine D2 receptors, respectively. Four radioactive point sources, 0.037-0.0925 MBq (1.0-2.5 μCi) each made of Tc-99m were placed bilaterally at the outer canthus of the eye and the external auditory meatus, respectively. The CM line estimated by visual identification of internal anatomical landmarks without the use of external markers significantly differed from that determined by the external markers. We believe that this is because visual identification of internal landmarks other than the basal ganglia is limited in dopamine SPECT images unlike in brain perfusion images. Another use of external markers is during attenuation correction an ellipse can be drawn around the skull as identified by the external markers. They can also be used to help assess whether there is patient motion and subsequently correct patient motion by realigning the external markers.

In conclusion, we have successfully performed over 70 dopamine transporter-receptor SPECT studies to date, and have found that the use of external markers have been helpful in producing transaxial images oriented in a standard fashion.

No. 1404

CLINICAL EVALUATION OF PARKINSON'S DISEASE WITH DOPASCAN ® I^{123} B-CIT. Alison A. Conway, BS, CNMT S. Khan, M.D., Nellie Kelty, MAS, CNMT.

Purpose:

Parkinson's disease (PD) is a progressive, degenerating disease that depletes presynaptic dopamine transporter sites in the striatum. The purpose of this phase II IND study was to both evaluate an imaging technique and to evaluate the uptake of Dopascan ® I^{123} B-Cit, a new tracer that binds to the dopamine transporters, in patients with newly diagnosed early Parkinson's disease.

Materials and Methods:

Eight newly diagnosed patients with stage 1, Hoehn & Yohr Scale, unilateral PD (5 male/3 female), and 8 normal (5 male/3 female) healthy volunteers were imaged after obtaining appropriate informed consent. Patients were injected with 5.0 (± 0.5) mCi of I^{123} B-Cit, diluted in a 6 mL volume of normal saline solution, one hour after pretreatment of 20 drops of Lugol's solution. Images were obtained at 24 hours (± 2 hours) with an SMV DST dual-headed gamma camera system with a low energy high resolution collimator. External fiducial markers for orientation purposes were placed at both ends of each canthomeatal line and on the right side of the forehead. A 360° SPECT study, with a noncircular orbit, was acquired using a 128 x 128 matrix, 64 stops per head, 20 seconds per stop and a 159 kev energy photopeak with a 20 % window. Data was reconstructed using a Butterworth filter, attenuation correction and zoom processing. Visual analysis was supplemented by semi-quantitative analysis to assess relative uptake in the caudate nucleus and putamen on each side.

Results:

The imaging technique allowed for successful evaluation of 15 patients. One normal patient's study was not evaluable due to patient movement which degraded the images. In healthy volunteers, the tracer accumulated homogeneously throughout the striatum. In newly diagnosed PD patients, unilateral decreased uptake was seen in one patient, as for the other seven all had bilateral decreased uptake in the striatum.

Conclusion:

The results conclude:

1. The fiducial marker technique allows symmetrical orientation of the patients brain for resconstruction. 2. Tracer accumulates uniformly in normal striatum. 3. Decreased accumulation in the striatum of early diagnosed PD patients. 4. Bilateral changes are present in patients with early unilateral symptoms. 5. Imaging with this new tracer may advance the diagnosis and staging of patients with suspected PD.

® Guilford Pharmaceuticals

No. 1405

CEREBRAL WHITE BLOOD CELL KINETICS AFTER ACUTE STROKE S.A. Barrow, R.H. Rubin, A.J. Fischman. Division of Nuclear Medicine, Massachusetts General Hospital, Boston MA.

White blood cell (WBC) infiltration is believed to contribute to tissue damage after acute stroke and myocardial infarction. Thus, drugs that eliminate or reduce this process are currently under active investigation. In this study, we used In-111 and Tc-99m labeled WBC's to study cerebral WBC kinetics after acute stroke.

Within 36 hrs after acute stroke (CVA), patients were co-injected with 0.5 mCi of In-111 and 10 mCi of Tc-99m labeled WBC's and serial brain SPECT studies were performed. Studies were performed at 4-6, 24, 48, 72 and 96 hrs after injection. The images were acquired with a dual headed gamma camera (Siemens, Multi-SPECT II) equipped with fan-beam collimators. All images were collected over 360° (180°/head) in a 128 x 128 digital matrix and were reconstructed with standard filtered back projection algorithm (Butterworth filter, cutoff = 0.5, order = 7). The first two studies were acquired in dual isotope mode and the later images were collected in only the In-111 window. Ten to 14 days after the first imaging study, the patients were re-injected with ~10 mCi of Tc-99m WBC's and imaging was performed 4-6 hrs later. The areas of injury were defined by CT or MRI, regions of interest (ROI's) were drawn over the lesions and corresponding areas of the contralateral hemisphere and lesion-to-contralateral count density ratios (L/C)were calculated.

In persistent infarct, the L/C ratio was ~1 at 4-6 hrs, increased markedly at 24 hrs and returned to ~1 at 48 to 96 hrs after injection. In contrast, when early spontaneous reperfusion occurred, the ratio was near unity at all time points. At 4-6 and 24 hrs, LC ratios measured with In-111 and Tc-99m labeled cells were nearly identical, however, image quality was superior with Tc-99m labeled WBC's. In the 10-14 day studies, L/C ratios were near unity in all cases.

The results of this study indicate that: 1. Radiolabeled WBC's are effective radiopharmaceuticals for studying the cerebral kinetics of white blood cells after acute stroke. 2. In-111 WBC's do not offer any advantages compared with Tc-99m cells. In the future, this technique could be of considerable value for the clinical evaluation of drugs designed to limit or abolish WBC infiltration into regions of CNS injury.

Session 202

Cardiac Papers

2:15pm–3:45pm **Room 703**
Moderator: Anne Orenek, CNMT
Co-Moderator: Jason Ramon Fawbush, CNMT, RT(N)

No. 1406

DETECTION OF VIABLE HIBERNATING MYOCARDIUM USING FDG MOLECULAR COINCIDENCE DETECTION AND Tc-99m TETROFOSMIN SPECT AT REST. B.M. Smith, R.E. Henkin, R.W. Wagner, G.H. Dillehay, J.R. Halama, S.M. Karesh, Loyola University Medical Center, Maywood, IL.

A two-day protocol for imaging the resting distribution of 2-[F-18]-fluoro-2-deoxyglucose (FDG) with Molecular Coincidence Detection (MCD) and of Tc-99m-[6,9-bis(2-ethoxyethyl)-3,12-dioxa-6,9-diphosphatetradecane] (Tetrofosmin) with SPECT was performed to compare the ability of the two procedures to detect hibernating viable myocardium.

Materials and Methods: Seven patients with prior myocardial infarction and known coronary artery disease underwent the two-day protocol. On the first day, one hour after intravenous injection of 185.0 MBq of FDG, heart uptake was imaged using MCD. An ADAC Labs Vertex Epic Plus Dual Head Gamma Camera with 15.9 mm (5/8") crystals was used for each 64 step MCD acquisition at 80 seconds per step. Twenty to 24 hours later the patient was injected with 296.0 MBq of Tc-99m-Tetrofosmin. Thirty minutes post injection a resting SPECT study was performed using a 64-step acquisition at 25 seconds per step. Using the resting SPECT images as a baseline and a 12 segment-mask of the short-axis, two experienced observers performed image evaluation and quantification of relative uptake into the myocardium for each respective radiopharma-ceutical. The scoring of the segments was determined as Normal, Hypoperfused, or No Perfusion.

Results and Conclusions: In five out of seven patients the FDG MCD images identified a greater number of viable segments than the Tetrofosmin SPECT images [107/120 (89.2%) vs 88/120 (73.3%)]. Three out of the five patients showed a dramatic difference in viability [67/72 (93.1%) vs 50/72 (69.4%)]. We conclude that FDG MCD imaging combined with Tc-99m-Tetrofosmin SPECT imaging increases the sensitivity of viability determination and can be a useful tool in assessing the viability of hibernating myocardium.

No. 1407

REPRODUCIBILITY OF EJECTION FRACTION MEASUREMENTS USING Tc-99m TETROFOSMIN DURING CHEST PAIN STUDIES AND DURING STRESS TESTS. W.D. Sharpe, D.H. Lewis, M.M. Gering, T.S. Koches. Harborview Medical Center and University of Washington, Seattle, WA.

PURPOSE: Ejection fraction (EF) measurments in patients undergoing myocardial imaging during episodes of chest pain were compared to EF measurements obtained on the same patients when they returned for followup stress myocardial imaging.
METHODS: Patients without a known history of coronary artery disease presenting to the emergency department were injected with Tc-99m tetrofosmin during episodes of chest pain and EF measurments are obtained from gated imaging (chest pain studies). When these patients return for followup stress testing, the EF is again calculated using gated images. 41 patients that had chest pain studies between September, 1996 and December, 1997 and had followup stress tests were examined. Patients ranged in age from 32 to 78 years (mean 52). There were 27 female patients and 14 male patients. Exercise stress tests were performed in 24 patients, persantine stress tests in 20, and a dobutamine stress test in one. Images were obtained on a Picker 3000 system.
RESULTS: Correlation between chest pain study EF and stress test EF was examined by making a graph with chest pain study EF on the x-axis and stress test EF on the y-axis using the model equation [stress EF] = [chest pain EF] + constant. With perfect correlation, one would expect the two measurements to lie close to the line y=x with a correlation coefficient of 1.00. The correlation coefficient obtained was 0.564 with the average discrepancy between EF's being 6.8%.
CONCLUSION: Ejection fraction measurements are reproducible with approximately 7% variation when comparing those obtained during chest pain studies with those obtained during stress testing.

No. 1408

REGIONAL VARIATION IN IMPROVEMENT OF INFERIOR WALL MYOCARDIAL PERFUSION DEFECTS WITH PRONE IMAGING. **A.M. Collins, M. Szulc, J. Cacciabaudo, and R. Hachamovitch. NY Hospital-Cornell Medical Center, NY, NY.**

Inferior wall SPECT perfusion defects often occur due to diaphragmatic attenuation and have been shown to improve or resolve with prone imaging. Regional variation, inferior wall at the base vs. mid vs. Apex, in defect improvement has not been described.
We identified 38 patients (pts; 37 male, age 64 ± 10) who underwent stress SPECT (25 exercise, 13 adenosine; 3 two day sestamibi, 35 dual tracer) and had prone imaging performed for the stress images. SPECT studies were blindly interpreted by two experienced readers using a 20 segment (seg), 5 point scoring system. Only the 10 inferior wall segs were considered for analysis (inferoseptal, inferior and inferolateral segs at the base, mid and distal LV, inferoapex). Summed scores of the inferoseptal, inferior and inferolateral segs at the distal, mid and basal slices of prone and supine stress SPECT were compared using paired t-test as follows:

	Prone	Supine	p
Apex	8.8 ± 2.3	8.5 ± 2.4	N.S.
Mid	9.5 ± 1.6	8.4 ± 1.7	0.0001
Base	9.2 ± 1.7	8.2 ± 1.9	0.0001

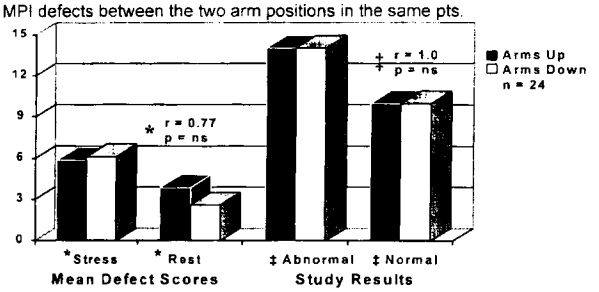
Overall, 20 of 38 pts (53%) had improvement in seg scores with prone imaging. However, at the distal inferolateral wall, 13/38 pts (34%) showed worsening of defects.
The improvement in perfusion defects with prone imaging is manifested in the base and mid-myocardium but not at the distal LV due to worsening of distal inferolateral defects with prone imaging.

No. 1409

Arm Positioning Does Not Affect the Number, Size or Severity of Myocardial Perfusion Defects with Tc-99m Sestamibi SPECT Imaging
DM Cross, MP White, A Russell, CC McGill, DA Clapp, JM Phillips, MJ Ferraro-Borgida, GV Heller Hartford Hospital, Hartford, CT, University of Connecticut School of Medicine, Farmington , CT

SPECT myocardial perfusion imaging (MPI) is routinely performed with patients (pts) arms above their heads to avoid potential attenuation artifacts. Currently, no data is available to support this practice using Tc-99m MPI. Accordingly, twenty-four patients referred for routine rest/stress MPI were imaged using the standard arm up protocol and again with arms down. Pts were injected with 10-45 mCi (370-1665 MBq) of Tc-99m sestamibi and SPECT images were acquired 30-90 minutes later. Eighteen pts were imaged on an ADAC Vertex dual-head camera and six pts on an ADAC Cirrus single-head camera. Images were interpreted by a consensus of experienced readers without knowledge of pt identity, acquisition type or camera using a 17 segment scoring model. (0 = normal to 4 = absent activity) **Results:** There was no significant difference in the stress or rest

scores, as well as either the percentage of abnormal studies or location of MPI defects between the two arm positions in the same pts.



Conclusion: Arm positioning does not impact on interpretation of Tc-99m sestamibi SPECT myocardial perfusion images.

No. 1410

Tc-99m SESTAMIBI CARDIAC SPECT IMAGING WITH LEFT ARM UP VS. DOWN Hershkop M, Allidina Y., Hendler A, Gabrys J., Liu P.

Purpose: Conventional Cardiac SPECT imaging requires the patient to extend their left arm over their head to minimize soft tissue attenuation. This also allows the camera to rotate closer to the patient. Many patients cannot lie motionless with their arm up, thus creating motion artefacts. Patients also complain that lying with their arm up during SPECT scanning acquisition is uncomfortable and sometimes painful.

We compared imaging with the left arm down using simultaneous transmission-emission attenuation correction vs. left arm up , using standard protocol. With the left arm down, we attempted to answer the following questions: Were patients more comfortable? Was motion artefact reduced? Did scan interpretation differ significantly when comparing these methods?

Method: During routine Tc-99m Sestamibi SPECT rest / stress scans, 28 patients had an extra set of images acquired with the left arm down. This was done either for the rest, stress, or both sets of acquisitions. There were 68 sets of images in total , 34 each for left arm up vs. down.

Each set of images was scored semi-quantitatively by two physicians. They scored each SPECT slice , or three slices per set (HSA, VLA, and HLA views). A quantitative motion artefact measurement using amount of pixel-shift was performed with each set of SPECT scans.

A questionnaire was given to patients asking the difference in degree of comfort between acquiring the Cardiac SPECT scan with left arm up vs. left arm down.

Results: Total number of SPECT slices = 102 slices each for arm down and arm up (Total = 204)

Number slices agreed:	Arm up: 92/102	Arm down: 88/102
Number slices disagreed:	Arm up: 10/102	Arm down: 14/102

1.All patients agreed that the arm down position was much more comfortable.

2.No significant patient motion difference was noticed between arm up and arm down.

3.The difference in scan interpretations was not statistically significantly different

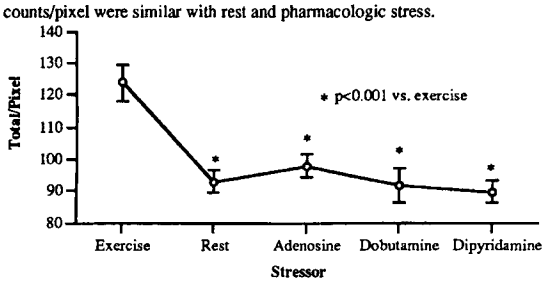
Conclusion:

Tc-99m Sestamibi Cardiac SPECT imaging with the left arm down , using simultaneous transmission-emission attenuation correction appears not to significantly compromise either scan quality or interpretation. The left arm down SPECT acquisition was the method preferred by patients.

No. 1411

Does the Type of Stress Affect Tc-99m Tetrofosmin Myocardial Count Statistics? A Russell, JM Phillips, AW Ahlberg, MP White, NM Moyna, MG Levine, GV Heller. Hartford Hospital, University of Connecticut School of Medicine, Hartford, CT.

Myocardial counts following radiopharmaceutical injection are dependent on the extraction fraction and linearity in relation to increases in coronary blood flow of the specific tracer. Tc-99m tetrofosmin (Tetro) has a lower extraction fraction and plateau effect than either thallium-201 or Tc-99m sestamibi. To evaluate the impact of stress-induced increases in coronary blood flow on myocardial counts, 37 patients (30 with known CAD, 7 low likelihood) were injected with 925-1480 MBq (25-40 mCi) Tetro at rest and during exercise, dipyridamole, adenosine, and dobutamine stress. A standard SPECT image was acquired (64 frames, 25-30 seconds/frame, 180 degree arc) 15-120 minutes following tracer injection. Using a similar projection, total myocardial counts, myocardial counts/pixel and background counts/pixel were determined by drawing a region of interest around the myocardium and adjacent background area. **Results:** (Figure) Myocardial counts were higher ($p < 0.001$) with exercise compared to rest and pharmacologic stress. Myocardial counts and counts/pixel were similar with rest and pharmacologic stress.



Conclusion: Myocardial counts with Tc-99m tetrofosmin are lower with pharmacologic stress compared to exercise. This may have important clinical implications.

Tuesday, June 9, 1998

Session 203

Pediatrics, Renal, Vascular Intervention and Therapy Papers

8:00am–9:30am **Room 703**

Moderator: Patti L. Corrigan, CNMT

Co-Moderator: Kathleen A. Tuttle, CNMT

No. 1412

ICTAL BRAIN SPECT IN THE PEDIATRIC PATIENT: TECHNICAL PROTOCOL. *S Ferency, D Rosenbaum, M Abrahamson, J Donat, K Adamski, D Shaw, P Murphy. Children's Hospital & Regional Medical Center, Seattle, WA.*

In early 1996 we were asked by Neurology to do SPECT scans on children with epilepsy. This report details the challenges and our solution to setting up a protocol for ictal and inter-ictal brain scanning in children. Personnel from Nuclear Medicine, Neurology, and Nursing met to discuss the aim of detecting epileptogentic foci and the logistical problems involved. Four main objectives were delineated: (1) Injection of radiotracer for ictal studies had to occur either during the seizure or within 30 seconds of its onset. (2) Strict radiation safety standards would be maintained, even though injections would be made by non-Nuclear Medicine personnel outside of the Nuclear Medicine department. (3) The scan parameters would be reproducible so that follow-up scans on the same patient could be directly compared to prior studies. (4) Children requiring sedation would be safely and adequately sedated for the duration of the tomographic acquisition. Children were evaluated by a Nuclear Medicine technologist and Radiology nurse at least one day before the brain scan to see if sedation would be necessary, and if so, to decide what medication(s) would be most appropriate for that individual patient. On the day of the exam, a dose of Tc-99m ECD was calculated according to the patient's weight and projected time of injection and delivered to the nurse practitioner on the dedicated epilepsy unit. Prior to dose delivery the patient needed to have a visibly patent I.V. in place. Once the injection occurred, the nurse called the Nuclear Medicine department for syringe pick-up and scan arrangements were then made. We used LEUHR fan collimators on our dual-head system and acquired a 128X128 w SPECT with 60 stops at 25 seconds per stop.

Over a 20 month period we have performed 17 exams: 12 ictal and 5 non-ictal. For 7 of the ictal studies, the mean time of injection after the onset of a seizure was 29 seconds (range: 6 to 81 seconds). Two patients with continuous seizures and 3 with incomplete data are excluded from the average. There were no complications regarding radiation safety (i.e. contamination, improper dose). Use of a patient data sheet made for reproducible scan parameters; additional ictal scans or non-ictal studies could be easily compared. Of the 17 studies, 12 required some sort of sedation. Seven patients were given I.V. Nembutol, 4 were done under general anesthesia, and one patient received I.V. Valium. Of the 6 patients not receiving sedation, one study was sub-optimal and in retrospect should have received sedation. We conclude that a protocol which seeks optimum parameters for ictal SPECT must be created with a high level of cooperations between departments.

No. 1413

INFLUENCE OF BACKGROUND CORRECTION FOR THE CALCULATION OF SPLIT FUNCTION IN RENAL SCINTIGRAPHY WITH TC-99M-MAG3 IN CHILDREN. S. Fischer, A. Busch, B. Roßmüller, and K. Hahn. Dept. of Nuclear Medicine, University of Munich, Munich, Germany

Renal scintigraphy with Tc-99m-MAG3 is a very appropriate study for calculation of split function, tubular extraction rate and renal outflow in pediatric nuclear medicine. In cases with unilateral enlarged hydronephrotic kidneys with decreased function the split function is sometimes difficult to calculate and the reproducability is poor,

obviously depending on type and placement of the kidney background region.
To find the most reliable type of background region in a Tc-99m-MAG3 study we calculated in 14 children (6 females, 8 males, age 6 weeks - 18 years) the split renal function with two different types of background correction and compared these results with the values of a Tc-99m-DMSA scan which was performed not more than three months prior to or after the MAG3 study.
For both studies the children received the radiopharmaceutical dose following the instructions of the Paediatric Task Group of the EANM. DMSA images were acquired 3 hours p.i. from anterior and posterior (300 kcts/view, 256x256 matrix) with a dual headed gamma camera (Picker Prism 2000). The MAG3 study was acquired for 30 minutes (360 images, 5 secs/image, 64x64 matrix). For calculation of the split function from the MAG3 study firstly the background regions were placed laterally of the kidneys and in the second processing the background regions were drawn as a circle around the kidney regions. For both methods the kidney and the background region were normalized before subtracting the background counts.
In 10 / 14 children the difference of both partial function calculations of the MAG3 study compared with the DMSA results was 5% or less. The maximun deviation was 8% with the laterally placed background regions in a 6 week old girl whereas the results of the circular background regions were the same as calculated from the DMSA scan.
In an additional case of a two months old boy again the circular background regions showed a better result compared to the laterally placed background regions
In conclusion we showed that in normal children the way of background correction in MAG3 studies does not influence the split function. Only in little babies and in those cases with unilateral enlarged hydronephrotic kidneys the kidney background correction with circular regions is preferable.

No. 1414

EXCLUSION OF RENAL OBSTRUCTION BASED ON THE 20 MIN/MAX CORTICAL RATIO. **B. Rothfusz, S. Grant, R. Halkar, A. Taylor. VA Medical Center, Atlanta, GA.**

The current era of managed care dictates the need for increased efficiency and cost reduction. Diuretic renography is often a two step procedure. First, a baseline study is obtained; furosemide is then administered and an additional 20 minutes of data are collected and analyzed. Our goal was to determine if a 20 min/max cortical ratio less than 0.3 on the baseline study would effectively exclude obstruction, obviate the need for the furosemide component of the study and, thereby, reduce costs and increase patient throughput.
Methods: Forty patients (76 kidneys) were studied by diuretic renography. A 24-minute baseline dynamic study was obtained with the patients supine following the intravenous administration of 5-10 mCi of Tc-99m MAG3. The patients were asked to void; they then received an injection of 40 mg of furosemide and a 20-minutes diuretic study was obtained. The baseline study was processed using the QuantEMTM software; relative function, a camera based MAG3 clearance and time to peak and 20 min/max ratios were obtained for whole kidney and cortical regions of interest using semiautomated whole kidney and automated cortical ROIs. Two-minute images were displayed and time to half peak height was calculated for the diuretic portion of the study. Obstruction was excluded by a T ½ $\leq$ 10 minutes or by the T ½ and images that clearly excluded obstruction. Kidneys with a T ½ > 10 minutes were not evaluated for the purposes of this study.
Results: In 40 of 76 kidneys, obstruction was excluded based on the criteria described above. In all 40 patients, the 20min/max ratio was less than 0.3. No patient with a 20 min/max ratio less than 0.3 had a T ½ greater than 10 minutes or a clinical study that was equivocal or suspicious for obstruction.
Conclusion: A normal 20min/max cortical ratio less than or equal to 0.3 can effectively exclude obstruction and obviate the need for the diuretic component of the study.

No. 1415

Sr-89 THERAPY IN BREAST AND PROSTATE CANCER PATIENTS: TWO CHICAGO HOSPITAL EXPERIENCES; **Y. Takamiya, N. Rosner, J. Smallwood, St. James Hospital and Health Centers, Chicago Heights, Illinois 60411, M.J. Blend, University of Illinois Hospital, Chicago, Illinois 60612.**

A major management problem for patients (pts) with advanced breast (BC) or prostate cancer (PC) and bone metastases is adequate pain control. Treatment options for these pts can sometimes be suboptimal and expensive. *Purpose:* We retrospectively reviewed 53 pt histories who receive Strontium 89 (SR-89) for pain relief to determine the following: 1. If pain relief occurred, 2. Time to bone pain relief after injection, 3. Survival benefit, and 4. reported change in the quality of life after treatment. *Methods:* 35 PC and 18 BC pt histories were reviewed (35 ♂ and 18 ♀ pts with a mean age of 69 years). All pts underwent a complete physical examination including assessment of painful sites, range of motion testing and recording of analgesic requirements. CBC's, biochemical profiles, and bone scans were performed on each pt within 8 weeks of Sr-89 treatment. All pts received between 148 to 181.3 MBq of Sr-89 via slow I.V. push (1 minute) through a 20g angiocath followed by 250 ml Of 0.9N NaCl solution. One PC pt received 4 doses, 7 pts (5 PC and 2 BC) received 2 doses and 45 received a single dose. *Results:* All pts tolerated the therapy well, without significant anemia. Pain relief began between 7 and 25 days post injection in 85% of pts with peak effect at 36 days and with an associated reduction in analgesic use. Duration of pain palliation ranged from 1 to 10 months with a mean of 5.6 months. Complete pain relief occurred in 13 (37%) PC and in 5 (27%) BC pts. Partial pain relief occurred in 18 (51%) PC and in 9 (50%) BC pts. No pain relief was observed in 4 (11%) PC and in 4 (28%) BC pts. Average life span post Sr-89 therapy in PC pts was 8 months (3-18 months) and 7.6 months (1-13 months) in BC pts, which was not significantly different from pts with the same stage disease without Sr-89 treatment. *Conclusions:* All pts tolerated the procedure well without significant anemia. 85% of the Sr-89 therapy pts showed complete or partial pain relief with reported duction of analgesic use. There was a reported improvement in the quality of life in 46% of BC and 70% of PC pts, but no significant survival benefit noted in either group.

No. 1416

IMAGING CAROTID THROMBI WITH THE Tc-99m LABELED SYNTHETIC PEPTIDE, P280 J.M. Lee ,S.A. Barrow, R.S. Lees, C.F. Nicodemus*, D.H. Klaus*, A.J. Fischman. Massachusetts General Hospital, Boston MA and *Diatide, Inc., Londonderry, NH.

The peptide P280 is a 26 amino acid dimer that binds with high affinity and specificity to the GPIIb/IIIa receptor expressed on activated platelets. This peptide is easily labeled with Tc-99m and previous studies have demonstrated high levels of accumulation in deep venous thrombi. In this study we evaluated the imaging properties of Tc-99m P280 in patients with carotid atherosclerosis.

A total of 8 subjects were studied; 4 healthy volunteers without evidence of carotid disease by doppler ultrasound (US) or magnetic resonance angiography (MRA) and 4 patients with carotid atherosclerosis (by US and MRA or contrast angiography) who were scheduled for carotid endarterectomy. Each subject was injected with ~20 mCi of Tc-99m P280. Planar imaging was performed immediately after injection and planar plus SPECT images were acquired at 1 and 3 hrs later. Imaging was performed with dual a headed gamma camera (Siemens, Multi-SPECT II). SPECT images were collected over 360^0 (180^0/head) in a 128 x 128 digital matrix and were reconstructed with standard filtered back projection algorithm (Butterworth filter, cutoff = 0.5, order = 7). In the patients, carotid endarterectomy was performed within 48 hrs after imaging.

All subjects showed low levels of tracer in the carotid region in the immediate and 1 hr images; consistent with blood-pool radioactivity. In the 3 hr images, there was no evidence of tracer uptake in 3 / 4 healthy subjects. In the 4th subject, SPECT revealed diffuse carotid activity; possibly due to early atherosclerosis. In contrast, all 4 patients showed diffuse accumulation in the carotid region and in one case focal accumulation was detected in the upper right carotid corresponding with the lesion detected by US and MRA. In all cases P280 accumulation was better defined with SPECT. Pathological analysis of the endarterectomy specimens revealed plaque without thrombus in 3 of the patients and plaque plus thrombus in the patient with focal P280 accumulation.

The results of this study suggest that: 1. Tc-99m P280 is a useful radiopharmaceutical for detecting arterial atherosclerosis and thrombi. 2. Delayed imaging is required for identification of lesions. These findings clearly support further investigations in a larger patient population.

No. 1417

UNIFORM ATTENUATION CORRECTION FOR IN-111 AND GA-67 SPECT IMAGING. **M. Reinhardt, A.C. Civelek, B. B. Chin. Johns Hopkins Medical Institutions, Baltimore, MD.**

Uniform attenuation correction for abdominal and cerebral SPECT imaging has been used to improve uniformity and contrast of more central structures. The purpose of this study is to experimentally determine the effective attenuation coefficients for In-111 and Ga-67 and to examine the effect of AC on patient studies.

Phantom studies were performed to determine attenuation coefficients for both Ga-67 and In-111. For each isotope, large cylindrical phantoms were filled with homogeneous activity and high count 360 degree SPECT acquisitions were performed. The appropriate attenuation coefficient was determined by choosing the reconstructed image with the flattest count profile from a series of reconstructions with attenuation coefficients ranging from 0.04-0.20 cm^2/gm. Attenuation coefficients were then applied to 5 Ga-67 and 5 In-111 abdominal SPECT studies in patients with no known liver disease. Images were assessed visually for artifacts and image quality. Uniformity in the liver was also assessed quantitatively by comparing count variability (coefficient of variation, CV) in ROIs of nonattenuation corrected vs. attenuation corrected transaxial images.

The phantom studies showed best uniformity with attenuation coefficients of 0.10 (cm^2/gm) for In-111 and 0.13 (cm^2/gm) for Ga-67. When applied to their respective patient SPECT studies, no central artifacts were evident and liver uniformity improved in all cases. All nonattenuation corrected images showed a higher percent variation in counts compared to attenuation corrected images. Quantitative measurements of liver counts/pixel also showed improved uniformity and lower CV for attenuation corrected images in all cases:

	Nonattenuation Corrected	Attenuation Corrected	p value
In-111	16.4+2.0%	11.5+2.8%	0.01
Ga-67	20.2+2.2%	12.9+3.0%	0.002

Effective attenuation coefficients can be measured for the multiple photopeaks of Ga-67 and In-111. These results can be applied to patient studies in the abdomen, such as with In-111 prostascint scintigraphy, to improve uniformity and contrast of central structures.

Session 204

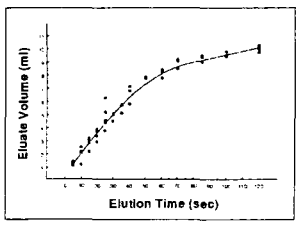
Radiopharmacy, Coincidence Imaging and Instrumentation Papers

9:45am–11:15am **Room 703**
Moderator: Duane A. Hollier, CNMT
Co-Moderator: Kathleen A. Tuttle, CNMT

No. 1418

THE RELATIONSHIP BETWEEN ELUTION TIME AND ELUATE VOLUME OF THE NEW UTK*-DTE GENERATOR. **A. Wang, D.T. Huang, D.W. Mahoney, and J.C. Hung. Mayo Clinic, Rochester, MN, USA.**

With the introduction of the new UTK*-DTE Tc-99m generator (Mallinckrodt Medical In., St. Louis, MO, USA), an ergonometric designed elution shield was devised to facilitated fractionation elution. This is accomplished by visually observing the eluted volume through the lead-glass window of a lighted elution shield. However, the concern of radiation exposure through the lead-glass window and the obscurity and sometime inaccurate volume graduation label make the new elution shield a less desirable way to perform fractionation elution. The goal of this study was to minimize these problems by using elution time to determine how much eluate can be milked from an UTK*-DTE generator. After triplicate elution at several pre-determined elution times, the initial weight of the vial was subtracted from the total weight after elution. A polynomial relationship was established between the eluted volume and elution time (Volume = 0.426 + 0.189t - 0.001t^2). This formula is suitable for the 10-ml vial, which is filled after two minutes, but this formula may not be accurate for the very first elution since UTK*-DTE generator is a dry-column generator when shipped. The following elution times were calculated based upon the equation for some commonly eluted volumes: 2 ml (9 sec), 4 ml (21 sec), 5 ml (28 sec), 7 ml (44 sec), and 10 ml (94 sec).



No. 1419

THE USE AND QUALITY CONTROL OF RE-188-LABELED COMPOUNDS IN A NUCLEAR MEDICINE LABORATORY. **S.Strömberg, K.J.A. Kairemo, T.K. Nikula, S.-L. Karonen. Helsinki University Central Hospital, MAP Medical Technologies, Finland.**

Re-188 is a generator (W-188/ Re-188) produced high energy β-emitter suitable for radionuclide therapy. It has a half-life of 16.9 hrs and a maximum β-energy of 2.2 MeV (range 11 mm).

We have labeled both bone-seeking phosphonate compounds and monoclonal antibodies using Re-188. Samples of Re-188-labeled phosphonates (HDP, DPD) were analyzed after 5, 10, 30, 60, 180 and 1320 min incubation. The labeling efficiency, the amount of free perrhenate and reduced Re has been controlled with thin layer chromatography (TLC) using sodium acetate and methylethylketone as solvents. Re-188-labelled monoclonal antibodies (anti-VCAM-1 and 3c10) were studied similarly by varying incubation time and solvents. The antibody labeling was based on stannous chloride reduction and glucoheptonate chelation technique.

The chromatography plates were analyzed using a gamma camera (Picker Prism 3000 XP). The gamma energy peak (155 keV; 15 %) was recorded and movements on TLC plates were investigated using rectangular ROIs. Our results indicate that Re-188-phosphonates remain in vitro stable at least for 22 hours and the labeling efficiency is higher than 92 %. Re-188-labelled antibodies demonstrated in vitro stability and >90% purity.

These Re-188-phosphonates may be used for treatment of metastatic skeletal disease and their distribution can be controlled using gamma camera as well as the quality of labelled compounds. Re-188-labeled MoAbs can be used for animal studies and we have applied them for detecting experimental inflammatory disease.

No. 1420

COMPARISON OF FILTERED BACK PROJECTION TO ITERATIVE RECONSTRUCTION OF COINCIDENCE DETECTION DATA: IMPACT ON DIAGNOSTIC IMAGE QUALITY. **L.J. Daley, H.M. Dey, C.K. Ng. VA Connecticut Healthcare System, West Haven, CT, and Yale University School of Medicine, New Haven, CT.**

The purpose of this study was to evaluate the diagnostic quality of low count images reconstructed with filtered back projection (FBP) and iterative reconstruction (IR) algorithms in a gamma camera with coincidence detection. Our goal was to select a reconstruction algorithm which provides better structural identification and signal to noise ratio for routine application in the nuclear medicine clinic.

All images were acquired on a Picker 2000XP dual-headed gamma camera equipped with a 3/4 inch (1.9 cm) NaI crystal and positron coincidence detection (PCD) capability. Thirteen PCD raw data sets imaged with [F-18] fluorodeoxyglucose (FDG) were available for analysis. 10/13 sets were clinical data acquired over the chest (8) and the abdomen (2); 3/13 were non clinical data acquired by using a 3-D Hoffman brain phantom (1), and a cylindrical phantom with hollow sphere inserts (2). All data sets were reconstructed using both FBP and IR algorithms. A low pass Butterworth filter (order 6.0, cutoff 0.32-0.42) and a theoretical attenuation correction were then applied to both reconstructed data sets. Paired data sets, in either axial or coronal planes, were submitted for blinded evaluation of comparative image quality by the nuclear medicine physicist and physician; differences were resolved by consensus.

The results showed that in 12/13 cases both readers preferred the data set reconstructed with an IR algorithm. The data sets reconstructed with the IR algorithm tended to be less noisy, thus providing more structural detail.

Although the FBP algorithm is more commonly used in the clinic due to a quicker turn-around time of 10 seconds, the recent advent of faster computers have made the use of the IR algorithm feasible in a clinical setting which currently requires 5 minutes of processing time for one raw data set. In the near future, IR reconstruction time is expected to be shortened. Based on preliminary clinical and phantom data, we conclude that an IR algorithm is preferred for reconstruction of clinical coincidence detection data sets in order to optimize image quality for diagnostic interpretation.

No. 1421

PRACTICAL CONSIDERATIONS FOR A TECHNOLOGIST TO PERFORM FULLY CORRECTED WHOLE BODY PET STUDIES. S.L.Riggin, R.J.Smith, J.S.Karp, University of Pennsylvania, Philadelphia, PA

Whole body PET studies with F18-FDG are performed to detect, stage, and monitor response to therapy. Fully corrected whole body PET studies provide accurate images of activity distribution to measure tumor size, shape and uptake both before and after therapy. This has a significant impact on patient management. For clinical utility the transmission scans need to be short, accurate and low noise measurements. Singles transmission scans performed post-injection have been used for this purpose using the PENN PET 240H scanner (marketed by GE under the name Quest). These use a point source of Cs-137 (662 keV gamma rays), a separate energy window and 1 minute/position transmission scans. Thus 60 cm of patient torso is both emission and transmission scanned within 60 minutes. It requires good organization and careful monitoring by the technologist to perform these scans within an hour and to generate fully corrected SUV images within an hour of scan completion. In addition to the normal pre-preparation of patient fasting, consent, and tests; patient weight, height and blood glucose levels are taken for future analysis. The FDG dose is injected 60-90 minutes before scanning to perform delayed imaging with higher tumor/background contrast. Coincidence emission and singles transmission scans are taken by stepping the patient through the scanner. Four minute/axial position emission and one minute transmission scans are typical, with 6 cm steps between scans. The non-attenuation corrected image is reconstructed while the patient is still in the PET suite to check that all necessary areas of the body have been successfully scanned. Iterative reconstruction with decay correction, normalization and deadtime corrections take less than 10 minutes. Fully corrected images with scatter and attenuation correction take a further 30 minutes. Since attenuation correction is based upon segmentation of the

transmission image, both transmission image and segmented image need to be checked for image quality. The fully corrected image is converted into SUV images using the measured patient weight and dose and camera deadtimes. The technologist performs all of the acquisition and processing for these studies and must apply quality control at each stage to insure a uniformly high standard of images. This paper will present the various technologist tasks at each stage of the study from patient preparation through acquistion to study processing and presentation, along with examples from the 300 patients studied this way at our PET Center. It is shown that good technologist organization and understanding of the studies insures rapid patient throughput and a consistently high standard of studies.

No. 1422

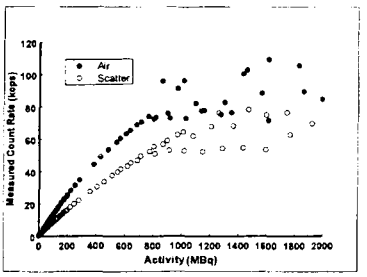
SIMULTANEOUS DUAL RADIOTRACER SPECT ACQUISITION OF Tc-99m MDP AND In-111 OR I-131 RADIOTRACER TO ASSIST ANATOMIC LOCALIZATION OF INFECTION OR TUMOR
K. Golder, P. Hinphy, O. Golosovker, P. Zanzonico, J. Rini and S.J. Goldsmith, New York Hospital-Cornell Medical Center, New York, N.Y.

In-111 WBCs, In-111-MoAb [*Prostascint,* Cytogen] and I-131 NaI provide unique opportunities to localize inflammation and certain tumors but these tracers produce images with limited anatomic landmarks rendering localization of lesions difficult even after comparison with CT or MRI. To provide precise anatomic localization and co-registration of images, we have performed simultaneous acquisition of Tc-99m MDP bone SPECT with In-111 or I-131 SPECT scintigraphy. Method: Tc-99m was acquired using a 140±10% keV window; In-111 window: 171±8% & 247±10% keV; I-131 window: 364±10% keV in a 64 x 64 matrix, 16 bit deep. It is necessary to acquire dual tracer flood corrections to avoid non-uniformities in the "off-peak" images. These are generated at low count rates [requiring 60-90 min per head] since at high count rates, digital detectors record pinpoint artifacts at higher energy peaks in multipeak images. A 5:1 Tc/In or Tc/I ratio is used to approximate in vivo activities. Data was acquired at 32 positions per head [total = 64] using a dual-head LFOV camera; 20 – 60 sec per stop determined by the count rate for the low photon flux, higher energy tracer. Each study is processed with filters appropriate for the count rate and spatial distribution. Collimation appropriate for the higher energy source is used. Results: Satisfactory images were obtained in ≤ 35 min, the usual acquisition time for the low dose tracer alone. Images can be displayed side by side or superimposed on one another in either slice or volume mode. Conclusion: The technique enables differentiation of bone from soft tissue involvement as well as improving localization of soft tissue foci.

No. 1423

EVALUATION OF THE ACCURACY OF SYSTEM DEAD-TIME MEASUREMENTS ON MODERN DIGITAL GAMMA CAMERA SYSTEMS.
Chip Jordan, Michael K. O'Connor, Lai K. Leong, Gregory A. Wiseman. Mayo Clinic, Rochester, MN, USA.

The performance characteristics of the modern digital gamma camera are not as well understood as that of their older analog counterparts and techniques used to evaluate analog systems may not be appropriate for digital systems. **Purpose:** The purpose of this study was to compare the count rate characteristics of digital gamma cameras determined from maximum count rate mesurements and time-activity curves (decaying source) to those determined from an Adam's phantom. **Methods:** The count rate characteristics of 2 digital gamma camera systems (Genasys EPIC, ADAC; Varicam, Elscint) were evaluated. In both cases, the systems were evaluated in normal count rate mode and their high count rate modes were not used. System deadtime under scatter conditions was measured using an Adam's phantom. On the EPIC detector, maximum count rate was assessed intrinsically using a Tc-99m point source. On the Varicam system, a Tc-99m time-activity decay curve was generated under both scatter and scatter-free conditions. Copper sheets (2.5 or 5 mm thick) were used to simulate sources of different activities. **Results:** EPIC system : system deadtime was measured at 2.7 µsec, giving a predicted 20% count loss rate of 82.6 kcps. However, maximum count rate obtained with a point source was < 66 kcps. Varicam system : Figure 1 illustrates the time-activity curve for point sources in air and scatter. Both systems demonstrated unusual count rate characteristics at high count rates. System deadtime



was measured at 3.1 µsec in air and 6.5 µsec in scatter, giving 20% count loss rates of 72 and 34 kcps respectively. Corresponding values calculated from Figur· 1 are 82 and 68 kcps respectively. **Conclusions:** The count rate characteristics of modern digital detector systems may be significantly different from those of their analog counterparts and existing test procedures may not reflect true system performance.

Session 205

Oncology and Instrumentation Papers

12:30pm–2:00pm **Room 703**
Moderator: Lyn M. Mehlberg, CNMT
Co-Moderator: William H. Erlenbusch, CNMT

No. 1424

USEFULNESS OF IMMEDIATE DYNAMIC OCTREOTIDE BRAIN SPECT IN POST-SURGICAL OR RADIATION THERAPY PATIENTS WITH MENINGIOMA.
J. Patel, J. Zhang, S. Kim, D. Andrews and C. Intenzo. Thomas Jefferson University Hospital, Philadelphia, PA.

Somatostatin receptors (SSR) are expressed in meningiomas, allowing reassessibility that scintigraphy with Octreoscan might be helpful in post-operative or post-radiotherapy brain tumor followup. Dynamic SPECT allows the calculation of the SSR to brain index. We have applied dynamic and delayed brain SPECT Octreotide to determine disease progression/regression during follow-up.

A total of 78 studies in 35 patients were evaluated with either histologically confirmed recurrent meningioma or unbiopsied tumors with a classic appearance on MRI or CT. SPECT imaging with Octreotide on a triple-headed scanner before and after fractionated stereotatic radiosurgery (FSRS) was obtained. Following the IV injection of 6 mCi of In-111 Octreotide, an immediate dynamic SPECT was obtained at 1.5 minutes per revolution for 25 minutes, and a static SPECT was obtained 24 hours later. The tumor to occipital skull ratio was calculated in all dynamic, combined 25 minutes and 24 hour SPECT.

The following were observed: (1) Dynamic SPECT imaging with 1.5 min. revolution is clinically feasible. (2) there was a rapid tracer activity within tumor for the first 0 - 4.5 mins. (3) positive studies were obtained with both early, (dynamic 25 mins.) and delayed (24 hr.) image acquisition in all cases.

SPECT Time	Pre FSRS	Post FRSR	p Value
0 - 4.5 min	1.6 ± 0.9	2.0 ± 0.8	< 0.01
25 min	1.8 ± 1.1	2.2 ± 0.9	< 0.01
24 hours	5.6 ± 3.1	5.4 ± 3.8	< 0.5 ns

In conclusion, dynamic SPECT is useful to distinguish tumor progression and regression in patients with meningiomas. Summation of the dynamic SPECT data has the same role as a routine clinical 2-3 hour post-injection static SPECT.

No. 1425

TECHNICAL ASPECTS OF IMAGING OCULAR TUMORS WITH Tc-99m MIBI: PLANAR PINHOLE TECHNIQUE OR SPECT?
O. Alonso, M. Núñez, F. Mut, J. Cánepa, and P. Guisoli. Clinical Hospital and School of Medical Technology, University of Uruguay, Montevideo, Uruguay.

Tc-99m MIBI is a well known radiopharmaceutical with tumor-seeking properties. However, to our knowledge, the evaluation of ocular tumors and the establishment of a suitable imaging technique, have not been reported with this tracer. Therefore, the aim of this study was to compare the ability of two imaging protocols in the detection of ocular masses: planar pinhole technique (PPHT) and SPECT.
Eleven patients with ocular lesions evaluated by CT/MR and/or US

were included in the study. All conventional imaging techniques were not conclusive for malignancy. MIBI abnormal foci were controlled by resection (n=9) or clinical and US follow-up for at least 10 months (n=2). Planar images were acquired in a LFOV camera fitted with a pinhole collimator (5.0mm), 10 minutes after the injection of 740 MBq of Tc-99m MIBI. We used an acquisition time of 10 minutes, 256 x 256 matrix and a zoom of 1.66. The SPECT study was performed immediately after: 20 sec/stop, 360° orbit, 64 steps, 128 x 128 matrix, LEHR collimator. Images were reconstructed using a Butterworth filter (cutoff 0.35, order 4) and transaxial, coronal and sagittal images of the orbits were generated. Eight lesions proved to be malignant (9.5-15 mm): primary tumors (choroidal melanoma n=4), local relapses of different tumors of the conjunctiva (n=3), and one ocular metastasis from a breast cancer. The remaining 3 lesions were diagnosed as benign (10–16mm): One inflammatory lesion, one benign intraocular calcification and one benign nevus. SPECT clearly detected all malignant lesions, whereas PPHT diagnosed only 2/8. One false positive result was visualized by both techniques corresponding to the inflammatory lesion.
In conclusion, SPECT Tc-99m MIBI ocular imaging is a clinically valuable technique, being a preferable alternative to pinhole imaging.

No. 1426

SERIOUS ARTEFACTS DUE TO IMPROPER OUTLINE DEFINITION IN ATTENUATION CORRECTED rCBF SPECT EXAMINATIONS. L. Engelin, A-M Danielsson, R Hatherly, C. Jonsson, M. Pagani, H Jacobsson, S A Larsson. Nuclear Medicine Section, Dept of Hospital Physics, Karolinska Hospital, Stockholm, Sweden

Introduction. Attenuation of photons in body tissues is a well recognized problem in SPECT and various correction methods have been developed and explored during the past twenty years. Most methods are fairly approximative and based on assumptions regarding the activity distribution and tissue attenuation. The very simple approach makes them clinically useful since they can reduce the image distortion introduced by photon attenuation. The required assessment of the body outline in these methods is generally made manually or semiautomatically from projected views or from reconstructed sections. However, these assessments may be inaccurate and the purpose of this investigation was to estimate the influence on rCBF SPECT values due to different outline settings.
Method. Alterations of the outline was performed in a phantom study and in rCBF routine examinations of patients with and without detected abnormalities. SPECT-examinations were performed with a three-headed TRIAD-system and manual definition of the outline from a dorsal and a lateral projection. A single ellipse is created from these definitions for the uniform Chang attenuation algorithm. The lateral outline was enlarged by up to 28 mm from the "normal" - either symmetrically or non-symmetrically with respect to the center of a brain phantom or the center of the brain of selected patients. The results were evaluated from selected ROI values of SPECT phantom images and by symmetrically located Brodmann areas in clinical rCBF SPECT sections.
Results. Phantom data showed a 6% increase in lateral "grey-matter" activity per 10 mm symmetrical enlargement of the outline. Of greater importance is the asymmetry of about 10% in "grey-matter" activity that was observed per 10 mm assymetrical enlargement of the lateral outline. In patients, the activity in left Brodmann areas no. 22 and 44 increased by 8, 14 and 17 % from "normal" at an asymmetric enlargement of 10, 20 and 25 mm, respectively, whereas the activity in the corresponding right areas remained unchanged.
Conclusion. These results stress the importance of a very accurate setting of the outline if attenuation correction according to the Chang method is applied. A minor mismatch may give an incorrect asymmetry that can mislead the interpreter. If the patient is positioned obliquely or with his head tilted in the camera, the outline mismatch may increase.

No. 1427

Sentinel Lymph Node Localization Using Tc-99m Human Serum Albumin or Tc-99m Filtered Sulfur Colloid in Patients with Newly Diagnosed Breast Cancer. **A. Sayer, A. M. Scheff, B. Czerniecki, C. Reynolds, C. Helsabeck, J. J. Kozar. University of Pennsylvania Health Systems, Philadelphia, PA.**

Purpose: To determine whether lymphoscintigraphy using Tc-99m Human Serum Albumin (HSA) or Tc-99m filtered Sulfur Colloid (fSC) can accurately identify sentinel lymph node(s) in patients with newly diagnosed breast cancer.
Methods: Prior to imaging 18.5 MBq Tc-99m HSA or Tc-99m fSC were injected at each of 4 sites around the palpable tumor, seroma or scar (total = 74 MBq in 8 ml). Static 128x128 anterior and lateral images with body contouring were obtained 1 hour post-injection. Indelible marks were made on the skin to identify the sentinel lymph node(s).
Results: Of the 33 patients studied to date, 94% had successful sentinel node localization. Factors which contributed to failed radionuclide localization include an inadequate injection volume, large tumor size and sentinel node(s) completely replaced by tumor. Techniques that increased accuracy include the intraoperative use of the gamma probe and Isosulfan blue dye. When the histopathology of the sentinel node was compared with findings in all nodes removed from the axilla during standard dissection, the sentinel node was 97% accurate in predicting the presence of cancer.
Conclusion: Both Tc-99m HSA and Tc-99m fSC are effective agents for sentinel lymph node localization in patients with newly diagnosed breast cancer. In this preliminary study, the histopathology of the sentinel node was 97% accurate for metastatic axillary lymphadenopathy.

No. 1428

Dual Isotope Protocol for Indium-111 ProstaScint (Capromab Pendetide Monoclonal Antibody) Imaging. **N.L.Kelty, S.H.Khan and L.E.Holder. University of Maryland Medical Systems, Baltimore, Md.**

The purpose of this paper is to describe a dual isotope imaging protocol in conjuction with Indium-111 ProstaScint Imaging for the detection and localization of nodal metastases from prostate cancer. Accurate clinical staging of prostate cancer or restaging when recurrence is suspected is necessary for choosing the most appropriate therapy . CT and MRI are the current conventional modalities used for staging and detect only 30-70 % of nodal metastases. Indium-111 ProstaScint a monoclonal antibody directed against prostate specific membrane antigen has a reported sensitivity of 60-70%, as reported in Phase 3 clinical trials. Utilizing a dual isotope technique, simultaneously imaging Tc-99m labeled red blood cells for vascular anatomy and Indium-111 ProstaScint we have further improved our sensitivity for disease detection with this antibody.

All patients are injected with approximately 5.0mCi of Indium-111 ProstaScint and are instructed to return 4 days post injection. When the patient returns invitro labeling process for Tc-99m red blood cells is started by drawing 3cc of the patients blood. While this labeling procedure is being performed the patient is positioned for a whole body antibody scan, using a camera speed of 6cm/min with a matrix of 512 x 2048. After the whole body scan, the patient is injected with 5-8mCi of Tc-99m labeled red blood cells and then positioned for a pelvis and abdomen SPECT scan. The camera-computer system is set up for a dual isotope 360 degree SPECT acquisition, Tc-99m: 126-154kev, In-111:164-182kev and 222-272kev, 64x64 matrix, 64 stops, at 40 sec/stop using medium energy collimators. Critical external anatomical markers for alignment and to assure precise coregistration are unnecessary as a single SPECT scan is acquired. Reconstruction of both the Indium-111 and Tc-99m isotope windows from the same acquisition assures us of precise correlation of images between blood pool and the antibody scan.

The dual isotope procedure outlined eliminates the need for SPECT acquisitions on two separate days, requires less time for patient imaging, is more comfortable for patients and allows precise image coregistration, assuring accurate blood pool and pelvic lymph node comparison for more confident and accurate image interpretation.

No. 1429

TECHNICAL ASPECTS OF SENTINEL NODE LYMPHOSCINTIGRAPHY FOR BREAST CANCER

LK Dunnwald, SD Hartnett, MK Baker, PK Pham, BG Duncan, DA Mankoff, JF Eary, University of Washington, Seattle, WA

Assessment of axillary nodes is important in staging and treating breast cancer. Complete axillary nodal dissection carries a significant morbidity risk to the patient. Lymphatic mapping has been investigated to determine if pathologic analysis of the sentinel node is predictive of nodal involvement in the axilla. We describe the technical aspects of sentinel node lymphoscintigraphy for breast cancer. Fifty-four patients were imaged 1 - 3 hours prior to time of surgery. In 43 patients with palpable lesions, the area was anesthetized with 2 - 4 ml 1% lidocaine and 1 ml sodium bicarbonate. Using 0.5 - 1.0 mCi (18.5 - 37 MBq) filtered [Tc-99m]-sulfur colloid in a total volume of 6 ml, four injections were made concentrically around the site. If the tumor required localization by ultrasound (8 patients) or mammography (3 patients), the tracer was

injected in a single catheter placed at the time of localization. Static imaging began immediately following the injection. Images were acquired into a 256 x 256 matrix for 1 - 5 minutes at 10 to 15 minute time intervals. The scan timing was dependent on how quickly the sentinel node was visualized. The patient was positioned in the same way as in surgery, and the sentinel lymph node was marked on the patient's skin as a point of reference for the surgeons. Marking was performed from an oblique position using persistence mode with a [Tc-99m] marker and triangulated at 45 degrees to estimate the depth of the node. Marks were re-verified using a hand-held gamma probe. The success rate for identifying the sentinel node was 81% (44/54 patients). The time to node visualization ranged from 2 to 120 minutes with a mean of 29 minutes, an average 1.4 nodes were visualized (3 maximum). We conclude lymphoscintigraphy for breast cancer is a detailed procedure which requires coordination with radiology and surgery teams to insure proper identification of sentinel nodes.

Session 206

Dosimetry, NRC Regulations, Cardiac and Instrumentation Papers

2:15pm–3:45pm **Room 703**
Moderator: Janet L. Champagne, CNMT
Co-Moderator: Michele A. Ganske, CNMT

No. 1430

TECHNICAL CONSIDERATIONS OF DOSIMETRIC MEASUREMENTS. S.A. Spaulding, R.J. Ackermann, R.L. Wahl, B. Shapiro, J. Carey, J.C. Sisson. University of Michigan, Ann Arbor MI

Dosimetric measurements can be performed using equipment commonly found in nuclear medicine laboratories. While the fundamental calculations of absorbed radiation are complex, the measurements of whole body, blood, and tumor radioactivity are usually accurate, and, from these determined values, absorbed doses can be estimated using easily applied formulae. However, basic rules must always be followed when making the measurements. Most are done with I-131 as the radionuclide. The applications are most often for patients with thyroid cancer who are to be treated with I-131, but also may be for other therapies.

For determination of whole body dose, a standard thyroid uptake probe equipped with a "flat field" collimator is employed. A geometric mean of activity, is obtained from anterior and posterior counts. Generally, whole body radiation is calculated from residual activity, i.e. a fraction of the initial or 100% activity is determined each day. The geometry and background must be constant; constancy checks are also essential. For blood dosimetry, accurate pipetting takes practice. Blood samples are pipetted into tubes and counted in a well counter, the sensitivity of which, in cpm/mCi/ml, also must be assessed periodically. The activity in an ml of blood is related to the administered dose. Tumor dosimetry data are obtained from regions of interest on the conjugate views of a gamma camera each day. A "mock tumor source" provides a valuable reference for quantifying the activity in a tumor. Fractional tumor uptake of radionuclide from a diagnostic dose can be compared with that obtained following a therapeutic dose to determine the accuracy of diagnostic predictors of absorbed radiation doses by a tumor.

Technologists can obtain data used to calculate whole body, blood and tumor dosimetry using equipment found in nuclear medicine laboratories. Calculations from these data aid physicians in prescribing safe, effective doses for radiopharmaceutical therapies.

No. 1431

Effective Implementation of the new NRC Regulatory Release Criteria with ^{131}I-labeled antibodies using Patient-Specific (PS) Dose Calculations. RM Dunn, M Juweid, RM Sharkey, D. Dunlop, and DM Goldenberg. The Garden State Cancer Center, Belleville, NJ.

The new NRC regulations regarding release criteria for patients administered radioactive material(s) facilitates radioimmunotherapy (RAIT) with ^{131}I-labeld antibodies (Mabs) on an outpatient basis. An ambiguity existed between the 0.1 rem total effective dose equivalent (TEDE) in 10 CFR 20, and the activity based release limit in 10 CFR 35.75 (<30 mCi or <5 mrems/hour). This had a significant impact on RAIT, particularly using ^{131}I-labeled antibodies (Mab's), since different radionuclides of similar activity yield different doses based on the effective half-life ($T_{1/2E}$) of a particular Mab. Effective May 29, 1997, the NRC amended 10 CFR 35.75 to allow for release of patients based on PS dose calculations, at activities higher than allowed previously. The release is based on certain criteria: the calculated maximum dose to an exposed individual must be <0.5 rem, patients must be given written instructions on reducing radiation exposure to others, and use of an occupancy factor (OF). If the calculated $T_{1/2E}$ is > 1 day, and the patient can follow the instructions above, an OF of 0.25 may be used. If the patient can live alone and have few visits for at least the first 2 days, and follow the instructions, an OF of 0.125 may be used. Detailed instructions on the formula and calculation are given in Reg. Guide 8.39 (April 1997). Our institution has initiated outpatient RAIT using ^{131}I-MN-14 (IgG), an anti-CEA Mab, at non-myeloablative activities. A review of 25 patients treated with ^{131}I-MN-14 (IgG), with different cancer types, and who were HAMA negative, was conducted to assess the feasibility of using WB $T_{1/2E}$ from diagnostic (Dx) injections to determine patient release criteria with ^{131}I RAIT. A computer program was developed to determine whole body (WB) clearance ($T_{1/2E}$ from serial ionization chamber (IC) exposure rate measurements (at a distance of 1 meter) post-Dx injection. The injected activities $T_{1/2E}$'s ranged from 1.1-3.2 days (mean ± SD= 2.4±0.6). The therapy $T_{1/2E}$'s (Tx) ranged from 1.1-3.2 (mean ± SD = 2.3±0.6), with activities ranging from 21.7-117.4 mCi (mean ±SD = 84.4±17.4). The length of inpatient stay ranged from 1.3-5 days (mean ± SD = 3.4 ± 0.9) According to our results, 23 of the 25 patients studied could have been treated as outpatients (OF = 0.25). With an OF = 0.125, all 25 could have been outpatients. To date, we have utilized outpatient therapy for 5 ^{131}I-RAIT injections with no complications, activities ranging from 65.5 to 110 mCi (mean ± SD = 84.5± 17.0). (Supported in part by USPHS Grant CA39841 from the NIH.)

No. 1432

COMPARISON OF FOUR 1-ml SYRINGES USED FOR ADMINISTRATION OF Tc-99m SESTAMIBI FIRST-PASS DOSES. C.G. McGough, D.T. Huang, and J.C. Hung. Mayo Clinic, Rochester, MN, USA.

For optimal imaging in myocardial first-pass studies, 1.11 GBq (30 mCi) Tc-99m sestamibi doses are drawn up in 0.1-0.3 ml. A single bolus injection of this small volume is important to obtain accurate time-activity curves. Due to the small volume and concentrated radioactivity, any significant amount of residual activity remaining in the syringe after injection is undesirable for study effectiveness and image quality. The purpose of this study was to compare the amount of residual activity in four different 1-ml syringes: (1) Monoject tuberculin syringe with 27 gauge (G) x ½" detachable needle, (2) Monoject insulin syringe with 28 G x ½" permanent needle, (3) Monoject tuberculin syringe with 25 G x 5/8" permanent needle, and (4) B-D MedSaver syringe with 25 G x 5/8" permanent needle. Each test syringe was filled with a volume (0.2 ml) of ~1.11 GBq (~30 mCi) Tc-99m sestamibi. Initial activity was measured, and the dose was then injected back into a vial only once, simulating bolus injection into a patient. Remaining activity was measured, and then percent of residual activity was calculated. The syringe with the 27 G detachable needle had the largest percent of residual activity at 17.6±1.8% (n=20). This could potentially affect the imaging quality of SPECT cardiac studies in obese patients. The space in the hub of the syringe retained a relatively large volume (~0.05 ml) of the dose after injection. The syringe with the 28 G permanent needle had the smallest percent of residual activity at 1.2±0.4% (n=20). Image quality was greatly improved using this syringe; however, the small gauge and flimsy nature of the 28 G needle led to needle bending, which could lead to potential problems such as inability to inject, radioactive contamination to the patient and imaging area, and employee needle sticks. The Monoject and B-D syringes with the 25 G permanent needle had a percent of residual activity at 1.9±0.3% and 1.8±0.6%, respectively (n=20). Both syringes had a much sturdier needle for injection, as well as a low percent of residual activity. However, the B-D MedSaver syringe is more expensive. Subsequent use of the Monoject tuberculin syringe with a 25 G x 5/8" permanent needle has proven to be ideal for first-pass patient studies due to its sturdiness, low residual activity, and facility to maintain optimal image quality.

No. 1433

Comparison of Iridium-191m and Tantalum-178 for First-Pass Assessment of Left Ventricular Function Using the Multiwire Camera
MP White, JL Lacy, CC McGill, N Nyak, PJ Day, AB Packard, GV Heller
Hartford Hospital, University of Connecticut, Farmington, CT; Proportional Technologies, Inc., Houston, TX; Children's Hospital, Boston, MA

Several ultrashort-lived isotopes have been introduced for first-pass radionuclide angiocardiography (FP). Development of the multiwire gamma camera (MWGC) increases the feasibility of using such isotopes for assessing cardiac function. Left ventricular ejection fraction (LVEF) and regional wall motion (RWM) was evaluated in 24 patients (PTS) with documented coronary artery disease by first-pass technique using iridium-

191m (IR) and tantalum-178 (TA) and compared with gated blood pool imaging (GPB). FP was performed with IR (T 1/2 = 4.96 sec, 2.22-4.25 GBq) using the MWGC in the anterior position. FP was repeated one hour later with TA (T 1/2 = 9.3 min, 1.11-1.67 GBq). GPB, following modified in-vitro labeling of Tc-99m red blood cells (0.93-1.11 GBq), were obtained 20 minutes later. LVEFs were calculated at two sites to determine inter- and intra-observer variability. RWM was evaluated by a consensus of experienced readers for anterior, apical and inferior segments using a 5 point scale (0=normal, 1=mild hypokinesis, 2=severe hypokinesis, 3=akinesis, 4=dyskinesis). **Results:** Calculated LVEF by FP were highly reproducible (inter-observer: r=0.93; intra-observer: r=0.98, p=ns) and demonstrated an excellent correlation with RVG (IR/RVG: r=0.865, p=0.0001; TA/RVG: r=0.95, p=0.0001). Both IR and TA showed significant differences in wall motion assessment compared with GPB. (see table)

Regional Wall Motion Assessment (p-values)				
	Anterior	Apex	Inferior	Total
IR / RVG	NS	0.02	NS	0.03
TA / RVG	NS	0.02	0.05	0.02

Conclusion: First-pass imaging with iridium-191m or tantalum-178 yields accurate and reproducible ejection fraction data when compared to gated blood pool imaging. Regional wall motion could not be evaluated with a high degree of confidence using either isotope.

No. 1434

Is Severity of Myocardial Perfusion Defects Affected by the Use of Ultra High Energy Collimation for Imagingof Tc-99m Labeled Agents?

D. Natale, P. DeMan, F. J. Th. Wackers, Yale University, New Haven, CT

Dual isotope SPECT imaging utilizing Tc-99m labeled agents in conjunction with F-18 fluorodeoxyglucose (FDG) has been proposed as a protocol for the detection of myocardial ischemia and viability. The physical characteristics of F-18 (511 keV) require multidetector SPECT systems equipped with Ultra High Energy (UHE) collimators. It is uncertain if lesion detectability with Tc-99m using UHE collimators is as sensitive as using low energy high resolution (LEHR) collimators currently used. The purpose of this study was to compare lesion detection in a Tc-99m cardiac phantom using both UHE and LEHR collimators. A phantom study was performed to quantitatively evaluate changes in Tc-99m defect size with varying Tc-99m activity ratios. A Data Spectrum cardiac phantom was imaged using a Picker triple head gamma camera, fitted with both UHE and LEHR collimators. One transmural insert (1.5x2cm) was placed in the central anterior (ANT) wall of the phantom. The myocardial space (but not the inserts) was filled with varying activity of Tc-99m(100, 150, 200 and 250uCi) to create ANT defect. SPECT images were acquired (360°, 60 projections, 10% window) with both collimators. Tc-99m images were reconstructed and quantified using circumferential count profiles. The effect of varying Tc-99m defect size was assessed by quantification of the severity of the ANT defect as defect nadir. Visually, an ANT defect was detected in all SPECT studies. Quantitatively, there was no significant difference, at any activity level, in the nadirs using the same collimators (see table). However, defect nadir was significantly smaller Using UHE collimator than using LEHR collimator. Thus, the use of UHE collimators may lead to underestimation of defect severity with Tc-99m labeled imaging agents.

Act (uCi)	100	150	200	250
LEHR	13.24	12.04	12.87	12.93
UHE	26.12	26.82	33.90	26.56

p=0.0005 LEHR vs.UHE (paired t)

No. 1435

COMPARISON OF 4 MOTION CORRECTION TECHNIQUES IN SPECT IMAGING OF THE HEART:A CARDIAC PHANTOM STUDY. M.W. Gebhard, M.K. O'Connor, K.M. Kanal, and P.J. Rossman. Mayo Clinic, Rochester, MN.

Purpose: The aim of this study was to evaluate the accuracy of 4 different motion correction techniques in SPECT imaging of the heart. Methods and Materials: We evaluated 3 automated techniques - the cross-correlation (CC) method, the diverging squares (DS) method and the 2-dimensional (2D) fit method, and one manual shift technique (MS) using a cardiac phantom. The phantom was filled with organ concentrations of Tc-99m closely matching those seen in patient studies. The phantom was placed on a small sliding platform connected to a computer controlled stepping motor. Linear, random, sinusoidal and bounce motions of magnitude up to 2 cm in the axial direction were simulated. Both single and dual 90° detector acquisitions were acquired using a dual 90°-detector system. Data was acquired over 180° with 30 or 15 frames / detector (single / dual head) @ 30 sec/ frame in a 64 x 64 matrix. Results: Simulated single detector system - the CC method failed to accurately correct for any of the simulated motions. The DS technique overestimated the magnitude of phantom motion, particularly for images acquired between 45° LAO and 45° LPO. The 2D and MS techniques accurately corrected for motion. Simulated dual 90°-detector system - the CC method only partially tracked random or bounce cardiac motion and failed to detect sinusoidal motion. The DS technique overestimated motion in the latter half of the study. Both the 2D and MS techniques provided superior tracking, although no technique was able to accurately track the rapid changes in cardiac location simulated in the random motion study. Average absolute differences between true and calculated position of the heart on single and dual 90° detectors were 1.7 mm and 1.5 mm for the 2D and MS techniques respectively. The corresponding values for the DS and CC techniques were 5.7 mm and 8.9 mm respectively. Conclusion: Of the 4 techniques evaluated, manual correction by an experienced technologist proved to be the most accurate, although results were not significantly different from those observed with the 2D method. Both techniques accurately determined cardiac location and permitted artifact-free reconstruction of the simulated cardiac studies.

POSTER SESSIONS

All posters will be available for viewing throughout the Annual Meeting. Posters will be on display in the Swing Space (Room 808) and Exhibit Hall F during the following hours: Monday, June 8, 10:30am–7:00pm; Tuesday, June 9, 7:00am–7:00pm; Wednesday, June 10, 7:00am–7:00pm; Thursday, June 11, 7:00am–Noon.

Posterboard No. 1500

EFFECT OF A COLLIMATOR AND TOTAL MYOCARDIAL COUNTS ON THE VOLUME MEASUREMENTS BY THALLIUM-201 GATED SPECT: A GATED PHANTOM STUDY. S. Shirakawa, E. Tadamura, T. Fujita , T. Kudoh, N. Hattori, M. Inubushi, E. Komori, N. Tamaki, J. Konishi. Kyoto University, Kyoto, Japan

ECG-gated thallium-201 SPECT (G-SPECT) is reported to provide an accurate assessment of left ventricular function in combination with Germano's algorithm. However, it is still uncertain which collimator should be utilized in G-SPECT. In addition, the effect of the myocardial counts on the measurement of the ventricular volume is not fully investigated. Therefore, we performed experiments using a cardiac phantom and an ECG simulator (75 cycles/min). G-SPECT was conducted on a dual head gamma camera using a LEGP and a LEHR collimator (30 steps over 180 degree, 8 frames per cycle). Acquisition time per step was changed from 10 to 60 sec to assess the effect of the total myocardial counts on the variability of the volume measurements for each collimator. The phantom volumes of the 8 frames were automatically calculated using Germano's algorithm. Coefficient of variation (CV) (SD/mean) of the volumes of 8 frames was calculated as an index of variability.

LEGP	time/step (sec)	10	20	30	40	60
	total counts($x10^3$)	222	498	738	1260	1491
	CV (%)	1.58	0.98	1.32	1.07	1.00
LEHR	time/step (sec)	10	20	30	40	60
	total counts($x10^3$)	144	303	471	659	990
	CV (%)	2.06	2.15	2.09	1.74	1.77

As expected, variability of volume measurements tended to decrease according to the increase of the total counts (increase of the acquisition time) for both collimators. A LEGP collimator was more stable for volume measurements than a LEHR collimator even when the total counts were low. These results suggest that a LEGP collimator is more suitable than a LEHR for volume measurements using G-SPECT and Germano's algorithm.

Posterboard No. 1501

CLINICAL STUDY OF RADIOIMMUNOIMAGING WITH ^{99m}Tc LABELLED ANTI-CEA MONOCLONAL ANTIBODIES. Ningyi Jiang, Xianping Lu, Lu bin. Memorial Hospital Sun Yat-Sen University of Medical Sciences. Guangzhou. 510120 P.R.China

In this olinical study, we assessed the accuracy and reliability of tumor radioimmunoimaging(RII) with ^{99m}Tc labelled anti-CEA monoclonal antibody(McAb) C50. 152 tumor patients were detected, including the ovarian neoplasms 115, intestinal neoplasms 26 and lung neoplasms 11. C50 was labeled with ^{99m}Tc using 2-mercaptoethanol reducing agent and MDP complex compound. The mean labeling efficiency of the labeled antibody was over 80%. The McAb dosage was 1.2±0.3mg every one. The ^{99m}Tc-C50 was injected after dexamethasone 5mg IV 30 min. ^{99m}Tc-C50 740~925 MBq was injected before four to six hours imaging. The planar or SPECT imaging was obtained by SOPHY DSX SPECT. It was positive diagnosis that the radioactivity has been accumulated in tumor site and the radio of T/NT was over 1·2. All were pathologically proved afetr operation. At the same term the ovarian neoplasms was examinated with B-ultrasonic. A comparative study has been made among the result of RII with the blood CEA level, the size of the tumor, the CEA content and the distribution in the tumor tissue by immunohistochemical examination. The sensitivity of ^{99m}Tc-C50 RII for tumor was 88.2%, the specificity was 81.2%, the accuracy was 83.7%, the detective of metastasis point rate was 84.1%. The sensitivity and accuracy was higher than B-ultrasonic. The quality of the RII had no relationship with the blood CEA level, but was sinificantly correlated with the main diameter of tumor, the CEA content and the positive CEA reaction distribution in the tumor tissue. The result show that ^{99m}Tc-C50 RII is a reliable method for detecting the tumor and metastasis point. The method is simple, effective and accurate for differentiating the malignant tumors from benign ones noninvasively.

Posterboard No. 1502

RADIONUCLIDE HEPATOBILIARY IMAGING IN EVALUATION OF POST-TRAUMATIC LIVER INJURIES. Susan M. Meli, BS CNMT, R.E. Taylor. M.D., Nellie Kelty, MAS, CNMT. University of Maryland Hospital, Baltimore, MD.

Purpose:
To describe the optimal technique for Hepatobiliary imaging in liver patients including special considerations involved in detecting and evaluating lacerations, biloma leak and obstructions.

Materials and Methods:
Eleven patients with post-traumatic liver injuries diagnosed by CT scan with suspected complications were evaluated. Radionuclide imaging included five second radionuclide angiogram, sequential dynamic one minute images for one hour; and as needed, right anterior oblique, right lateral and delayed static and dynamic imaging. A clinical data sheet was completed at the time of each scan.

Results:
A total of 11 patients were imaged. Seven patients had liver laccrations, four patients had bile leaks, two patients had bilomas; there were no obstructions and three of the eleven patients were normal. The origin of the leaks were detected in all cases; and using the additional imaging sequences, the lacerations and bilomas could be anatomically localized.

Conclusion:
Dynamic Hepatobiliary imaging with specialized positioning improves the ability of radiologist's to answer questions about post-traumatic liver complications including biloma, leak, laceration and obstruction.

Posterboard No. 1503

A SIMPLIFIED APPROACH TO ABSOLUTE QUANTITATION OF I-131 UPTAKE IN RADIONUCLIDE THERAPY PATIENTS. D.G. Elliott, D.J. Macey. R.F. Meredith. University of Alabama at Birmingham AL.

Treatment planning for therapy patients who receive I-131 labeled radiopharmaceuticals depends on absolute quantitation of uptake in selected target tumors/organs. Uptake in these sites is usually calculated from the number of counts detected in conjugate view Anger camera images combined with attenuation correction factors(ACF) derived from a transmission scan image. Because it is impractical to measure ACF's for I-131, transmission scan images are acquired at 122 KeV with a Co-57 flood source and empirically determined factors used to translate the ACF values measured at 122 to 364 KeV. The objective of this study was to design a step wedge phantom to replace the transmission scan image procedure and combine the information from the step wedge with the body thickness measured from a CT image. A step wedge (5,10,15,20,25,30 cm Lucite) phantom containing small I-131 sources with activity weighted for each step thickness was imaged with an Anger camera. The counts/37 kBq detected from each step were plotted as a function of a source in air. The linear attenuation coefficient calculated for I-

131 from the step wedge phantom counts was lower than the narrow beam look-up table value and decreased as wedge thickness increased. ACF's derived using body thickness measured from a CT scan image and a narrow beam linear attenuation coefficient for I-131 resulted in overestimation of uptake by as much as 30 %. This step wedge approach was found to quantitate I-131 uptake to better than 10 %, and provide camera sensitivity on each imaging day.

Posterboard No. 1504

SPONTANEOUS GALLBLADDER (GB) CONTRACTION DURING ROUTINE CHOLESCINTIGRAM IMAGING: A PREDICTOR OF CHOLECYSTOKININ (CCK) RESPONSE.
A.Arroyo, K.Kroger, and Y.Patel. St. Vincent Mercy Medical center, and the Medical College of Ohio (MCO). Toledo, Ohio.

OBJECTIVE: The value of CCK cholescintigraphy in identifying patients with depressed GB motor function secondary to a chronically inflamed, partially obstructed or functionally impaired GB, is well established. The aim of this study was to determine if by analizing the first hour of data (pre-CCK), would allow us to predict an abnormal vs. normal response to CCK. No previous reports of this technique have appeared in the literature.
METHODS: 40 CCK studies were collected. A GB ROI was used to quantitate the ejection fraction (GBEF). The GB time activity curve (TAC) of the pre-CCK data was analized by extrapolating the downslope (from max.), and utilizing this new fitted curve we predicted if the CCK response would be normal or abnormal.
RESULTS: 11 cases incorrectly predicted an abnormal response due to inadequate downsslope. 8 cases were excluded as there was no spontaneous GB contraction. However, of the 21 cases that did contract within the one hour window, all were predicted correctly (8 normal and 13 abnormal). Thus, our preliminary data shows 100% sensitivity, 54.2% specificity, 42.1% positive predictive value (PPV), and 100% negative predictive value (NPV).
CONCLUSION: Provided with a useful GB downslope TAC, we were able to predict both normal and abnormal responses to CCK. This may allow us to prevent repeat studies when a CCK intervention is suggested as a follow up, with the additional savings in costs and patient inconvinience.

Posterboard No. 1505

THE POOR MAN'S IMAGE FUSION: A SIMPLE WAY TO LOCALIZE WRIST PATHOLOGY
R.W. Yost, A.K. Verma, J. L. Littlefield, St. Louis VAMC, St. Louis, MO

PURPOSE: To provide a mechanism for accurate anatomic localization of bone scan abnormalities in the hand and the wrist using a positionally matched standard radiograph without the use of complex digital image fusion techniques.
METHODS: A simple mechanical device was fabricated which would restrain either hand in a fixed anatomic position for both bone scan images and a radiograph. The bone scan image was digitally zoomed so that the size of the hand on the film transparency was comparable to that of the x-ray film. Use of fiducial markers appropriate to both sets of images allowed the bone scan and plane radiograph to be accurately superimposed on a view box without the necessity of digitization of the plane film and subsequent computer image fusion with the bone scan. Interpretation of 24 sets of bone scan images both alone and with manual radiographic superimposition on the viewbox was performed and interpreted by two experienced observers.
RESULTS: In all cases the method was helpful in the localization of the bone scan abnormality to the small bones of the wrist as well as injuries to the arm/carpal articulation and carpal-metacarpal joints. This was felt to provide a more accurate diagnostic categorization of the abnormalities into traumatic, degenerative, post-operative reparative, and avascular necrosis nosologies.
CONCLUSIONS: Using a simple, mechanical, hand immobilizer with fiducial markers allowed manual superimposition of bone scans and plane radiographs on a view box. The necessity of image digitization of the radiograph and fusion was avoided. We were able to improve the reliability of our interpretations of bone scans in hand injuries.

Posterboard No. 1506

DECISIONS AND INSTRUCTIONS: WHAT TO DO WITH THE RADIOACTIVE PATIENT. S.D. Purnell, J.L. Littlefield, M.G. Haenchen, L.D. Chandler. St. Louis Univ. Med. Ctr., St. Louis, VA Med. Ctr., St. Louis, MO

PURPOSE: To review the new Nuclear Regulatory Commission (NRC) regulations regarding hospitalization following administration of unsealed sources of radioactive materials and the exposure of the general public from these patients and to present our approach to the requirements for informing patients/family and necessary record keeping.
METHODS/RESULTS: For many years the decision relating to hospital admission or discharge of patients administered therapeutic doses of radioactive isotopes was based upon a *patient activity* model, as required by the NRC. This was the famous 30 mCi limit. Effective May 29, 1997, the NRC's new *dose based* rule, also called the "Patient Discharge Rule" (Fed. Reg. 1997;62:4120), allowed release of a patient when the total dose to a member of the public exposed to the patient is unlikely to exceed 5 mSv in a year. Whenever the dose to any such individual is likely to exceed 1 mSv, licensees will need to estimate the dose to members of the public, including family members, and to advise the patient on ways to prevent the dose to these people from exceeding 1 mSv. Because these new regulations may alter the decision to hospitalize patients to be treated with radioisotopes, we have attempted to develop guidelines which help our staff in these decisions and help the patient and the family in understanding the factors which will reduce their exposure.
SUMMARY: This presentation reviews: 1) How to estimate the exposure to those coming in contact with a patient having been given a non-sealed source radiopharmaceutical therapeutic dose and what factors are necessary to minimize that exposure, 2) Patient and family instructions in order to prevent exceeding the 1 mSv dose limit and how to reduce contamination, including minimizing solid waste disposal contamination, 3) Our approach to the record keeping requirements.

Posterboard No. 1507

SPECT IMAGING OF IODINE-125 BRACHYTHERAPY SEEDS. K.F. Smith, T. Lowinger, I.S. Seo, T.V. Mazzilli, C.J. Homs, P.C. Sze, J.G. McBride, W.M. Sy, S.H. Huh. The Brooklyn Hospital Center-New York University School of Medicine, Brooklyn, New York.

This investigation was conducted to assess the ability of SPECT to image I-125 brachytherapy seeds. There is increasing interest in the potential of scintigraphic techniques to image the dose distribution from either radiopharmaceutical therapy or brachytherapy. The dosimetry of I-125 is more complex than for conventional interstitial sources due to the structure of the seeds and their low energy emission spectrum. In brachytherapy of prostate carcinoma, the dose deposition is altered due to high electron density structures which absorb the radiation emitted from low energy implantation sources. Thus, the traditional method of calculating the dose distribution via orthogonal or stereo-shift radiographs may yield incorrect results.

Patient and phantom SPECT studies were acquired. Phantom studies were used to determine sensitivity and point response functions (PRFs) from which full width at half maximum (FWHM) was calculated. PRFs in air and water were obtained by imaging a single seed placed centrally in a Jaszczak phantom. To study the ability of SPECT to resolve individual seeds, the seeds were distributed spatially in 3-dimensions in a Lucite phantom. Patient studies were obtained to evaluate dose distribution and to study attenuation effects from the low energy emissions (0.025-0.035 Mev). All SPECT studies were obtained for a total of 60 projections into a matrix of 64 x 64 in word mode. A low energy all purpose collimator was used. A 100% window centered at 0.05 Mev was used. Seed activity was approximatly 18.5MBq. Phantom images were reconstructed using a filtered backprojection algorithm with a ramp filter. Patient images were first prefiltered using a Butterworth filter, then reconstructed using filtered backprojection with a ramp.

The measured SPECT FWHMs, obtained from Gaussian fitting of the raw profiles, were 2.5cm in air and 3.5cm in water respectively. Images of the Lucite phantom demonstrate the ability of SPECT to resolve individual seeds. Patient sinograms show a rapid rise in attenuation as the detector moves laterally and posteriorly.

In conclusion, SPECT imaging of I-125 seeds is possible provided the camera pulse height analyzer allows setting of the window to include 0.025-0.035 Mev. A suitable attenuation correction algorithm might be useful to reduce the sharp decrease in counts seen when the detector moves laterally and posteriorly.

Posterboard No. 1508

EFFECT ON LABELING EFFICIENCY AND STABILITY OF Tc-99m LABELED MDP AND SESTAMIBI WITH ALTERNATIVE PREPARATION PROCEDURES. T.V. Bogsrud, T.J. Herold, M.-N. Chen, D.W. Mahoney, and J.C. Hung. Mayo Clinic, Rochester, MN, USA.

Nuclear pharmacy staffs usually have the highest hand radiation dose due to the reconstitution of Tc-99m radiopharmaceutical kits with high activity. An alternative preparation procedure using two separate syringes, adding saline before Tc-99m activity to the MDP kits, has been shown to effectively reduce the radiation dose to the fingers. However, it is not known how this altered reconstitution procedure may affect labeling efficiency and stability of Tc-99m labeled radiopharmaceuticals since the oxygen in the saline may

prematurely oxidize the reducing agent in the cold kit. We have tested the labeling efficiency and stability of Tc-99m labeled MDP and sestamibi (two commonly used radiopharmaceuticals in our laboratory), employing separate syringes for saline and Tc-99m pertechnetate, adding saline before activity, as well as adding activity before saline. A standard procedure of withdrawing both Tc-99m activity and saline into the same syringe before adding into kit was used as the control group. For both kits, the standard amounts of Tc-99m activity routinely employed in our laboratory were used. The radiochemical purity (RCP) was tested utilizing 6 kits of each radiopharmaceutical for all three methods at 0, 1, 3, 6, 12 (only for Tc-99m sestamibi), and 24 hr after reconstitution. A 2-strip paper chromatography method (Whatman 31ET/acetone and ITLC-SG/water) was used to determine the RCP values of Tc-99m MDP. For Tc-99m sestamibi, the standard RCP testing procedure, as described in the package insert, was used. For Tc-99m MDP, we found no overall difference between procedures ($p>0.5$), but a small overall time effect after 24 hr ($p=0.0016$), which was consistent both within ($p>0.5$) and between methods ($p>0.5$). The overall labeling efficiencies of Tc-99m MDP at 0, 1, 3, 6, and 24 hr post reconstitution were 99.1±0.4%, 99.4±0.3%, 99.5±0.3%, 99.7±0.3%, and 97.9±0.3%, respectively. For Tc-99m sestamibi, we found no overall difference between procedures ($p>0.5$) and no overall time effect ($p>0.1$). In conclusion, the addition of Tc-99m activity and saline with two separate syringes did not affect the labeling efficiency and stability of Tc-99m labeled MDP and sestamibi.

Posterboard No. 1509

DAILY ROUTINE MINIATURIZED CHROMATOGRAPHIC QUALITY CONTROL PROCEDURES FOR RADIOPHARMACEUTICALS J.T. Timpe, A.M. Zimmer, W.G Spies and S.M. Spies. Northwestern University Medical Center, Chicago, IL.

Multiple daily radiopharmaceutical preparations are formulated in our nuclear medicine department. Miniaturized chromatographic quality control procedures are performed on each formulated radiopharmaceutical preparation prior to use and, if needed, at specified times after formulation. In the last several years, our laboratory has developed rapid miniaturized chromatography systems to assess the radiochemical purity of newer radiopharmaceuticals including Tc-99m labeled sestamibi, tetrofosmin, mertiatide, arcitumomab (CEA-Scan) and nofetumomab (Verluma) and also In-111 octreotide, satumomab (Oncoscint) and capromab (ProstaScint). For these radiopharmaceuticals, either a single strip chromatography procedure or a two strip chromatography procedure is utilized. Single strip chromatography systems include Whatman paper (31ET, 1, or 17) with ethyl acetate and Gelman ITLC-SG with normal saline. A two-strip chromatography system, consisting of ITLC-SG with acetone:dichloromethane (50:50) and distilled water, is used to assess Tc-99m mertiatide. Results from newly developed miniaturized chromatography procedures have been compared to manufacturer's recommended procedures. Results indicate that the miniaturized chromatography procedures outlined are effective in evaluating the radiochemical purity of these radiopharmaceuticals. In addition, the miniaturized chromatography systems offer significant advantages in time saving, ease of use and less waste generation when compared to the manufacturer's recommended procedures.

Posterboard No. 1510

A CONVENIENT AND EFFECTIVE METHOD FOR THE DETERMINATION OF RADIOCHEMICAL PURITY OF In-111 SATUMOMAB PENDETIDE (In-111 OncoScint® CR-OV). **M.-N. Chen and J.C. Hung. Nuclear Medicine, Department of Diagnostic Radiology, Mayo Clinic, Rochester, MN, USA.**

Since there is no recommended method for testing radiochemical purity (RCP) of In-111 satumomab pendetide (In-SP), the purpose of this study was to develop a convenient and effective method for the quality control (QC) of In-SP. Instant thin-layer chromatography impregnated with silica gel (ITLC-SG) or polysilicic acid (ITLC-SA) and Whatman 31ET paper were used as the stationary phase. Three different QC methods were used in our evaluation: (1) In-SP sample was incubated with the same volume of 0.05 M DTPA for 1 min and then applied to the three different stationary phases and developed with normal saline. (2) In-SP sample was applied to each of three stationary phases and developed with 0.05 M DTPA solution. (3) In-SP sample was applied to one of the three stationary phases previously dried with a drop of 0.05 M DTPA on the origin and developed with normal saline. The VISTA 100 Analytical Digital Imaging System (Radiomatic Instruments & Chemical Company, Meriden, CT) was used to evaluate the results obtained utilizing these three chromatographic methods. Free In-111 and RCP values of 50, 85, and 99% In-SP were used to verify these three methods. The In-SP samples with intermediate RCP values were obtained by sampling from the reaction vial at 5, 10, and 20 min during the 30-min incubation period. With the proposed three methods, free In-111 migrated to the solvent front while labeled In-SP remained at the origin. The Sep-Pak method was also used to verify the 99% pure In-SP, and showed comparable results to the proposed methods. In contrast to the Sep-Pak method, ITLC and paper chromatography methods can be performed at less expense and with much less sample volume. In general, our results showed that there were no significant differences among the methods using three different stationary phases. Method 1 showed the most consistent results, while methods 2 and 3 required the least sample. ITLC-SG with method 3 had a better resolution than ITLC-SG with method 2. However, method 2 has the advantage of simplicity when compared to the other methods.

Posterboard No. 1511

INVESTIGATION ON FEASIBILITY OF USING A SCINTILLATION CAMERA FOR THE MEASUREMENT OF BLOOD ACTIVITY. H. Fujioka, K. Murase, T. Inoue, Y. Ishimaru, A. Akamune, J. Ikezoe. Matsuyama Shimin Hospital and Ehime University Hospital, Ehime, JAPAN.

When performing quantitative measurement of blood flow such as cerebral blood flow (CBF), radioactivities in the blood are necessary to obtain an input function, and they have usually been measured with a well-type scintillation counter (well counter). However, well counters are not routinely available in all hospitals. Then, the present study was undertaken to determine whether scintillation cameras can be used to measure radioactivities in samples, e.g. radioactivities in the blood.

First, aqueous I-123 solutions of various concentrations ranging from 0.008 kBq/ml to 868.0 kBq/ml were infused at a volume of one ml into individual blood-sampling vials having an internal diameter of 22.5 mm, and static images were acquired for one minute with a scintillation camera to measure radioactivity counts. The static images were acquired using a 64 x 64 matrix after removing the collimator, and the regions of interest with 7 x 7 pixels (21 mm x 21 mm) were defined. The radioactivities were also measured with a well counter, and were compared with those measured by a scintillation camera. There was a good linear correlation between the data obtained with the scintillation camera (y, kcpm) and the well counter (x, kBq/ml) in the range between 0.008 kBq/ml and 868.0 kBq/ml ($y=7.78x+141.5$, $r=0.99$).

Next, we investigated the feasibility of using a scintillation camera for CBF measurement. CBF was measured in 12 patients with cerebrovascular disorders using N-isopropyl-p-(I-123) iodoamphetamine and a microsphere model in which the input function was obtained by 5-min continuous arterial blood sampling. The octanol-extracted radioactivities of the arterial blood samples were measured with a well counter to obtain an input function. They were also measured with a scintillation camera after the collimator had been removed. The CBF values were calculated using the input functions measured by the two procedures, and were compared with each other. There was a good agreement between the CBF values obtained by the two procedures ($y=1.14x-2.85$, $r=0.97$).

In conclusion, it appears that scintillation cameras can be substituted for well-type scintillation counters in the measurement of radioactivities in samples, such as radioactivities in blood.

Posterboard No. 1512

ROBOTIC SYNTHESIS OF 6-[F-18]FLUORO-L-DOPA. **C.W. Chang, H.E. Wang, H.M. Lin, J.B. Chen, R.S. Liu. Taipei Veterans General Hospital, National PET/Cyclotron Center, and National Yang-Ming University School of Medicine, Taipei, Taiwan.**

The aim of this study was to develop an automatic 6-[F-18]Fluoro-L-dopa (6-[F-18]FDOPA) synthesis using a robotic system (Scanditronix Anatech RB III, Uppsala, Sweden).

6-[F-18]FDOPA has been developed for the evaluation of central dopaminergic function with positron emission tomography (PET).

[F-18]Fluorine was produced by using a Scanditronix MC17F cyclotron via (d,α) reaction with bombardment of Ne and subsequently reacted with tin precursor in freon-11 solution. The resulting protected 6-[F-18] FDOPA was purified by dual column and then hydrolyzed in 48% HBr at 130°C to remove the protected groups. The reaction mixture was

partially neutralized with 3N NaOH and acetate buffer. All above steps were done by robotic system which was controlled by an Anatech Robotic Controller program. The raw product was purified by semi-preparative radio-HPLC. The purified 6-[F-18]FDOPA was collected and filtered through a 0.22 μm sterile membrane filter. An average of 3.13 mCi of 6-[F-18]FDOPA was obtained for three runs with 15 μAh current integration (30 μA beam current). The total synthesis time was 150 min from EOB (end of bombardment). The radio-LC showed that its retention time was 9.4 min which was in consistent with 6-[F-19] FDOPA. The radiochemical purity was greater than 99%. The results was same as manual synthesis.

In conclusion, the robotic system can provide an automatic synthesis for 6-[F-18]FDOPA. The radiation exposure of the operator can also be reduced to minimum.

Posterboard No. 1513

IS TOTAL PROSTATE-SPECIFIC ANTIGEN (PSA) LESS THAN 4 ng/ml A SAFETY ZONE IN SCREENING PROSTATIC CANCER? C.S. Yang, R.S. Liu, J.M. Lu, S.Q. Liao, and K.G. Chen. Taipei Veterans General Hospital and National Yang-Ming University School of Medicine, Taipei, Taiwan.

When the total PSA (TPSA) value is greater than 10 ng/ml, the incidence of prostate cancer is 50-67%. For a TPSA value less than 4 ng/ml, the incidence of cancer is low and usually no further evaluation is necessary. For patients with TPSA value between 4 and 10 ng/ml (the diagnostic gray zone), ratio of free-to-total PSA can be of useful in differentiating prostate cancer from benign prostate hypertrophy (BPH). In this study, we assessed the ratios of free-to-total PSA in patients with BPH or prostate cancer of whom the TPSA value less than 4 ng/ml to see if TPSA at this low level is a safety zone or not.

A total of 101 patients underwent transrectal ultrasonography or transurethral resection of the prostate and biopsies were studied. Thirty-three patients were finally proved to have prostate cancer and 68 patients were proved to have BPH only. Their TPSA value ranged from 0 to 15 ng/ml. TPSA and free PSA levels were determined using a immunoradiometric assay (PSA-RIACT, FPSA-RIACT, CIS). The appropriate cut-off point of free-to-total PSA ratio in diagnosing prostate cancer determined by receiver-operating characteristic (ROC) curve was 0.19. In 36 patients of whom the TPSA less than 4 ng/ml, 17 patients (47%) had free-to-total PSA ratio less than 0.19. Among them, 14 patients (39%) were proved to have prostate cancer. The false positive rate was 8% and the false negative rate was 5%. The sensitivity and specificity was 88% and 85%, respectively. Accord-ingly, 39% of patients who was thought to have low risk of prostate cancer due to low TPSA level were reclassified into the high risk group of cancer.

In conclusion, TPSA less than 4 ng/ml is not a safety zone in screening of prostate cancer, and free-to-total PSA ratio is mandatory for this group of patients.

Posterboard No. 1514

ORGAN RATIOS: RESULTS OF STATIC VS VARIABLE SPEED WHOLE BODY ACQUISITION. M.O. Afriyie, F. Leveque, R. Johnson, P. Osei-Boah, B. Tomas & C.J. Palestro. Long Island Jewish Medical Center, New Hyde Park, NY.

Uptake ratios, including those of paired organs are often obtained using speed-dependent whole body images. A shutter is used to facilitate the whole body acquisition. The shutter opens a horizontal window through which data are collected. The small field of view does prevents proportional data collection from respective point activities. Because this could potentially affect data analysis, we performed an experiment to explore this. A renal phantom consisting of a right and left kidney was filled with Tc-99m solution in a 1:2 (R/L) ratio. Activity in the kidneys was subsequently increased from 100 uCi to 1 mCi maintaining a 1:2 ratio proportionality. Each increment was imaged at 5, 8, 12 & 18 cm/min followed by a 3-min static image. Using vendor supplied software, regions of interest (ROI) were drawn on the kidneys & ratios generated.

Activity rt/lt kids	Delta	Mech Ratio	Static Image	5cm	8cm	12cm	18cm
100&200	1.85	1:2	1:2	1:2	1:2	1:2	1:2
300&600	5.5	1:2	1:2	1:2.22	1:2.17	1:2.10	1:2
400&800	7.4	1:2	1:2	1:2.27	1:2.22	1:2.08	1:2
500&1000	9.2	1:2	1:2	1:2.32	1:2.27	1:2.17	1:2.08

The expected 1:2 ratio was obtained on all static images regardless of activity. On the whole body images, and on whole body scans for <200 uCi activity. For 300 uCi and above, the ratio varied up to 14% using speeds of 5-8 cm/min. At 12-18 cm/min, ratios approached the expected 1:2. In summary, accurate data sampling depends on both activity & speed of the sampling instrumentation. Lower activities corresponding to lower decay rates are sampled effectively & proportionately by stationary dtectors. Inherent properties of moving imaging systems may affect data collection & ratios estimated using whole body images may be inaccurate. The magnitude of the error depends on the Multiple Factor (delta) of the disintegration rates in the ROI & scan speed. That ratios approach expected values at higher scanning speeds confirms that data are poorly sampled at such speeds. If ratios are needed in a patient study, static imaging should be performed.

Posterboard No. 1515

EFFECT OF TEMPERATURE ON RADIOCHEMICAL PURITY AND IMMUNOREACTIVITY OF RADIOLABELED MONOCLONAL ANTIBODY 1H10. J.T. Kang, W.S. Huang, M.H. Yu, M.Y. Yeh. Tri-Service General Hospital, National Defense Medical Center, Taipei, Taiwan, R.O.C..

While radiolabeled monoclonal antibodies (MAbs) are potential tools for tumor imaging and treatment, problems remain before it become applicable on a large scale clinical basis. The investigation was undertaken to investigate the effect of temperature on the preservation of radiochemical purity and immunoreactivity of I-125 and I-131 labeled MAb 1H10, an antibody against human cervical carcinoma cell-surface antigen. An antibody-irrelevant human melanoma cell, H2669, served as the control. I-125 and I-131 labeled MAbs 1H10 and H2669 were carried out by chloramine-T method. All the prepared MAbs were divided into aliquots and stored at 4, -20 or -70 °C, respectively, for 2 to 14 days. Radiochemical purity and immunoreactivity of the radiolabeled MAbs in settled conditions were measured by thin layer chromatography and a modified index, respectively, after a single freeze and thaw cycle. Reduced release of free radioiodide and better preservation of immunoreactivity were observed in the radiolabeled MAbs stored at -70 °C than in those stored at -20 or 4 °C. The extent of free iodide dissociation and immunologic binding degradation of I-125 labeled MAb 1H10 appeared milder than that of I-131 under the same condition. However, both I-125 and I-131 labeled MAb stored at -20 or -70 °C retained greater than 90% radiochemical purity for at least 3 days. In conclusion, I-125 or I-131 labeled MAb 1H10 appeared stable in both radiolabeling and binding studies when stored at temperatures of -20 °C or below for 3 days. The data suggest that freezing may provide an appropriate alternative for reducing radiolysis and preserving immunoreactivity of radiolabeled MAb that is newly developed and is still under pre-clinical *in vitro* or *in vivo* investigation.

Posterboard No. 1516

QUANTITATIVE CEREBRAL BLOOD FLOW USING INHALED XENON 133 AND DYNAMIC SPECT IMAGING-REPRODUCIBILITY OF THE CONVOLUTION ALGORITHM. V. Valdivia, C. Thomas, H.L. Pham, F. Mishkin. Harbor-UCLA Medical Center, Torrance, CA.

Kanno and Lassen demonstrated that absolute cerebral blood flow may be measured using a modification of Obrist's method employing regional cerebral washout rates measured from dynamic tomographically acquired data after inhalation of xenon 133 gas to equilibrium. Devous and coworkers adapted and validated a modification of this technique for data dynamically acquired every 10 seconds for 6 minutes with a three headed Prism camera. Lung activity is used as the arterial input function. A full convolution algorithm for calculating absolute cerebral blood flow appears to measure

the low blood flow rates more reliably than the Kanno-Lassen double integral algorithm. In addition, the use of higher resolution collimators permits differentiation of gray from white matter on parametric images. We have used this commercially available program for more than a year in over 300 patients ranging in age from 3 to 90 years old. Recently, the program was rewritten. We evaluated the reproducibility of the measurements between the two different programs and two different operators who analyzed the same data independently in 20 patient studies. Comparison was made between the value for mean cerebral cortical blood flow which utilized the data from all pixels with values encompassing 60% of the maximum blood flow as well as the imaging data. Our results show a 0.96 correlation coefficient and correspondence of the images in each case. In addition, we assessed the ratio of white matter to gray matter flow estimates in the frontal lobe using a standard region of interest. In the right hemisphere, white matter flow averaged 0.75 of the cortical flow, and on the left, 0.74. We conclude that this technique provides a highly reproducible means for measuring absolute cerebral blood flow as well as parametric images which distinguish between cortical and white matter flow.

Posterboard No. 1517

A METHOD FOR DEVELOPING NEW IMAGING PROCEDURES FOR NUCLEAR MEDICINE TECHNOLOGISTS, J. Fry, A. Dado, V. Phillips, G. Hinkle, R. Pozderac and J. Olsen, The Ohio State University Medical Center, Columbus, OH.

Several new imaging procedures have been introduced during the past two years in our department. The instruction on the purpose of the procedure, physiology and suggested imaging parameters has not always been smooth or efficient. In order to provide high quality images in a consistent manner, a method was developed for introducing and refining new imaging procedures by the technologists in our department.

Lymphoscintigraphy for sentinel lymph node mapping in melanoma and breast cancer were two procedures introduced by this method. An initial imaging procedure was formulated by the nuclear medicine physicians and recorded in the procedure manual. Two technologists were assigned to perform all lymphoscintigraphy for a five month period. During that time they worked with the Nuclear Medicine physicians to refine the imaging parameters, acted as liason between the Department of Nuclear Medicine and the Department of Surgery, worked with the nurses who use the intraoperative gamma probe detector and observed surgical removal of the affected nodes in the operating room. All observations were recorded and reviewed on a regular basis. Modifications were made to improve the procedure as the five month period progressed. A final procedure and case studies were presented at a monthly technologist staff meeting.

This method of introducing and refining an imaging procedure has been successful. It has established a rapport with the Department of Surgery and resulted in consistent high quality images. It allowed for technologist participation and input during the developmental stages of these procedures and added valuable insight into the importance of their work.

Posterboard No. 1518

DAILY QUALITY ASSURANCE OF POSITRON EMITTERS ON A DUAL HEAD POSITRON COINCIDENCE DETECTION GAMMA CAMERA: S.M. Hamblen, C.M. Laymon, T.G. Turkington, and R.E. Coleman. Duke University Medical Center, Durham, NC.

The current daily quality assurance (QA) program on our Elscint Varicam includes a Co-57 flood acquired with the low energy collimator. This protocol allows us to perform a total system check (uniformity, energy resolution, sensitivity). After these data are reviewed the collimators are changed to HES (slit collimator with graded absorber) collimators for positron coincidence detection (CoDe) with dual head imaging. The Varicam can be set up to perform CoDe imaging studies using 4 energy windows. One is for the positron peak and three scatter windows. A project to develop a specific daily QA program for a total system CoDe imaging on the Varicam was undertaken. An appropriate QA program for CoDe imaging would test camera uniformity and sensitivity at 511 keV, and the timing between cameras. It was determined that the use of a fillable flood source was not appropriate because of the radiation exposure, activity required, and difficulty filling on a daily basis. A 61.3 cm small diameter stainless steel line source was designed. Teflon tubing was inserted through the stainless steel tube. On each end of the Teflon tube adapters were installed which connected to 3-way stopcocks. The stopcock system allowed filling the system without air bubbles consistently. This line source was filled with 3.4 mCi of N-13 ammonia and imaged dynamically for 100 minutes. The data acquired were exported and graphed to determine the activity levels which could be used in future acquisitions. Although a line source which is close to the camera does not yield a uniform singles distribution on the cameras, the resulting distribution, which is slightly peaked at the middle, should be consistent from day to day. Singles distributions, count rate constancy, and sensitivity provide a useful measure of camera performance. The performance of a total system daily QA program for CoDe imaging is essential to check camera uniformity, and sensitivity at 511 keV, as well as the timing between cameras. We conclude that a line source is the best method and that a fairly wide range of source activities would be suitable for this. In the future the line source could be designed for use with Ge-68 to provide count constancy, ease of use, and extended life.

Posterboard No. 1519

PRONE SCINTIMAMMOGRAPHY SPECT: A NEW METHOD FOR IMAGING BREAST CANCER. D.S.Thakrar, J.R.Buscombe, D.McCool, A.J.W.Hilson. Royal Free Hospital and School of Medicine, London, UK

Scintimammography has become an established diagnostic method in both the USA and Europe. Using the standard prone dependent technique a good accuracy can be obtained. However tomography can be useful as it increases contrast resolution allowing small objects to be visualised against background activity and also allows for more precise localisation. Traditionally SPECT of women with suspected breast cancer has been performed in the supine position. This has drawbacks in that the lower right breast lies over the upper liver and the left breast over the heart. Scatter from these organs will prevent accurate visualisation of small cancers in the overlying breast.
A new technique has been developed using a special custom-built soft couch which consists of two cushions to support the body of the patient below the chest and the patient's head. Triangular inserts are provided with the apex of the triangle supporting the sternum. With the patient lying prone both breasts are dependent. One insert contains a thick lead shield and prevents 'shine through' on planar imaging. The other contains no lead and is used for prone SPECT, using a twin headed gamma camera and high resolution collimators and a 128x128 matrix using a 15 minute acquisition.
It has been possible to image 15 patients with both prone SPECT and planar imaging. At present we have not found any new sites of cancer in the breast, though more extensive disease can be seen on prone SPECT. We were however able to find uptake in axillary lymph nodes not seen on planar imaging. All patients found the couch comfortable and tolerated the study. Also as the patient did not have to move between images it was more suitable for patients with mobility problems.
Initial use of this custom built couch prone SPECT appears possible and further work will now be done to determine its role in scintimammography

Posterboard No. 1520

A GEOMETRY PARAMETER FOR DOSE CALIBRATORS APPLIED TO QC AND DAILY CLINICAL ROUTINE. H. Greuter, A. van Lingen, J.Eijndhoven, A.J. Wilhelm, W. den Hollander. Free University Hospital, Amsterdam, The Netherlands.

Most QC tests for a dose calibrator (DC) are general detector tests (background, sensitivity, and linearity). A parameter which reflects the influence of source geometry on the read-out is not generally used, neither for QC nor with the daily use of the DC.
We introduce such a parameter Qdc, based on the specific activity (MBq/gram) of both a sample and a standard. The standard is a 60 cc syringe filled with activity of which has been weighted accurately. The Qdc reflects the factor with which the DC read-out changes due to the change in geometry of the sample (change in syringe size, volume or position in the DC).
For some often used radionuclides (Tc-99m, Tl-201, Ga-67, F-18, and, In-111) and syringe sizes (1-20 cc), filled for 50% and 100%, the Qdc has been determined. For the first four radionuclides Qdc values within the range of 0.97 and 1.04 (N=88) were found, and the variability (CV) was 1.3%. For In-111 the Qdc ranged from 1.03 to 1.16 (N=22), with a variability (CV) of 3.5%. The difference between the latter radionuclide and the former radionuclides is mainly due to the photon-cascade of the ^{111}In, which becomes less noticible with larger syringe volumes. The Qdc is a parameter that can easily be apllied to detect changes in the DC and can be implemented in the regular QC.
The Qdc can also be applied for (pharmaco-)kinetic studies: a blood

sample can be obtained in any test tube and volume and by means of the Qdcof this tube the read-out in the DC can be converted to the read-out of a standard test tube and volume. This facilitates an accurate determination of the activity concentration of the blood sample.

Posterboard No. 1521

IMPROVED WHOLE-BODY IMAGING WITH AN ECAT ART SCANNER. M.A. Dachille, T. Beyer, D.W. Townsend, C.C. Meltzer, J. Jerin and P. Luk. PET Facility, Department of Radiology, University of Pittsburgh, Pittsburgh, PA, and CTI PET Systems, Knoxville, Tenn.

The ECAT ART scanner comprises dual BGO block detector arrays rotated at 30 rpm to acquire a complete 3D projection set. Such a partial ring configuration has both lower sensitivity and lower cost compared to a full-ring scanner. Since clinical whole-body scanning with FDG is an important application of the ECAT ART, imaging protocols must be optimized to provide diagnostically useful images, preferably with attenuation correction. Scan protocol parameters that require optimization include the injected dose of FDG, the division of imaging time between emission and transmission scanning, the choice of bed position overlap, the use of pre- or post-injection transmission scanning with or without transmission image segmentation, and the use of statistically-based image reconstruction algorithms. The scatter and randoms correction procedure also influences the quality of the reconstructed images. Since the ART has no septa, the effect of scatter and randoms from activity outside the field-of-view, particularly from the brain, heart and bladder, must also be taken into account. It has further been shown that BGO block detector performance can be improved both by reducing the pulse integration time and by operating the scanner with a slightly shorter coincidence window. The physical size of the patient also has a significant influence on image quality. Over 300 clinical whole-body scans, primarily in patients with cancer of the lung and esophagus, have been performed at our institution using a variety of imaging conditions. From our analysis of these studies, we conclude that, for small or medium-sized patients, high quality, attenuation-corrected whole body images can be obtained on an ECAT ART scanner with a 6 mCi injection of FDG and a total scan time of less than one hour.

Posterboard No. 1522

PROCEDURES TO IMAGE NON-HUMAN PRIMATES PERFORMED BY A NUCLEAR MEDICINE TECHNOLOGIST. L.A. Ruszkiewicz, D.M. Ratica, D.L. Milko, D.E. Parkinson, L.G. Smith, E.C. Klein*, C.A. Mathis. PET Facility, *Central Animal Facility, University of Pittsburgh Medical Center, Pittsburgh, PA.

The animal is first immobilized by using a squeeze cage and injected in the gluteus area (i.m.) with a solution containing 20 mg/kg of ketamine and 1 mg of atropine for initial anesthesia and control of heart rate and salivation. When unconscious, a 18g - 22g catheter is placed in the antecubital vein and an i.v. saline drip is started. The animal is then intubated using an endotracheal tube whose size is dependent on animal weight, and pancuronium bromide is injected for paralysis (i.v. bolus 0.06 mg/kg). A blood pressure cuff is placed on an arm and heart rate and blood pressure are periodically checked. The animal is ventilated with 40% oxygen/medical air and isoflurane gas (0.2 - 1.5%). The end tidal pCO2 is monitored and maintained at (33 - 40 mm partial pressure). Pancuronium bromide is added to the i.v. saline drip and infused at a rate up to 0.06 mg/kg/h, as determined by monitoring muscle twitch responses to electrical stimulation (an increase or decrease of pancuronium bromide is applied depending upon the number of twitches). A foley catheter is then placed along with a rectal temperature probe, and a five lead electrocardiogram is used to monitor heart rate. The groin is shaved and prepped with betadine and isopropyl alcohol using a sterile technique. The skin is pierced using a 18g needle, and a 20g x 1.75 in. arrow radial artery catheter is inserted into the femoral artery. The catheter is sutured into place, connected to a physiocontrol pressure monitor, set for cardiac height, and zeroed. At the completion of the Positron Emission Tomography scan, the arterial line is removed along with the foley catheter and the rectal probe, and the isoflurane gas is turned off. The animal is given neostigmine (1 mg i.v.) to reverse the immobilization and atropine (1 mg i.v.) to control heart rate and salivation. The i.v. is removed, and the animal is placed in a lateral position in the cage. Within 15 min, the animal will begin to actively resist the mechanical ventilation. The ventilation tube is then disconnected so that the breath pCO2 can be monitored. When breathing is maintained, the endotracheal tube cuff is deflated and removed. Within 20 minutes, the animal regains full consciousness and will sit up and move around the cage freely.

Posterboard No. 1523

Tc-99m TETROFOSMIN: EVALUATION OF RADIOCHEMICAL PURITY OF FRACTIONATED KIT. C. Sdraiati, R. Casati, F. Boccagna, F.R.Colombo, R. Leo. Nuclear Medicine Dept., IRCCS-Ospedale Maggiore, Milano, Italy.

Myoview is a freeze-dried ethylene diphosphine ligand that, upon reconstitution with sodium Tc-99m pertechnetate, rapidly yields a preparation containing the lipophilic cationic myocardial imaging agent Tc-99m Tetrofosmin (Tf). The aim of this study was to compare the radiochemical purity (RCP) of fractionated kit in order to reduce the cost of each radiotracer preparation. The literature has reported the rate of formation of Tf in kit formulation < 15 min with a ligand concentration within 30-60 μg/ml. Myoview kits (originally containing 230 μg of tetrofosmin) were dissolved in saline, split into 2 , 4 and 6 aliquots of 1 ml and stored at -80°C in sterile and evacuated vials for two weeks.The latter were reconstituted with different final volumes with a ligand concentration ranging between 9.6 and 76.6 μg/ml and a pertechnetate concentration of 1110 MBq/ml. Quality controls were performed up to 8 hours using the TLC method in according to the instructions of the manufacturer.

μg of Tf per frozen vial	μg / ml of Tf per reconstituted vial	RCP% (mean of 2 preparations)		
		0 h	2 h	8 h
115.0	14.4	94.69	95.14	92.29
115.0	28.7	94.60	94.53	94.12
115.0	57.5	95.78	95.03	95.11
115.0	76.6	95.59	95.90	96.15
57.5	14.4	93.08	92.58	91.07
57.5	28.7	95.70	93.60	93.96
38.3	14.7	93.01	93.91	92.95
38.3	9.6	92.27	92.25	88.53

Tf kit fractionation and reconstitution at the maximum Tc-99mTcO_4^- concentration do not affect RCP for at least 8 hours if the tetrofosmin concentration is kept above 14.4 μg/ml. This procedure may result in reduced costs particularly for emergency use.

Posterboard No. 1524

RADIATION SAFETY IN A HIGH DOSE RADIOIMMUNOTHERAPY SETTING.
L. Durack, J. Eary. University of Washington Medical Center, Seattle, WA.

Our group has been performing radiolabelled monoclonal antibody infusions as part of bone marrow transplant regimens for patients with non-Hodgkin's B-cell lymphomas and acute leukemias. Recently the dose delivered to normal organs has reached as high as 27 cGy, corresponding to more than 800 mCi of I-131 administered to some patients. Yet radiation doses to personnel are not exceedingly high. Therapy dose labelling is performed in a well shielded hood. The IV bag that will hold the patient's dose, with primed IV line and IV pump drip chamber monitor already attached, is suspended inside a lead tower, which itself is inside a large wheeled cart. The final product is pumped directly into the 1 liter IV bag, and the dose cart is wheeled to the patient's room. The room is prepared beforehand by covering the floor with surgical drapes, and all tables and other flat surfaces are covered with plastic-backed absorbent sheets. All items that the patient is likely to touch are covered with plastic. The floor around the toilet is also covered with absorbent pads, and the patient is instructed to squirt a generous amount of Betadine into the toilet after each use. All personnel involved in the therapy infusion wear alarming dosimeters. After the patient has received his infusion, the therapy cart is retrieved, and from that point until release from radiation isolation no one enters the patient room, except for medical emergencies. A brachytherapy shield is placed in the doorway, and Radiation Area/Radioactive Materials signs are posted. All meals are delivered on disposable utensils and placed on a table outside the room. The patient can then choose only the food he wants to eat, thereby reducing the amount of waste the he must keep in the room until release. The room preparation makes clean-up fairly straightforward All laundry and trash, including floor and surface covers, are presumed contaminated and placed into separate bags and labelled appropriately. Usually the only items requiring actual decontamination are the sink and toilet. As a consequence of these safety measures, personnel exposures have been maintained at very low levels. The nurse coordinator and nuclear medicine technologist for our projects typically receive less than 200 mrem/year to total body, and rarely more than 1000 mrem yearly to their hands. With improved methods and more automation of labelling tecniques, doses to the radiochemists have fallen to 2,000 mrem to hands and 210 mrem to body in 1996. Personnel on the nursing floor where radioimmunotherapy patients are cared for rarely record more than a minimun badge reading in any month.

Supported by NIH P01 CA44991-08.

Posterboard No. 1525

EVALUATION OF EFFECTS OF COLLIMATORS AND NUCLIDES ON THE CERBRAL PERFUSION SPECT IMAGES ASSESSED BY A TEXTUAL ANALYSIS: A PHANTOM STUDY H.Ohnishi, M. Takada,

T.Kida, K. Noma, M. Yoshimura, S. Matsuo, K. Masuda, I. Yamamoto and R. Morita. Shiga University of Medical Siecnces, Ohtsu, Shiga, Japan

Purpose

The purpose of this study is to evaluate whether characteristic of frequencies of the brain SPECT images differ according to both collimators and nuclides using a texture analysis .

Material and Methods

A 4-head scinti camera, SPECT-2000H-4(Hitachi, Tokyo,Japan) was used, and planner and SPECT images of a brain phantom, (Kyoto-Kagaku, Kyoto, Japan) were obtained using 64x64 matrix. Nuclides of 123-I, 99m-Tc, and 201-Tl were evaluated for three collimators; LEHS, LEGP and LEHR. Each image was trasformed to two-dimensional power spectrum using Fourier transform, and the radius and angle direction distribution function(Pr(n) and P0(n)) were calculated. Pr(n) and P0(n) were compared for each nuclide and collimator.

Results

The effective cut-off frequencies for both collimators and nuclides in the Pr(n) are shown in the table below. They differed depending the collimators and nuclides. The Pθ(n) values varied up to 35% (LEHS) according to increase of the sensitivity of the collimator.

	LEHS	LEGP	LEHR
Planar	0.507	0.787	1.113
SPECT	0.551	0.651	0.729

The values were cycles/cm and at 99m-Tc

Conclusion

The cut-off frequencies of the filter need to be changed according to the collimators and nuclides in the SPECT Images. This may suggest that the radius and angle direction distribution function in the power spectrum is good not only in qualitative but also in quantitative assessment for SPECT images

Posterboard No. 1526

PLANNING OF PATIENT THROUGHPUT: ECONOMICAL CONSIDERATIONS FOR WHOLE-BODY FDG-PET AND OFF-SITE FDG PRODUCTION. C. Ponath, H. Bender, H-J. Biersack. Department of Nuclear Medicine/PET-Center, University of Bonn, Germany

Purpose: Assessment of various scan-modalities, under the aspect of adequate patient throughput (clinical relevance) and economical considerations (break-even point).

Assumptions and Methods: Patients are examined employing a dedicated PET-scanner (ECAT EXACT 921/47; Siemens/CTI) ,with field of view of 16.5 cm. An average of 5 total-body scans per day is assumed. Each examination consists of at least 5 bed-positions including emission-scan (EM) (10 min. per bed-position), and a transmission-scan (TR) (5 min. per bed-position). In addition 10 min. are needed to position the next patient for the scan, or 5 min., if patient-bed is repositioned only. Incubation time after injection of FDG is assumed to be 45 to 60 min. FDG is produced off-site, average time of transportation is 2.5 hrs., and the provider bills the amount of FDG ordered (incl. transportation).

Three different models were compared: model A: EM --> bed repositioning --> TR ; model B: TR --> FDG-injection and incubation on the scanner-bed --> EM; model C: TR in patients 1-4 --> injection and incubation in a separate room --> three-point repositioning of the patient --> EM, patient 5 treated according to model A.

Results: The least amount of FDG needed, resulted from model C, demonstrating a reduction of 41% and 90% as compared to model A or B, respectively. Additionally, problems due to (a) discomfort as a result of the long resting period and (b) artefacts produced by filling of the bladder, were significantly reduced in model C.

model C also reduced the time-requirement by 1/3rd. due to overlap of incubation and TR time as compared to model B. and using the waiting time needed for transportation as compared to model A.

Major limitation of model C is the error induced by inadequate repositioning, which does not seem significant in oncological patients. In those cases, hot-spot imaging and semiquantitative assessment is mostly sufficient. In addition, unwanted patients movement during whole-body scan should not be underrated.

Conclusions: A most cost-effective way of combining high patient-throughput and lower FDG costs can be achieved by optimizing logistics of scan-times and waiting periods (patients, technicians) as outlined in model C. Thus, PET-scanners can be run economically also in areas distant from FDG-production sites.

Posterboard No. 1527

Decreased Cost of ProstaScint Imaging Using Dual-Isotope Imaging, JR Krzos, RH Wagner, RE Henkin, Loyola University Medical Center, Maywood, Illinois

In-111 - Capromab Pendetide (ProstaScint),Cytogen Corporation, Princeton, New Jersey, is a monocolonal antibody indicated for use in both newly diagnosed prostate cancer patients as well as post-surgical patients with a rising PSA. The recommended imaging procedure proved to be lengthy and required significant camera and staff time. Since November 1996, we have acquired over 75 patients using a modified imaging technique. This technique decreases the patient imaging time while providing physicians with more information. This is achieved at no significant cost increase to our department.

The recommended procedure suggests that a blood pool SPECT study of the pelvis be obtained thirty minutes post-infusion of the isotope. The delayed imaging sequence consists of a whole body image, as well as SPECT studies of the pelvis and abdomen on days four, five or six post-infusion. The clearance of ProstaScint from the body is through the urinary and GI tracts. Repeat delayed imaging is often needed on two days. This results in over seven hours of imaging time for the patient. We have modified this procedure by eliminating the blood pool SPECT imaging on the day of infusion and replaced it with a Tc-99m labeled in-vivo red blood cell procedure. This procedure is done in conjunction with all SPECT delayed imaging. Since the studies are acquired simultaneously, the problem of exact patient repositioning from early to delayed imaging sessions is eliminated. This technique gives the physicians a higher confidence level when comparing the blood pool images with the ProstaScint images. Another improvement is through the usage of the whole-body SPECT acquisition software on the Siemens MultSPECT II gamma camera system. This software allows the camera to acquire a pelvis/abdominal SPECT first, then index the table and acquire an abdominal/chest SPECT. We acquire scans from the mid-femur to the top of the shoulder on most patients. This permits the visualization of possible lymph node metastases in the pelvis, mesenteric region and even the chest. The dual-isotope SPECT studies are reconstructed to form a single study for display, filming and interpretation. We conclude that the use of ProstaScint can be made less costly through the use of the dual-isotope red blood cell technique and whole-body SPECT software.

Posterboard No. 1528

USEFULNESS OF I-123 TOTAL BODY SCANS IN THE EVALUATION OF THYROID CARCINOMA AND METASTASES. L. Gordon, K.M. Spicer, S.J. Nitke, W. Yaakob. Medical University of South Carolina, Charleston, South Carolina

It is recognized that diagnostic doses of I-131 larger than 2mCi will cause some cell injury to the tissue in which it concentrates and reduce subsequent uptake of I-131 administered therapeutically. I-123 has been suggested as an alternate radiopharmaceutical to perform total body scans since it only has gamma rays and does not cause "thyroid stunning" and cell injury. The purpose of this study was to assess the effectiveness of I-123 for total body scans.

We examined 15 patients who had I-123 total body scans for known papillary/follicular thyroid cancer with suspected metastases. All patients had prior neck surgery and were given 1mCi I-123. Twenty-four hours later, a total body image and static views of relevant areas were obtained. If abnormal uptake was noted, patients were treated with large doses of I-131 and then had total body I-131 scans seven to 10 days post-therapy. These images were compared to I-123 total body scans. In six patients there was no abnormal foci of activity identified, which correlated with their clinical profiles. Nine patients had abnormal scans and were treated with therapeutic doses of I-131, followed by total body scans seven to 10 days later. In eight patients, the activity seen on the I-123 scans correlated well with that seen on I-131 scans. In one patient, additional lesions were noted on the I-131 images. In another patient, no abnormal activity was seen in a palpable lateral neck mass and surgical removal of this revealed metastatic carcinoma consistent with papillary thyroid carcinoma. Follow-up treatment with I-131 and total body scan also revealed no abnormal foci.

We conclude that I-123 is effective in demonstrating residual thyroid tissue, thyroid carcinoma and metastases, and recommend its use for total body iodine scans since it does not cause "thyroid stunning."

Posterboard No. 1529

CONGENITAL THYROID DISEASE: SPECTRUM OF MIGRATIONAL ANOMALIES. B.M. Gordon, W. Yaakob, S. Willi, M. Buse and L. Gordon. Medical University of South Carolina and VA Medical Center, Charleston, SC.

Congenital thyroid diseases are important causes of hypothyroidism in neonates and children. These include migrational anomalies and defects in hormone synthesis and are estimated to occur once in every 3,000-5,000 births. Congenital hypothyroidism is due to thyroid agenesis in 30% of cases, ectopic tissue in 60%, and defects in thyroid hormone synthesis in the remaining 10%. We present five patients, four of whom were hypothyroid, and one patient who was euthyroid. These demonstrate the spectrum of migrational anomalies as well as a patient case of dyshormonogenesis, which include thyroid imaging and correlative anatomical imaging to illustrate the utility of radioisotopic evaluation in congenital thyroid disease. Evaluation of these patients should include scintigraphy. Radioisotope evaluation provides important information concerning the location and function of thyroid tissue. Together with pharmacologic intervention, dyshormonogenesis can also be evaluated. In conclusion, radioisotopic evaluation of thyroid is useful in diagnosing migrational abnormalities. When combined with pharmacologic intervention, dyshormonogenesis can be accurately evaluated.

Posterboard No. 1530

ARTERIAL SAMPLING VIA INDWELLING PORTS FOR QUANTITATIVE PET STUDIES IN RHESUS MONKEYS. W. Greenley, W. Linthicum, J. Bacher, M. Thomas, R. Carson, and P. Herscovitch. PET Dept., NIH, Bethesda, MD.

Arterial access is a necessary adjunct to quantitative PET scanning. Arterial blood better represents tracer delivery than venous blood and samples can be drawn more rapidly. In nonhuman primates, we previously performed arterial cutdowns. These are time consuming, however, and prolong anesthesia up to one hour. Frequent cutdowns cause scar tissue to develop, making subsequent access less reliable. This is particularly important in studies with C-11 radiotracers because synthesis begins before the animal is ready to be scanned, but the short half life requires that scanning begin as soon as the tracer is available. To circumvent these problems, we use indwelling arterial ports. The port (model 21-4036, Deltec, St. Paul, MN) is a small chamber with a self-sealing silicone septum; it is implanted subcutaneously over the upper femur and attached to a catheter threaded through the femoral artery to the abdominal aorta at the level of L3 and L4. The animals are given 4 weeks for surgical recovery. For arterial access, the port is prepped with alcohol and betadine, and a Huber needle, which is connected to a double stopcock, is inserted into the port. The distal stopcock is used to empty the deadspace of the catheter and the proximal one to draw blood. The blood in the distal stopcock is reinjected to reduce blood loss. To maintain patency between studies (approximately 6 weeks), ports are flushed weekly with saline and heparin. To check for port infection, regular blood cultures are obtained and the animals are weighed to monitor their health.

We have used ports in 12 rhesus monkeys. Animal preparation time (from anesthesia to scan start) is only about one hour. Blood pressure, heart rate, and samples from blood gases are easily obtained from the port. Animals remained healthy as long as aseptic technique was used to flush and prep the port site. In 3 out of 77 scan sessions, the port catheter was found to have clotted and venous sampling was used. In all remaining cases, animal preparation time was sufficiently short such that radiopharmaceutical injection could be performed promptly. A disadvantage is that if the port is not functioning, it must be repositioned, replaced or removed. Aseptic technique is important to avoid infection, which can necessitate port removal. Out of 17 ports placed, we have had to remove 8, 3 due to clotting (after periods of 3, 4, and 9 months), and 5 due to infection (4 of these were traced to poor technique during weekly flushing; infections did not recur after staff were retrained). Indwelling ports have functioned for as long as 2 1/2 years. We have found that arterial femoral ports are preferable to cutdowns to provide reliable arterial access for repeated PET studies in rhesus monkeys.

Posterboard No. 1531

A NEW SPECTRAL ANALYSIS APPROACH FOR QUANTIFICATION OF DYNAMIC PET STUDIES. A. Bertoldo, C. Cobelli. Department of Electronics and Informatics, University of Padova, Italy

Spectral analysis (SA) was introduced by Cunnigham et al. (J Cereb Blood Flow Metab, 1993) as a model independent technique to describe PET tracer kinetics. It assumes that the tissue time activity curve is describable as the convolution of the plasma time activity curve with a sum of M different exponential terms $\alpha_i e^{-\beta_i t}$ with α_i, $\beta_i \geq 0$ $\forall i$ and with the M eigenvalues β_i a priori fixed. The method estimates the number N≤M of nonzero values of α_i which (together with the corresponding N fixed β_i) best describe the data. Here we propose a new more general SA method and compare it with classical SA. Our approach relaxes the nonnecessary (possibly misleading) assumption of $\alpha_i \geq 0$ and estimates directly from the data the α_i and β_i necessary and sufficient to describe the tissue activity data. Briefly, our method starts using M=2 and estimates by nonlinear least squares with weights choosen optimally, the values of α_1, β_1, α_2, β_2 with their precision; then one tries M=3 and estimates α_1, β_1, α_2, β_2, α_3, β_3 and so on. Using model parsimony criteria, one can select the best model to describe the tracer data. Below we show the results on a representative brain [18F]FDG study in one normal subject (gray matter ROI):

Classical SA	
β (min^{-1})	α (min^{-1})
0.0033	0.0021 (4052)*
0.0036	0.0143 (619)
0.0752	0.0084 (1143)
0.0829	0.0083 (1201)
0.4655	0.0626 (26)
∞	0.074 (18) unitless

New SA	
β (min^{-1})	α (min^{-1})
0	0.0113 (6)
0.0347 (30)	0.0153 (21)
0.3864 (31)	0.0661 (23)
∞	0.075 (21) unitless

*precision expressed as percent CV

Our method gives not only the precision of α_i but also of β_i (not possible with classical SA since β_i are fixed), and avoids the problem of the line doubling (showed by classical SA). This new SA method thus gives more reliable model-independent insight into model structures, e.g. above results show that data are compatible with a model richer than Sokoloff's model.

Posterboard No. 1532

ASSESSMENT OF LESION DETECTABILITY IN BRAIN SPECT IMAGING. **S. Vandenberghe, P. Lahorte, Y. D'Asseler, M. Koole, K. Audenaert, I. Lemahieu, R. Dierckx, University Hospital of Gent, Department of Nuclear Medicine, Belgium.**

The present study was undertaken to investigate the influence of various lesion characteristics as size, position and percentage of hyper- or hypo-activity on the detectability of the lesions following a typical brain SPECT imaging protocol.

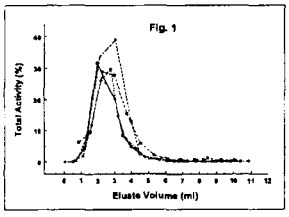
Spherical lesions of varying size and percentage of hyper- or hypo-activity were created at clinically relevant positions in the digital three-dimensional Hoffman brain phantom. A typical acquisition protocol on the Toshiba GCA-9300A triple-headed SPECT camera was modelled for these lesioned phantoms using shareware sinogram simulation software. The acquistion images were subsequently reconstructed with filtered backprojection and analyzed using standard nuclear medicine software (HERMES from Nuclear Diagnostics).

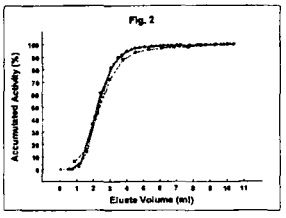
Visual inspection of the subtracted images reveals that the minimum activity difference needed for lesion detectability initially shows a marked decrease with increasing lesion diameter, followed by a gradual levelling off. These minimum activity differences prove to be significantly lower for hot spots than for cold spots. Finally it is noted that the position of the lesion in the brain phantom influences the specific relationship between the minimum activity difference needed for detectability and the lesion diameter.

Posterboard No. 1533

FRACTIONATION ELUTION PERFORMANCE OF THE NEW UTK®-DTE Tc-99m GENERATOR. **M.-N. Chen, D.T. Huang, D.W. Mahoney, and J.C. Hung. Mayo Clinic, Rochester, MN, USA.**

Use of a fractionation technique is sometimes necessary for eluting an extremely high specific concentration of Tc-99m eluate from a Tc-99m/Mo-99 generator, and is also helpful in extending useful life of a generator by providing desirable concentrations of Tc-99m eluate. Mallinckrodt Medical, Inc. (St. Louis, MO, USA), recently introduced a new type of Tc-99m generator (UTK®-DTE generator) which is shipped dry, but functions as a wet-column generator after first elution. The objective of this study was to evaluate performance of the fractionation elution process with the UTK®-DTE Tc-99m generator. Fractionation was made in four separate trials with 20 consecutive elutions at 0.5-0.8 ml increments utilizing 10-ml evacuated vials. Collection of each fractionated eluate was controlled by timing the elution process utilizing specific time periods. The fractionation elution profile of the new UTK®-DTE Tc-99m generator was constructed employing two methods: (1) plotting % total activity of each eluate volume (0.5-0.8 ml) and (2) plotting % accumulated activity versus accumulated eluted volume. The first plot (Fig.1) shows that maximum % total eluted Tc-99m activity appeared at ~2.8 ml. The second plot (Fig. 2) reveals that 95.8±1.9% (n=4) of total eluted Tc-99m activity was accumulated in the first 5 ml. In conclusion, elution of the initial 5-ml eluate from the UTK®-DTE generator would contain ~96% of the total eluted Tc-99m activity, and fractionation of the 5-ml eluate would take ~28-30 sec elution time.





Posterboard No. 1534

PET ON THE WEB - A TOOL FOR CONTINUING EDUCATION AND INTERNAL COMMUNICATION. P. Baldwin, J. Everett, M. Der, G. Elliott, J. Green, S. Green, W. Greenley, G.I. Jacobs, W. Linthicum, S. Sestrich, R.E. Carson, M.E. Daube-Witherspoon, P. Herscovitch. PET Department, NIH, Bethesda, MD.

Procedures for PET clinical research protocols frequently change, due to changing investigator needs and the introduction of new equipment and technologies. As PET technologists, we needed to record and communicate these changes efficiently, and to have the information readily available. We previously kept documents important to daily operations and technologist education in different computer files or as hard copies. As part of our institution's total quality improvement program, we initiated a project to collect all this information into one Web site that would be easily accessible to PET technologists and investigators. Our specific goals were improved communication among PET technologists and investigators in our department, efficient archiving and retrieval of information, and facilitation of technologists' ongoing education. To achieve these goals, it was necessary to define the categories of information to be included in the Web site, to define the formats for presenting this information, to prepare materials if they did not currently exist, and to establish a user-friendly mechanism to transfer information to the Web site in an ongoing fashion.

Items selected to be included were: (1) details of PET clinical research protocols at our institution, including study purpose, patient preparation and positioning, injection

technique, scanning protocol, blood sampling requirements, and image processing details; (2) quality control procedures and performance specifications for our three PET scanners; (3) protocols for special laboratory procedures, including arterial blood gas analysis, plasma glucose analysis, and blood counting; (4) minutes of weekly technologists' meetings; and (5) written materials summarizing in-service training sessions and frequently asked questions. Although the team decided as a group the type of information to be included, different individuals were responsible for producing items in each category. Items were reviewed by the group as a whole for completeness and accuracy before incorporation into the site. The required computer hardware and software were available in our department, and are typical of the resources found in any PET facility. The output of this quality improvement project is a Web site containing the information in the categories identified above. We measured success by the extent to which all the identified items were included and accessible through the site. In addition, the site can be monitored with a counter to record each time the site is queried and what portions are used. The Web site has been in use for several months, and has facilitated intradepartmental communication. It is not a one-time project, however, but rather is a continuing process, with the flexibility and capability to add new information to the site on an ongoing basis.

Posterboard No. 1535

PERIPHERAL NEUROPATHY IN PATIENTS WITH OSSESSOUS METASTASES AFTER TREATMENT WITH Re-186 HEDP / Sr-89 CHLORIDE / DISODIUM PAMIDRONATE. GS Limouris[1], N Triantafyllou[2], SK Shukla[3].[1]Nucl Med Div, Areteion Hosp and [2]Dept of Neur, Eginition Hosp, Univ Med Faculty, Athens, [3]Nucl Med Dept, St Eugenio Hosp collab CNR, Rome

Recently a new therapeutic scheme consisting of Re-186 HEDP / Sr-89 Chloride and Disodium Pamidronate is established in our division for the palliation of painful osseous metastases with impressive analgetic duration efficacy. Toxicity usually observed is a reversible thrombocytopenia ; hardly ever peripheric nerves have been affected resulting in a temporary neuropathy.
In 23 patients with painful osseous metastases due to breast (n = 12) and prostate (n = 11) cancer 148 MBq of Sr-89 Chloride, 1554 MBq of Re-186 HEDP at onset and 180 mg Disodium Pamidronate in a monthly dosage were i.v. injected. The intense follow-up period covered 14 weeks.
Besides the response to treatment, toxicity was evaluated by polymorphonuclear and platelet count determination. Of 23 treated patients 6 developed transient peripheral neuropathy, 5 of the lower limbs consisting of loss of tendon reflexes and distal weekness of lower exremities confirmed by reduced conclusion velocities and 1 of the facial nerve, shortly (15 to 20 days p.i.) after the therapeutic application. Prednisolone was given orally in a dosage of 1 mg/kgr body weight daily for 1 week. Paresis regressed completely in all cases and nerve conduction velocities became normal.
Development of transient peripheral neuropathy as a side effect of Sr-89/Re-186 application due to endosseous oedema need to be differentiated from neurologic symptoms induced by the progression of the disease.

Posterboard No. 1536

A TECHNIQUE FOR PERFORMING XENON-133 LUNG VENTILATION AFTER PERFUSION IMAGING WITH TECHNETIUM-99M. C.L. Puckett, J.S. Parekh, and CD Teates. University of Virginia Health Sciences Center, Charlottesville, VA.

Lung Ventilation Imaging with Xenon-133 gas is the preferred method in many institutions to assess airflow to the lungs in patients with suspected pulmonary embolism (PE). One Limitation has always been the assumption that, due to the relative gamma energies of Xenon-133 and Technetium-99m (80 keV and 140 keV respectively), the ventilation sequence must be performed before the perfusion images. Typically the posterior projection is used for the ventilation sequence which results in sub optimal assessment of most defects. The ventilation sequence is also performed on all lung scan patients, resulting in wasted xenon and needless radiation exposure to those patients with normal perfusion scans. A second assumption is that the washout phase cannot be evaluated easily for air-trapping, again due to the spill down of Technetium-99m into the Xenon-133 imaging window. This is very important in evaluating patients with underlying airway disease.

Lung Ventilation Imaging with computer subtracted background correction and frame enhancements is a reliable and accurate method for performing these studies after the perfusion images have been completed. The selection of the optimal projection for the ventilation sequence is based on the perfusion image that best demonstrates the defect. The ventilation sequence is eliminated in those patients with normal perfusion scans, and multiple ventilations can be performed if necessary to evaluate multiple defects. Background subtraction and frame enhancement is also a fast reliable method for evaluating the washout phase for air trapping in patients with underlying airway disease.

Posterboard No. 1537

EVALUATION OF BIODISTRIBUTION PATTERNS OF ORAL AND INTRAVENOUS FLUORINE-18-FDG ADMINISTRATIONS WITH PLASMA TIME-ACTIVITY CURVE AND EXTERNAL TLD MEASUREMENT. J.S. Lee, Y.D. Lin, K.L. Chou, H.R. Chen and R.S. Liu, National PET/Cyclotron Center and National Yang-Ming University, Taipei, Taiwan.

Oral administration of flourine-18-FDG to infants or to patients with chronic illness usually is clinically necessary when traditional intravenous injection would not be successfully carried out. The purpose of the study is to evaluate the difference of their plasma time-activity curves and biodistribution patterns in standard PET imaging procedures.
Six patients were selected for the study. The subjects were asked NPO at least 6 hours prior to the test. Pre-test serum glucose level was checked and was within normal limits. After a 5-min transmission scan, a total of 10mCi of FDG was given orally, then immediately after, a 120-min emission scan was performed. The subjects repeated the same PET scan on the next day except for the FDG IV injection was instead. The plasma time-activity curves of the two methods were compared. At the two scans, three sets of LiF-100H TLD disks were placed to the patient's body surface close to source organs (include nine organs, from head to bladder) to obtain information on body-surface doses. Each set of the TLD was removed from the body surface at 15, 30 and 60 mins of the scan accordingly. As the surface dose is connected to the cumulated activities in the organs through radiation transmission in the body which can be estimated with the aid of a mathematical phantom, the organ biodistribution patterns can be obtained by inverse transform method.
From the study, we found that the peak activities of plasma FDG were at 5 and 45 mins by using oral and IV administrations, respectively. The stomach and heart received peak doses at the first 15 mins, then liver and brain took place at 30 mins by the two administrations, accordingly. At 60 mins, the bladder accumulated the highest doses (0.3~0.64 rad/mCi) that were essentially the same in the two methods, however there was about 10~35% less dose to the bladder with oral administration.

Posterboard No. 1538

LYMPHO- AND IMMUNOLYMPHO- SCINTIGRAPHY IN MELANOMECTOMIZED PATIENTS. GS Limouris, V Voliotopoulos, A Stavraka, L Vlahos. Nuclear Medicine Div, Areteion Hosp, Univ Medical Faculty, Athens

Most important indication of lymphoscintigraphy in patients with melanoma b e f o r e surgery is to image the lymphatic drainage net and particularly to detect the sentinel node ; the purpose of immunolymphoscintigraphy a f t e r surgery is to map the lymphatic drainage and to detect a possible spread of the malignancy towards the lymph nodes surrounding the surgical field or more distal regions. The aim by the present was to assess the sensitivity of a two phase procedure with Tc-99m-labelled agents for exploring possible spread of melanoma after the thorough resection of the primary lesion.
Seven melanomectomized patients were enrolled into the study. The melanomas were situated on the head, back, arm and buttock of these patients. Intracutaneous lymphoscintigraphy with Tc-99m sulphur microcolloid [Lymphoscint, Solco, Basel, Switzerland] and i.v. scintigraphy with Tc-99m-antimelanoma antibody [Tecnemab-K-1, Sorin Biomedica Spa, Saluggia, Italy] in a dosage of 55 MBq and 740 MBq respectively, were performed in 13 patients to define possible infiltration of lymph nodes after surgery with a time interval of 1 week between the two examinations. Tc-99m sulphur microcolloid preceded the Tc-99m anti-melanoma antibody scan. The scintigrams were evaluated by three experienced nuclear physicians.
The method correctly detected 3 out of 16 suspicious nodes as malignant. Combined two phase technique improves the diagnostic and staging accuracy of cutaneous melanoma affected population and appears extremely useful in the surgical confrontation of the lymphatic spread.

Posterboard No. 1539

SERONEGATIVE SPONDYLARTHROPATHIES AND GUT

J.C. Alonso, A. Soriano, C. Rubio*, J.L. Cuadra*, M. Zarca, P. Guerra**, C. Molino
Nuclear Medicine Unit, Department of Reumatology*, Clinical Research Unit **
C. Hospitalario de Ciudad Real, Plaza de Pio XII s/n 13002 Ciudad Real, Spain.

The factors that contribute to development of seronegative spondylarthropathies (SSp) are not completely known. Gut inflammation is frequent among patients with SSp, as demotrated by colonoscopy and histological examination of biopsy samples. The aim of this study was to evaluate the presence of positive abdominal scintigraphy in patients with SSp and without clinical symptoms or signs of inflammatory bowel disease (IBD) **Materials and methods:** A total of 86 patients were prospectively studies by technetium-99m hexamethylpropylene amine oxime (99mTc-HMPAO)- labelled leukocyte scintigraphy. 59 fulfilling the European Spondylarthropathy Study Group 1991 criteria, 23 ankylosing spondylitis, 7 psoriatic arthritis, 9 reactive arthritis and 20 undifferentiated SSp. 37of them were men (62.71%), average age was 37.2±16.3. A total of 27 individuals without SSp, taking non-steroidal anti- inflammatory drugs, were used as control group, 11 Rheumatoid arthritis, 16 chronic low back pain, 3 lumbar disk herniation and one juvenile chronic arthritis. *Leukocyte labeling:* In vitro leukocyte labeling was achieved according to the method of Vorne et al with some modifications. *Imaging and interpretation:* Images were obtained in the anterior abdominal projection at 30 min and 2 hour after the injection of labeled leukocytes. The tracer uptake was scored in the whole series of images form 1 (lowest uptake) to 4. **Result:** The scan was positive in 33 patients with SSp (55.93%), 27 of them scored from 2 to 4 (50.94%). Four were positive in the control group (14.80%), 1 higher than 2 (4.17%). χ^2= 12.78, p =0.00035. Odds Ratio = 7.3. Interval of trust (95%) 2.24-23.74. Patients with scored from 2 to 4 the relationship was χ^2= 13.07, p =0.0003. Odds Ratio = 21.94. Interval of trust (95%) 2.79-172.46. **Conclusion:** These findings provide a evidence, as our previous studies, linking SSp with intestinal inflammation and suggest that in some cases a bowel – related process could contribute to the development of SSp.

STUDENT DAY ORAL SESSIONS

Tuesday, June 9, 1998

Session 215

8:00am-9:30am Room 708

Moderator: Kristen M. Waterstram-Rich, MS, CNMT

No. 1600

A BI-MODALITY IMAGE FUSION TECHNIQUE WITH CT, MR, SPECT AND PET. R. Nelson, P. Backstrom, University of Iowa Universities and Clinics, Iowa City, IA.

Modern radiology serves as an invaluable tool in the diagnosis of a variety of ailments. Cross-sectional studies exemplify this utility by permitting the detection of disease processes in the three dimensional domain. Superimposition of images from several modalities, including SPECT, PET, CT, and MRI, facilitates the diagnosis of numerous diseases. The objective of this study is to report on the University of Iowa Hosptials and Clinics technique for image fusion and our attempts to improve it.

In practice, the fusion processing typically follows the accompanying protocol. The patient undergoes PET or SPECT imaging, and correlative images from MRI or CT are downloaded to the Nuclear Medicine computer. The CT or MRI images are then imported as nuclear medicine studies and compressed to a 128 X 128 matrix. Subsequently, all images are scaled to a common cubic voxel size. The data sets are then co-registered through orthogonal views and fused with selectable thresholds and transparencies. Our goal is to improve this technique through on-going improvements in communication with CT and PET, software efficiency, and image fusion.

No. 1601

Uptake Ratios in Osteoarthritic Knees Compared to Normal Knees by Bone Scintigraphy. S.E. Gratzer, K.A. Carlson. Indiana University Medical Center, Indianapolis, IN.

Objective: The purpose of this research study is to evaluate the uptake of Tc^{99m} MDP in women with unilateral knee osteoarthritis (OA) confirmed radiographically and whose contralateral knee was radiographically normal. Initial data gathered is being used to compare uptake ratios of the subject's knees.

Methods: Twenty-two participants were injected with approximately 740 MBq of Tc^{99m} MDP. At three hours post injection, anterior, left lateral and right lateral knee images were obtained on a dual-headed gamma camera. Bilateral regions of interest were drawn around the medial and lateral femoral condyles, medial and lateral tibial condyles, and regions above and below the knee in the femur and tibia. Total counts from each knee were added together and evaluated as a ratio of the osteoarthritic knee to the normal knee.

Results: The uptake ratios ranged from 1.00 to 2.12. Broken down into groups, six subjects' ratios were from 1.00 to 1.02, four were between 1.03 and 1.05, five were between 1.06 and 1.11, and three were between 1.12 and 1.17. The four other ratios were 1.25, 1.37, 1.58, and 2.12, each having one person per category.

Conclusion: When regions were compared, there was a notable difference between counts obtained in the left knee versus the right knee in all but one patient. This patient had an exact one to one ratio indicating similar counts in the OA knee and the normal knee. The uptake ratios in 16 patients showed a definite difference in the uptake between the radiographically confirmed normal knee and the OA knee. But in 6 patients, the uptake ratio range was only 1.00 to 1.02 and does not indicate a scintigraphic difference in uptake between the normal knee and the confirmed osteoarthritic knee.

No. 1602

PRACTICAL METHODS FOR REDUCTION OF RADIOACTIVE CONTAMINATION INCIDENTS IN NUCLEAR CARDIOLOGY LABORATORY. L.J. Peterson, E.A. Mosman, A. Wang, J.C. Hung, and R.J. Gibbons. Mayo Clinic, Rochester, Minnesota, USA.

We have noted that a number of minor radioactive contamination incidents have occurred in the exercise rooms of our nuclear cardiology laboratory. The purpose of this study was to determine the extent and cause for these incidents, and then to develop possible solutions for minimizing future occurrence in the nuclear cardiology laboratory. We conducted a record review to determine root causes of the 15 radioactive contamination events that have occurred in the exercise areas since 1986. Of the 15 documented events, 8 were caused by failure of IV apparatus, and 7 were due to syringe mishandling. We then circulated a questionnaire to the nuclear cardiology technologists, requesting that they list the causes of exercise room contamination based upon their experience. Technologists indicated that the most prevalent cause of radioactive contamination incidence other than problems associated with IV setup was injector inexperience, followed closely by radioactive syringe disposal problems, injection technique, and unclear designation of duties during exercise procedure. Our continued observation of exercise room studies supports these preliminary findings. Consequently, to reduce radioactive contamination incidents in the nuclear cardiology laboratory, radiation safety training, including a mock injection workshop using UV visible dye in place of the radiopharmaceutical, must be required for all personnel handling radiopharmaceuticals in the nuclear cardiology laboratory. IV apparatus involving delivery of the radiopharmaceutical must be closely examined in advance to ensure proper connection. To prevent contamination due to dripping or dropped syringes during disposal, a mobile radioactive waste container should be placed adjacent to the injection area prior to administration of the radiopharmaceutical. Finally, to reduce the risk of error during exercise studies, clear designation of duties for personnel should be included in the exercise procedure protocol.

No. 1603

ATTENUATION BY ARTIFICIAL HEART MATERIALS.

H.P. Motee, M.M. Dalipaj, T.V. Mussivand and T.D. Ruddy. University of Ottawa Heart Institute at the Ottawa Civic Hospital, Ottawa, Ontario.

Background:
Heart disease continues to be the single largest cause of death, with heart transplantation or artificial hearts being the only hope of survival for some patients. Nuclear imaging would be helpful in assessing left ventricular function and possible thrombus formation in patients with artificial hearts. A totally implantable, intrathoracic electrohydraulic ventricular assist device (EVAD) has been developed at our center and is presently made of plastic with a proposed newer version to be made of titanium.

Purpose:
To determine the effects of attenuation by plastic and titanium on count statistics.

Methods:
Three fillable spheres (0.5ml, 1.2ml and 1.6ml) were filled with 5 MBq and 10 MBq of 99m-Tc pertechnetate (simulating small thrombi) and imaged in the absence and presence of 2mm thick plastic and 1mm thick titanium. Percent attenuation was calculated and the size of the spheres were measured. The half value layer of titanium was calculated by experimentally determining the linear attenuation coefficient.

Results:
Using 5 and 10 MBq of 99m-Tc, plastic and titanium both attenuated counts by about 1 - 3%. The size of the spheres were reproducibly measured with both of the attenuating materials (r=0.997). The half value layer for titanium was determined to be 2.01 cm.

Conclusion:
Adequate images of simulated thrombi can be obtained with minimal attenuation by materials used for artificial heart devices.

No. 1604

DEVELOPMENT OF A QUANTITATIVE METHOD FOR ANALYSIS OF DIPYRIDAMOLE IODINE-123 PHENYLPENTADECANOIC ACID METABOLIC IMAGES. E.M. Castromayor, B.T. McKee, T. Hewitt, M.M. Dalipaj, P. Slomka and T.D. Ruddy. University of Ottawa Heart Institute at the Ottawa Civic Hospital, Ottawa, Ontario.

Previous reports have described the diagnostic accuracy of I-123 phenylpentadecanoic acid (IPPA), a metabolic imaging agent, in conjunction with exercise or dipyridamole stress and visual analysis for the noninvasive detection of coronary artery disease (CAD).
Purpose: To develop a clinically useful database specific for the quantitative analysis of IPPA images acquired following dipyridamole stress.
Methods: Fifteen normal male volunteers (age 33±11 years) with <1% probability of CAD underwent dipyridamole stress, IV injection of 300 MBq of IPPA and tomographic imaging. Reconstruction was carried out using a predetermined protocol into transverse slices. The Perfit program (Nuclear Diagnostics, Sweden) was used to manipulate and fit the slices to a common size and orientation. The autofitted transverse slices were then amalgamated to form a normal template. Four patients with angiographic CAD underwent IPPA imaging with comparison to the normal database.
Results: Using the Perfit method for automatic registration, a normal database (male) has been created for I-123 IPPA cardiac SPECT images. The four patients had quantitative abnormalities corresponding to visually apparent image defects and known CAD.
Conclusion: Quantitative analysis of IPPA images is feasible and will need further validation in a larger series of patients with angiographic CAD data.

No. 1605

COMPARISON OF LEFT VENTRICULAR EJECTION FRACTION BY FIRST PASS RADIONUCLIDE ANGIOGRAPHY VERSUS GATED BLOOD POOL STUDIES.

O.A. Sileika, M.M. Dalipaj, P. Irvine and T.D. Ruddy. University of Ottawa Heart Institute at the Ottawa Civic Hospital, Ottawa, Ontario.

Introduction: Biplane first pass radionuclide angiography (RNA) has been developed and is useful for regional wall motion analysis. Left ventricular ejection fraction (LVEF) from first pass LAO projection data has also been validated with gated SPECT sestamibi data.
Purpose: To correlate LVEF from both the LAO 60 and RAO 30 first pass studies versus the conventional gated blood pool scans.
Methods: Fourteen volunteers (7 patients, age 52+12 years and 7 normals, age 25+2 years) underwent simultaneous biplane RNA followed by a gated blood pool study. LVEF was calculated from the first pass studies and compared to the gated blood pool results.
Results: Adequate studies were obtained in 9 of 14 volunteers. Poor studies were due bolus transit time > 10 seconds, low count rate and irregular heart rates. First pass LVEF correlated with gated equilibrium LVEF (LAO: $r=0.943$, $p<0.05$; RAO: $r=0.756$, $p<0.001$) with the technically adequate studies.
Conclusions: First pass EF from the LAO projection correlated well with the gated blood pool EF. The lower correlation seen with the RAO projection was due to left atrial contribution to the time activity curve.

No. 1606

COMPARISON OF INNERVATION OF ATRIA IN NORMAL AND STELLECTOMY CANINE HEARTS. B.J. Fannin, W.L. Winkle. **Department of Radiology, Indiana University School of Medicine, Indianapolis, Indiana**

Objective: Myocardial stellectomy is the surgical interruption of the sympathetic nerve pathways to the heart. This study compared the sympathetic innervation of normal canine atria to stellectomy canine atria using [C-11] hydroxyephedrine (HED), a highly specific marker for sympathetic nerve terminals. [F-18] radiolabeled microspheres were used to image regional myocardial blood flow.

Methods: The atria of three normal and three stellectomy mongrel dogs were prepared and imaged for fifteen minutes both immediately and one hundred minutes following the injections of [C-11] HED and [F-18] microspheres. A small animal PET scanner was used for acquisition, and nine regions of interest were evaluated and compared for statistically significant differences in [C-11] HED uptake and [F-18] microspheres.

Results: The [C-11] HED binding for sympathetic nerve terminals was decreased in the atria of the stellectomy subjects by an average of 51% compared with normal subjects ($p<0.006$). The blood flow, evaluated by [F-18] microspheres, was increased in the stellectomy subjects by an average of 930% compared to normal subjects ($p<0.004$).

Conclusions: PET imaging with [C-11] HED permits quantitative assessment of atrial sympathetic nerve terminals. The results of this study suggest the atria of the stellectomy subjects have less sympathetic innervation than normal subjects, whereas myocardial blood flow was increased compared to normal subjects.

No. 1607

INNERVATION OF THE ATRIA IN NORMAL CANINE HEARTS. **H.C. Ardeel and W. L. Winkle. Department of Radiology, Indiana University School of Medicine, Indianapolis, IN**

Objective: The purpose of this research study was to evaluate the innervation of the atria by imaging with Carbon-11 Hydroxyephedrine (C-11 HED).
Methods: The atria of four mongrel canine hearts were imaged in a small animal positron emission tomography scanner. The scanner rotated around the atria for an acquisition time of fifteen minutes. The C-11HED images were then normalized, and nine regions of interest were analyzed for neuronal uptake.
Results: Among the four dogs imaged, the C-11HED neuronal uptake was normal. The uptake values for the right atrial anterior wall is 2.9 std. of 0.6+/-, the septum is 2.6 std. of 0.5+/-, the left atrial appendage is 1.9 std. of 0.5+/-.
Conclusions: The C-11HED radionuclide allowed assessment of the innervation of the atria because of the good uptake of C-11HED in the cardiac sympathetic nerve terminals. The study proposed that C-11HED was a proficient imaging agent.

Session 216

9:45am-11:15am **Room 708**
Moderator: Kristen M. Waterstram-Rich, MS, CNMT

No. 1608

THYROID STUNNING : DOES IT EXIST ? T. Nguyen, **H.L. Pham, F. Mishkin, C. S. Marcus, S. Diestelhorst, O. Pena. Division of Nuclear Medicine, Harbor-UCLA Medical Center, Torrance, CA.**

In the treatment regimen of metastatic differentiated thyroid cancer, pretherapy I-131 Na I scans are routinely done to verify that residual tissue has uptake adequate for therapy. There is convincing data to show that larger scanning doses (SD) of I-131, 370 MBq or more, are capable of demonstrating residual tissue not seen on scans performed with a lower dose, 74 MBq or less. Some data suggests that the larger SD "stun" the residual tissue, impairing the uptake mechanism and thus interfere with delivering an adequate therapeutic dose (TD) within a short time period after the SD. We reviewed the scan and clinical data in all 13 patients (age 47 - 89 years old) who had had a pre-treatment diagnostic scan (DS) with 370 MBq followed by a TD of I-131 within a 2 weeks period in whom both DS and therapeutic scans (TS) were performed at the same time interval after receiving the oral dose. Using the same time interval studies corrects for effect of plasma and tissue clearance on the scan appearance. Residual functioning thyroidal tissue uptake (in most cases representing metastatic disease) was visually quantitated compared to salivary gland, mouth, hepatic and background activity by 2 skilled observers. In no case did uptake by residual tissue appear relatively less on the TS than the DS. A lesion to lung region of interest ratio was compared for 5 paired studies. In every case, the ratio was higher for the TS. In one case, the percent uptake of administered dose in the residual tissue was measured after both DS and TS. An aliquot of approximately 0.2 MBq I-131 in a test tube placed in a cardboard box adjacent to the body was included in the camera field of view so that counts in residual functioning tissue could be translated into retained Bq and percent retention calculated on the basis of administered dose. In that case, the TS had a factor of 10 times the concentration in residual tissue compared with the DS uptake. We conclude that none of these patients demonstrated a so-called "stunning" phenomenon.

No. 1609

PET Scans Using Filtered Backprojection Versus Expectation-Maximization Methods. T.E. Cook, D.S. Schauwecker, R. Fain, G.D. Hutchins, JD Wagner. Indiana University Medical Center. Indianapolis, IN.

Purpose: The purpose of this study is to evaluate the differences between the traditional filtered backprojection (FBP) method of reconstruction and the ordered subsets expectation maximization (OS-EM) reconstruction method for PET whole body scans.
Method: Ten human whole body scans were reconstructed using both methods. These studies were randomly selected from the primary study group. Patients in the primary group were suspected of having non-palpable deep nodules. FBP and OS-EM image reconstructions were then evaluated against surgical pathological findings. Area of interest for the evaluation was the lymph node drainage basin.
Results: OS-EM reconstruction of eight of the studies resulted in no change from the FBP reconstruction method. One of the OS-EM reconstructions gave a true negative reading while the FBP outcome was a false positive. The other OS-EM reconstruction gave a true positive reading while the FBP outcome was a false negative. This improved the correct reading percentage from 70% to 90%.
Conclusion: The OS-EM method improved the diagnostic accuracy of PET studies for whole body scans. These preliminary results indicate that further studies will show PET studies with OS-EM reconstruction to be an accurate method of determining tumor location and malignancy.

No. 1610

SENSIBLE APPROACHES TO AVOID NEEDLE STICKS IN NUCLEAR MEDICINE AND NUCLEAR PHARMACY. C.L. Schmit, S.J. Krause, D.T. Huang, and J.C. Hung. Nuclear Medicine, Mayo Clinic, Rochester, Minnesota, USA.

Needle sticks are a continuous concern in the health care environment because of the prevalence of blood-borne pathogens in today's society. Radioactive contamination is another concern with needle sticks during nuclear medicine/nuclear pharmacy procedures. In our institution, substantial efforts have been made to prevent needle sticks, but they still occasionally occur. The purpose of this project was to analyze different practices and products to determine the best protocol in an effort to avoid further needle sticks. The nuclear medicine/nuclear pharmacy technologists were surveyed to determine how many needle sticks have occurred and the situation behind each occurrence. Using our initial survey, the circumstances involved in each incident were reviewed, suggestions considered, and different means of protection analyzed. Five options were then presented in a second survey. These included three needle-capping block designs focused on ease of use and two utilization choices based on availability. Other options included a safety needle and more portable sharps container that would make the practice of recapping needles obsolete. Results of the second survey showed that technologists favored the option to choose any one of the three needle-capping blocks, with a request for wider availability of the needle-capping blocks throughout the area. We felt that the most effective protocol to implement was one that would evoke the most participation by the technologists. In our case, this meant a combination of the three different needle-capping blocks, as this would allow the technologists to choose the one best suited to their needs. In conclusion, this proposed protocol was easy to implement, and we will continue to monitor the effectiveness of this new approach in preventing needle sticks.

No. 1611

O^{15} Gas Delivery System Testing on a Canine Model Utilizing PET Imaging. K.D. Groce, K.A. Carlson. Indiana University Medical Center. Indianapolis, IN.

Objective: It has been noted that the effectiveness of an O^{15} gas delivery system plays a vital role in Positron Emission Tomography (PET) brain imaging. The purpose of this article is to compare five different methods of O^{15} gas deliverance to determine which system delivers the largest quantity of O^{15} to the brain.
Methods: A canine model was taken to the PET imaging area at which time an IV was started and adequate sedation was given with Thiopental and Isoflurane. After assembling the appropriate gas delivery system, approximately 3700 MBq of O^{15} gas was administered. Imaging then took place for 10 minutes for each of the five systems. This procedure was performed five times, each time with different parameters. Image quality was then visually inspected to identify which machine delivered the largest amount of O^{15} to the brain.
Results: In the experiment, data was inconsistent from study to study indicating that the experimental design needs to be improved. Visually, image quality indicated that more activity was present in the brain when using the Harvard Ventilator as the delivery system. Further investigation will need to take place to estimate the possibility of any leaks in each of the delivery machines as well as further interpretation of specific numeric data.
Conclusion: Visually, the Harvard Ventilator is the most efficient delivery machine. Results will need to be confirmed quantitatively to verify that this is conclusive and to concur that the findings of this research are valid.

No. 1612

***IN VIVO* IMAGING OF DOPAMINE TRANSPORTERS WITH CARBON-11 2B-CARBOMETHOXY-3B(2-FLUORO)-TROPANE IN LESIONED RATS. M.Y. Seyer, W.L. Winkle. Department of Radiology, Indiana University School of Medicine, Indianapolis, IN.**

Objective: The purpose of this study was to evaluate (C-11) 2β-carbomethoxy-3β(2-fluoro)-tropane (β-CFT) concentrations in the rat's normal and lesioned striatum using a small field of view PET scanner.

Methods: The neurotoxin, 6-hydroxydopamine (6-OHDA), was injected directly into the substantia nigra of adult rats. The contralateral side of the brain was used as a control in each animal. 14 days post-lesion, the animals were injected with (C-11) β-CFT and imaged *in vivo* using a small field of view PET scanner. The differences in (C-11) β-CFT concentrations were quantified.

Results: Data analysis of the (C-11) β-CFT concentration showed a significant difference between the individual rat's lesioned and non-lesioned striatum Lesioned striatum (C-11) β-CFT concentration was less than the non-lesioned concentration. P-values ranged from (p=0.000 to p=0.015). the data from the group was pooled and there was a statistically significant difference in lesioned versus non-lesioned striata (p=0.05).

Conclusions: Chemical lesioning of the dopaminergic fibers in the rat brain striatum cause a depletion of dopamine transporter levels. The potential to image *in vivo* could lead to transplantation therapy and/or the design of new drugs for treating abnormalities relating to the dopamine system.

No. 1613

In-111 OCTREOTIDE AS A PRIMARY DIAGNOSTIC MODALITY FOR MENINGIOMA AND CARCINOID TUMOUR: A COST-BENEFIT ANALYSIS. R.J. Juaneza. St. Michael's Hospital, Toronto, Ontario, Canada.

This report examines the cost-efficiency and medical benefit of In-111 octreotide (pentreotide) in the diagnosis and clinical management of two specific neuroendocrine malignancies – carcinoid tumours and meningioma. In-111 pentreotide, a radiolabeled derivative of the therapeutic agent octreotide, has been used to demonstrate the presence of somatostatin receptors (SSR) on various neuroendocrine tumours. The studies conducted show that in a majority of patients, a malignancy was detected using this radiopharmaceutical; however, it was not utilized as the primary diagnostic modality. The aforementioned result, in addition to the fact that this nuclear medicine procedure is quite expensive, precipitated the hypothesis that for diagnosis, it is financially and medically prudent to employ other modalities. 13 patients afflicted with these tumours were studied. Each patient's medical records were then examined retrospectively and the following were recorded – the diagnosis; the physician's plan of action; and, the quantity, type, and result of each diagnostic procedure performed on the patient (i.e. nuclear medicine, magnetic resonance imaging, computed tomography, and ultrasound). The medical costs were then calculated from two perspectives – first, the amount charged to the Ontario Health Insurance Plan (OHIP) for diagnosing a patient using the In-111 octreotide scan was computed and compared to all other diagnostic scans conducted previously – namely MRI, CT, US. Secondly, the time spent by a medical radiation technologist in each of the modalities to perform the studies needed for diagnosis was multiplied by their average dollar wage per minute. This produced a "real-time" cost analysis for performing the octreotide study versus the other modalities. Several conclusions were derived from this study. In-111 octreotide imaging is a more expensive study to conduct than US, CT or MRI, when these other modalities are performed alone or in combination. This holds true whether considering expenses under the umbrella of OHIP, or "real-time" cost of the technologists. Also, the other diagnostic modalities (i.e. CT, US, MRI) are far more effective in providing a definitive diagnosis for carcinoid tumour or meningioma than In-111 octreotide. Finally, In-111 octreotide, because of its physiological nature, is vital to the management and perhaps the treatment of oncology patients afflicted with these neuroendocrine tumours. From the results obtained, it is evident that although In-111 pentreotide may not be vital for primary diagnosis, it may serve a purpose in assisting the clinician in directing the management of patients afflicted with meningioma or carcinoid tumour.

No. 1614

In^{111} Oxine Labeled Platelets and Tc^{99m} Labeled RBC's Used to Image Sites of Lithotripsy Trauma. A.S. Haun, K.A. Carlson. Indiana University Medical Center. Indianapolis, IN.

Objective: Shock wave therapy (or lithotripsy) used to ablate kidney stones often results in other renal complications. Among these are inflammation, reduced blood flow to the injured area, and fibrotic scarring. A pilot study involving a female pig was devised to further investigate.
Methods: The autologous pig platelets were labeled with 27 MBq of In^{111} oxine using a standard labeling technique. The red blood cells (RBC's) were labeled with 103 MBq of Tc^{99m} using Ultratag=AE kits and prepared according to the manufacturer's guidelines. The left kidney was treated with lithotripsy and the right was left untreated and used as a control. Posterior images were taken with a Seimens Rota gamma camera at multiple time intervals over 72 hours and acquired on a computer for analysis. Regions of interest were drawn around each kidney and the distribution of the labeled cells in the treated and untreated kidneys were compared.
Results: It was expected that there would be an immediate increase in the In^{111} labeled platelet counts in the left kidney. Planar images do suggest an immediate increase in platelet localization in the focal treatment area of the left kidney. Data counts from the labeled platelets in the In^{111} window were lower in the left region as compared to the right region up to 21 hours post injection. At 21 and 49 hours post injection, the left kidney counts began to increase over the counts in the right. The ratios were 1.5:1 and 1.8:1 respectively. Data count in the Tc^{99m} window on the immediate image showed a decrease in the left kidney counts when compared to the right. This was a result of decreased blood flow to the treated area.
Conclusion: In^{111} oxine labeled platelets and Tc^{99m} labeled RBC's were useful in this study to localize and semi-quantitate trauma to the kidney from lithotripsy.

CONTINUING EDUCATION

Listed on the following pages is an overview of each SNM-TS course being offered at the SNM 45th Annual Meeting. Credit hours may change. Dates, times and rooms are subject to change. Please check the Program/Show Directory.

Saturday, June 6 and Sunday, June 7

ADVANCED CARDIAC LIFE SUPPORT (ACLS) PROVIDER INITIAL TRAINING

8:30AM–2:30PM **Room 707**
CME: 5.0 **CPE: 5.0** **VOICE: 6.0**

Advanced Cardiac Life Support (ACLS) Provider Initial Training
John Bovia, EMTP

Educational Objectives: Upon completion of this course, the attendee should be able to:
1. Demonstrate basic cardiac life support (BCLS) skills as they pertain to the complete management of an arrested patient.
2. Describe and demonstrate the adjuncts for providing an effective airway and adequate oxygenation in the cardiac arrest situation.
3. Recognize and specify appropriate pharmacologic and/or therapeutic modalities for the following ectopy of dysrhythmias: ventricular fibrillation; asystole; AV block—first degree, second degree (Mobitz I & II), third degree; electromechanical dissociation; bradycardia with hypotension; premature supraventricular complexes; and premature ventricular complexes.
4. Demonstrate the ability to recognize cardiac arrest and initiate treatment, including defibrillation and synchronized cardioversion.
5. Describe specific drug therapy, as appropriate, for the aforementioned dysrhythmias.
6. Identify the need for stabilization of the cardiac arrest patient at the scene and during transplantation to a tertiary care facility.

Summary: This course is designed to provide an opportunity for nuclear medicine technologists to receive initial provider training and certification of advanced cardiac life support skills. Professional training will be provided by faculty members of Life Support Services, who provide training for Mayo Medical Center, University of Michigan and Northwest Anesthesia Seminars. To be eligible for this class, participants must have completed a basic life support training course within the last three years. The American Heart Association (AHA) textbook will be provided to course attendees on a lending basis. Any participant wishing to keep the textbook will be charged $30.00 in addition to the course fee. ACLS Provider certification cards will be given to those who successfully complete the course.

Organizer/Moderator: Patti L. Corrigan, CNMT

Sunday, June 7

JRCNMT WORKSHOP

8:30AM–11:30AM **Sheraton Hotel**

JRCNMT Workshop
Elaine J. Cuklanz, MS, MT (ASCP) NM

Educational Objectives: Upon completion of this course, the attendee will:
1. Review the revised *Essentials and Guidelines for the Nuclear Medicine Technologist* (adopted 1997).
2. Review the proposed revision of the *Self-Study Application for Accredited Educational Programs for the Nuclear Medicine Technologist.*

Summary: Attendees in the workshop will become acquainted with the changes incorporated in the *Essentials and Guidelines for the Nuclear Medicine Technologist* (adopted 1997). The changes resulted from the workshops, questionnaires to program directors and administrators, and responses to the earlier drafts of the document. In addition, they will review proposed changes in the *Self-Study Application for Accredited Educational Programs for the Nuclear Medicine Technologist.* The revised self-study application is based on recommendations received during the 1996 workshops.

Organizer/Moderator: Kristen M. Waterstram-Rich, MS, CNMT

WEB PAGES WITH HTML

8:30AM–2:30PM **Room 706**
CME: 4.5 **CPE: 4.5** **VOICE: 4.5**

Web Pages with HTML
Jerry Glowniak, MD

10:00AM–10:30AM
Break

12:00PM–1:00PM
Lunch

Educational Objectives: Upon completion of this course, the attendee should be able to:
1. Browse the World Wide Web with ease.
2. Understand how web pages are constructed.
3. Write a document in Hypertext Markup Language (HTML).
4. Link documents using Hypertext links.

Summary: This day-long course, designed for physicians and technologists who have an interest in creating their own web sites, will present the information one needs to create a World Wide Web page using Hypertext Markup Language. There will be an overview of the Internet and the impact that the web has had on information sharing. Web sites will be reviewed for content, practicality and construction. There will be ample opportunities for hands-on involvement.

Organizer/Moderator: Frances L. Neagley, CNMT

NUCLEAR MEDICINE REFRESHER COURSE

8:30AM–2:30PM **Room 709**
CME: 4.5 **CPE: 4.5** **VOICE: 4.5**

8:30AM–9:15AM
Contributions of Nuclear Oncology to the Management of Patients with Cancer
Annick D. Van Den Abbeele, MD

9:15AM–10:00AM
Radionuclide Imaging of Infection
Holley M. Dey, MD

10:00AM–10:30AM
Break

10:30AM–11:15AM
Gastrointestinal Scintigraphy—How, When and Why
Lawrence P. Davis, MD

11:15AM–12:00PM
Nuclear Cardiology 1998
Finn Mannting, MD, PhD

12:00PM–1:00PM
Lunch

1:00PM–1:45PM
Nuclear Medicine Applications for Renal Imaging
Lilitha Ramanna, MD

1:45PM–2:30PM
Bone Scintigraphy, Clinical Applications and Pertinent Technical Aspects
Mariano Fernandez-Ulloa, MD

Educational Objectives: As a result of attending this categorical refresher course, the participant will be able to:
1. Describe the indications for the three commonly performed gastrointestinal scintigraphic examinations: HIDA scintigraphy, GI bleed scintigraphy and technetium RBC liver scintigraphy (liver hemangioma assessment).
2. Discuss the new and additional information available from myocardial perfusion gated SPECT imaging.
3. Review the specific technical aspects that may affect the value of bone scintigraphy as a diagnostic tool.
4. Understand the clinical and technical aspects of nuclear oncology imaging and the role we play in optimizing these studies to each patient.
5. Compare and contrast the physical properties of the currently available radiopharmaceuticals for infection imaging.
6. Explain the indications for renal imaging, describing the various protocols used, and discuss the clinical significance of the findings.

Summary: This year's categorical course offered by the SNM Technologist Section is a nuclear medicine Refresher Course. This course is being offered in three 90-minute sessions. Highlighted will be six of the most common imaging areas within nuclear medicine. The information that will be discussed will be both a review and an update on the latest imaging procedures being utilized today. Technologists and physicians attending should be able to come away with valuable information on technical aspects, clinical indications and usefulness, as well as the cost effectiveness of nuclear scintigraphy. The distinguished faculty organized for this review makes it a course not to be missed.

Organizer/Moderator: Nellie L. Kelty, MAS, CNMT

Co-Moderator: Susan P. Gavel, CNMT

RECERTIFICATION CLASS FOR ADVANCED CARDIAC LIFE SUPPORT (ACLS)

8:30AM–2:30PM **Room 707**
CME: 5.0 **CPE: 5.0** **VOICE: 6.0**

Recertification for Advanced Cardiac Life Support (ACLS)
John Bovia, EMTP

Educational Objectives: Upon completion of this course, the attendee should be able to:
1. Demonstrate basic cardiac life support (BCLS) skills as they pertain to the complete management of an arrested patient.
2. Describe and demonstrate the adjuncts for providing an effective airway and adequate oxygenation in the cardiac arrest situation.
3. Recognize and specify appropriate pharmacologic and/or therapeutic modalities for the following ectopy of dysrhythmias: ventricular fibrillation; asystole; AV block—first degree, second degree (Mobitz I & II), third degree; electromechanical dissociation; bradycardia with hypotension; premature supraventricular complexes; and premature ventricular complexes.
4. Demonstrate the ability to recognize cardiac arrest and initiate treatment, including defibrillation and synchronized cardioversion.
5. Describe specific drug therapy, as appropriate, for the aforementioned dysrhythmias.
6. Identify the need for stabilization of the cardiac arrest patient at the scene and during transplantation to a tertiary care facility.

Summary: This course is designed to provide an opportunity for nuclear medicine technologists and others who already have certification of advanced cardiac life support (ACLS) skills to refresh and review. Professional training will be provided by faculty members of Life Support Services, who provide training for Mayo Medical Center, University of Michigan and Northwest Anesthesia Seminars. To be eligible for this class, participants must have completed a basic life support training course within the last three years. The American Heart Association (AHA) textbook will be provided to course attendees on a lending basis. Any participant wishing to keep the textbook will be charged $30.00 in addition to the course fee. ACLS provider certification cards will be given to those who successfully complete the course.

Organizer/Moderator: Patti L. Corrigan, CNMT

HONING YOUR SKILLS FOR HEALTH CARE 2000

8:30AM–3:00PM **Room 705**
CME: 5.75 **CPE: 5.75** **VOICE: 5.75**

8:30AM–9:25AM
Health Care, Where It Started and Where Are We Now?
Glenda Price, PhD

9:25AM–10:20AM
Factors Impacting Nuclear Medicine and Other Allied Health Professions
Robert F. Carretta, MD

10:20AM–10:30AM
Break

10:30AM–11:25AM
Does Reimbursement Still Matter?
Lynne T. Roy, MBA, CNMT, FSNMTS

11:25AM–12:25PM
Practicing Practice Guidelines
Julie Booth, MS, ART

12:25PM–1:00PM
Lunch

1:00PM–2:00PM
Technology and Outcomes Assessment in Nuclear Medicine
Frank Papatheofanis, MD, PhD

2:00PM–3:00PM
Marketing Strategies: Pulling It All Together
Joni Herbst, CNMT

Educational Objectives: At the completion of this program, the attendee should be able to:
1. Describe the events that have transpired within health care over the last five years.
2. Identify the various forces that are driving the health care movement.
3. Review the factors affecting nuclear medicine and related allied health professions.
4. Explain reimbursement and define common terms, acronyms and principles.
5. Understand the process that is utilized for practice guideline development.
6. Explain the economic analysis of diagnosis and understand marketing strategies to increase relevant clinical procedures and service improvement.
7. Describe the various types of outcome assessments and their methods of utilization in disease management.

Summary: Where are we after five tough years of startling health care changes? How are we managing? Can we adequately assess our outcomes from these changes? This course is designed to review the changes that have occurred over the past years, discuss current and future trends and show how we can actively develop skills needed to be allied health professionals in 2000. Participants are presented basic fundamental knowledge needed to begin the process of developing the talent and strategic approaches that will aid them in the positioning of nuclear medicine for the upcoming millennium. All technologists would benefit from this categorical, but the information is better suited for assisting supervisors, managers and/or administrators in shaping the goals of their departments.

Organizers: Christina Carlson, CNMT, FSNMTS; Mary Jo Struttmann, CNMT; and Joni Herbst, CNMT

Moderator: Christina Carlson, CNMT, FSNMTS

Co-Moderator: Kathleen M. Krisak, CNMT

NUCLEAR CARDIOLOGY—TECHNOLOGIST PROGRAM

1:30PM–3:00PM **Room 713 A/B**
CME: 1.5 **CPE: 1.5** **VOICE: 1.5**

Quality Control and Artifact Recognition
SPECT Acquisition and Processing Guidelines
Case Presentations
Faculty: E. Lindsey Tauxe, CNMT; Andre Gagnon, CNMT; Donna Natale, CNMT; and Brenda McSherry, CNMT

Educational Objectives: Upon the completion of this course, the attendee should be able to:
1. Discuss camera quality control requirements and proper quality control of patient images, including artifact recognition.
2. Explain acquisition and processing guidelines for obtaining high-quality SPECT images.
3. Evaluate patient images and identify scan abnormalities.

Summary: The technologists will attend a separate afternoon program covering the technical component of imaging. This session begins with a review of proper camera quality control guidelines and will focus on the important role the technologist plays in reviewing patient images for identification of artifacts and patient motion. The next discussion will focus on the utilization of various perfusion radioisotopes and compare acquisition and processing techniques. Lastly, a series of case studies will be presented and discussed. They will include filter selections, reconstruction parameters and imaging artifacts, along with guidelines for proper acquisition and processing techniques. This course is designed for technologists involved in performing nuclear cardiology studies. Fundamentals as well as advanced techniques will be discussed.

Organizers: Brenda McSherry, CNMT; and Donna M. Natale, CNMT

Moderator: E. Lindsey Tauxe, CNMT

Co-Moderator: Andre Gagnon, CNMT

Monday, June 8

NUCLEAR MEDICINE: WHERE WE'VE BEEN, WHERE WE'RE GOING

12:30PM–2:00PM **Room 706**
CME: 1.5 **VOICE: 1.5**

Nuclear Medicine: Where We've Been, Where We're Going
Jennifer Prekeges, MS, CNMT; and Nancy S. Sawyer, CNMT

Educational Objectives: Upon completion of this lecture, the attendee will be able to:
1. Describe changes in nuclear medicine practice from 1977 to 1997.
2. Preview the new task analysis.
3. Use the Nuclear Medicine Technologist Certification Board (NMTCB) Components of Preparedness statements as a teaching and review tool.

Summary: This presentation will document changes in the practice of nuclear medicine over the last 20 years, based on task analyses performed by the NMTCB since its inception in 1977. Using the current (1997) task analysis, the regional variations in frequency of procedures and radiopharmaceuticals will be examined. Finally, the new task analysis and Components of Preparedness statements will be examined and their usage as a teaching tool explained.

Organizer: Kristen M. Waterstram-Rich, MS, CNMT

Moderator: Patricia C. Wells, MAE, CNMT

GOVERNMENT AND HEALTH CARE: UPDATE ON POLICY, LEGISLATION AND REGULATION

12:30PM–3:00PM **Room 707**
CME: 2.25 **VOICE: 2.25**

12:30PM–1:15PM
Regulation, Legislation and Appropriations in Nuclear Medicine Today
David Nichols

1:15PM–2:00PM
Medicare Reimbursement and Other Important Policy Issues in Nuclear Medicine Today
Wendy Smith, MPH

2:00PM–2:15PM
Break

2:15PM–3:00PM
How to Access Available Resources for Information About Government in Nuclear Medicine
LisaAnn Trembath, CNMT

Educational Objectives: After attending this course, the attendee should be able to:

1. Identify three effective methods of communicating with representatives from government regarding health care policy and legislation.
2. Define key terms in government relations that relate to health care, such as the Health Care Financing Administration (HCFA), energy and water appropriations, Title VII, proposed rule, Pew commission, and legislative network.
3. Discuss current HCFA policy issues that directly affect the practice of nuclear medicine through Medicare reimbursement.
4. Relate news stories about health care policy to the practice of nuclear medicine.
5. Describe key concepts in the Nuclear Regulatory Commission (NRC) revision of Part 35 and how they might affect the practice of nuclear medicine technology.
6. Explain the current legislative effort toward national licensure for radiologic technologists.

Summary: This continuing education session, intended for nuclear medicine technologists, but open to all interested parties, is designed to provide a review and update on health care policy and legislation that affects nuclear medicine. Topics to be covered will include: NRC revisions, national licensure for technologists, Medicare reimbursement and efforts to increase appropriations for allied health training programs. The lectures will be geared specifically to include the most recent information on these topics. Additional topics may be included if new issues arise. Attendees will learn how to access the legislative network to participate in initiatives for change and how to get follow-up information on important issues.

Organizer/Moderator: LisaAnn Trembath, CNMT

Co-Moderator: Mickey Clarke, CNMT

PRACTICAL RADIATION SAFETY IN THE 90s

12:30PM–3:45PM **Room 705**
CME: 3.0 **CPE: 3.0** **VOICE: 3.0**

12:30PM–2:00PM
Surviving the Inspection—A Role Play
Philip M. Chambless, ME; and Thomas G. Ruckdeschel, MS

2:15PM–3:45PM
Comparative Risks: The Radiation from This Bone Scan Is the Same As...
Carole A. South-Winter, BS, RT, CNMT

Educational Objectives: Upon completion of this course, the attendee should be able to:

1. Remove the intimidation factor from an inspection.
2. Explain the importance of a thorough knowledge of rules and regulations as they pertain to human use of radioactive materials.
3. Explain the importance of knowledge of a facility's license, as well as application, and other materials incorporated in the license.
4. Reveal common myths within some of the most common violations cited during these inspections.
5. Recognize the difference between a regulatory requirement and an inspector's opinion.
6. List valid questions that can be raised by the technologist during the inspection.
7. List common nonvalid statements or questions made by technologists during inspections.
8. Understand the need for concise inspection findings from the inspector during the exit interview.
9. Identify which records should be available versus those that do not have to be available for inspection.
10. Recognize the average American's annual whole-body equivalent.
11. Discuss the risks of radiation on the body.
12. Determine risk evaluation.
13. Compare annual radiation risks from varying sources.
14. Compare risks from radiation to risks from natural sources.
15. Develop explanations of radiation risk versus benefit for common studies.

Summary: This course is designed for physicians, physicists and technologists involved in the administration of radioactivity and radiation safety. Using role-playing as a vehicle, the purpose of the first talk is to demonstrate the common interchange that occurs between the radioactive materials inspector and the nuclear medicine technologist during an unannounced inspection at a licensed facility. Techniques for persevering the inspection will be demonstrated by the importance of the technologist's knowledge of all rules and regulations as they apply to nuclear medicine. Using the 20 most common violations cited during unannounced nuclear medicine inspections as a framework for this presentation, the first nine educational objectives listed will be applied. As nuclear medicine technologists, it is our responsibility to minimize the patient's radiation exposure. This is a role that has been underestimated in importance. As practicing technologists we develop our own style of explaining procedures to patients and families. When asked to compare the dose of radiation some technologists might casually respond, 'It's the same as a chest x-ray or a GI series,' or perhaps explain it as same as the risk of flying transcontinental or smoking. Do we really know the comparative risks? This presentation will look at exposure comparisons as well as natural and industrial risks. Through the use of group and panel discussions, this session will discover and clarify the comparative risk questions.

Organizer: Carole A. South-Winter, CNMT, RT

Moderator: Andrew W. Kibbe, CNMT

Co-Moderator: Nicholas J. Langenfeld, CNMT

IMAGING WITH NEW RADIOPHARMACEUTICALS I

12:30PM–3:45PM **Room 709**
CME: 3.0 **CPE: 3.0** **VOICE: 3.0**

12:30PM–1:15PM
ProstaScint Imaging—Technical and Clinical Considerations
Robert F. Carretta, MD

1:15PM–2:00PM
CEA Scan Imaging—Technical and Clinical Considerations
Debbie Erb, BS, CNMT; and Hani H. Abdel-Nabi, MD, PhD, FACNP

2:15PM–3:00PM
OctreoScan Imaging—Technical and Clinical Considerations
Peter Cutrera, CNMT

3:00PM–3:45PM
Miraluma Imaging—Technical and Clinical Considerations
Kathryn M. Sobey, CNMT

Educational Objectives: After attending this course, the attendee should be able to:

1. Identify four radiopharmaceuticals used in evaluating patients with neoplastic disease.
2. Define patient preparation required for each study.
3. Determine correct imaging parameters for each radiopharmaceutical.
4. Recognize the clinical utility of each radiopharmaceutical in determining extent of disease.

Summary: This course is designed for physicians and technologists involved in the diagnosis of known or suspected neoplastic diseases. Discussions will include some of the most recently Food and Drug Administration-approved radiopharmaceuticals.

Organizer/Moderator: Carol V. Bonanno, CNMT

Co-Moderator: Vicki J. Sharp, CNMT

HOW TO USE THE SNM-TS "PREP" PROGRAM TO INCREASE REFERRALS AND TARGET KEY MARKETING AREAS

12:30PM–2:00PM **Room 713 A/B**
VOICE: 1.5

Faculty: Mary Jo Struttmann, CNMT; and Joni L. Herbst, CNMT

Educational Objectives: Upon completion the attendee will be able to:
1. Produce patient information sheets using PREP software.
2. Describe several types of customization available.
3. Understand basic principles of design and layout.
4. Identify several target markets.
5. Design a method to measure results.

Summary: PREP (Patient Related Educational Pamphlets) is a new software package developed by the Technologist Section of SNM. It describes approximately 60 diagnostic and therapeutic nuclear medicine procedures in a page-by-page format. The package is published as a floppy disk with each patient information sheet saved as a file in both DOS and Windows for immediate printing. This interactive session will prepare you to use the PREP package and demonstrate how you can develop and design your own customized patient information materials in a variety of formats for use at your own institution. Examples of several designs and how to format them will be discussed. Tips on selecting a specific marketing strategy, how to measure your results and where to buy cost-effective paper materials will be presented.

Organizer: Joni L. Herbst, CNMT

Moderator: Christina M. Carlson, CNMT, FSNMTS

Co-Moderator: Valerie Cronin, CNMT

CONTINUING COMPETENCY ASSESSMENT: REGULATORY PRESSURES AND PROFESSIONAL OBLIGATIONS

2:15PM–3:45PM **Room 706**
CME: 1.5 **VOICE: 1.5**

Continuing Competency Assessment: Regulatory Pressures and Professional Obligations
Martha W. Pickett, CNMT, FSNMTS

Educational Objectives: Upon conclusion of this presentation, the attendee should be able to do the following:
1. Describe current and proposed regulatory requirements for maintaining competency, including those of the JCAHO, MCQA, state and federal government, and professional registries.
2. Discuss professional obligations to maintain competency to practice.
3. Organize a system of documentation and file maintenance to satisfactorily demonstrate ongoing competency assessment of the professional and the department.

Summary: When the Pew Commission joined with the Citizen's Advocacy Center to sponsor a conference on Continuing Professional Competence, they posed the question: Can the public be confident that health care professionals who demonstrated minimum competency when they earned their licenses continue to be competent years and decades after they have been in practice? The answer was "No." In this presentation the increasing pressures from payers, public and regulatory agencies to ensure professional competency in an ongoing fashion will be discussed. As part of that discussion, ethical obligations to society will be reviewed and some options that may be effectively used by employers, professionals and educators will be proposed.

Organizer/Co-Moderator: Kristen M. Waterstram-Rich, MS, CNMT

Moderator: Patricia Wells, MAE, CNMT

THE WINNER'S CIRCLE

2:15PM–3:45PM **Room 713 A/B**
VOICE: 1.5

Faculty: Valerie R. Cronin, CNMT; Mary Jo Struttman, CNMT; and Joni L. Herbst, CNMT

Winners of PR Stars Contest To Be Announced

Educational Objectives: After attending this session, the attendee will be able to:
1. Describe some of the winning techniques used to create awareness.
2. Understand how to put together a team to accomplish goals.
3. Estimate budget requirements to meet objectives.
4. Modify ideas that can be used successfully in their own institution.
5. Identify several methods of creating publicity that are free.

Summary: Back again by popular demand, the winners of the Public Relations (PR) Stars Contest share their creativity and award-winning ideas. This session will describe how several institutions went about creating awareness of nuclear medicine in their own community. Attendees will be encouraged to ask questions and learn what tips worked; how a budget was determined; and what they learned from their efforts.

Organizer: Joni L. Herbst, CNMT

Moderator: Christina M. Carlson, CNMT, FSNMTS

Co-Moderator: Valerie R. Cronin, CNMT

Tuesday, June 9

HOW SHALL I FILTER? LET ME COUNT THE WAYS

8:00AM–9:30AM **Room 705**
CME: 1.5 **CPE: 1.5** **VOICE: 1.5**

8:00AM–9:30AM
How Shall I Filter? Let Me Count the Ways
C. David Cooke, MSEE

Educational Objectives: Upon completion of this course, the attendee will be able to:
1. Explain the need for filtering nuclear medicine images.
2. Describe how filter parameters affect image appearance for both common and uncommon filters, including filter combinations of various sequences.
3. Identify several classes of filters from graphic representations.
4. List considerations regarding filter selection for specific clinical situations.
5. Explain how quantitation is altered by image filtering.

Summary: This presentation is designed to familiarize the participant with filtering of nuclear medicine images, to include identification of filters used in nuclear medicine studies, selection of filter type and filter parameters for various procedures and study types, and an explanation of effects of filtering on image appearance and study quantitation. Through participation in this course, the attendee will be instructed to select an appropriate filter for a particular nuclear medicine study, adjust filter parameters based on initial impact on raw data images and avoid artifacts caused by improper filterings. This course is

intended for nuclear medicine professionals involved with processing SPECT studies.

Organizer/Moderator: Richard D. Gillon, CNMT

BRAIN SPECT FROM ALL ANGLES

8:00AM–2:00PM **Room 707**
CME: 4.5 **CPE: 4.5** **VOICE: 4.5**

8:00AM–9:30AM
Clinical Applications of CNS Imaging
Darlene Fink-Bennett, MD

9:30AM–9:45AM
Break

9:45AM–10:30AM
An Overview of Reconstruction and Filtering Methods
Michael A. King, PhD

10:30AM–11:15AM
The Normal Brain
Jack E. Juni, MD

11:15AM–12:30PM
Lunch

12:30PM–1:15PM
Imaging of Brain Tumors with SPECT and PET
Andrea Varrone, MD

1:15PM–2:00PM
Neuroreceptor Imaging—Past, Present and Future
John P. Seibyl, MD

Educational Objectives: Upon completion of the course the attendee should be able to:
1. Recognize underlying cerebrovascular disease and transient ischemia in various imaging procedures.
2. Demonstrate the uses of various reconstruction algorithms.
3. Identify and describe the causes of variations in "normal" cerebral perfusion images.
4. Discuss the uses of various radiopharmaceutical agents used in brain tumor imaging.
5. Explain the new directions in neuroreceptor imaging.

Summary: This course is designed for physicians and technologists who are interested in increasing their knowledge of current directions in brain imaging and further developing their neuro-imaging skills. It is a wonderful array of presentations representing many current trends in clinical brain imaging as well as in the research environment.

Organizer/Moderator: Michele L. Early, CNMT

Co-Moderator: Barbara Rossi, CNMT

NUCLEAR CARDIOLOGY I

8:00AM–9:30AM **Room 713 A/B**
CME: 1.5 **CPE: 1.5** **VOICE: 1.5**

8:00AM–8:30AM
Cardiac Disease States
Mary Dalipaj, CNMT

8:30AM–8:50AM
Cardiac Drugs
Bernard Villegas, MD

8:50AM–9:30AM
Basic ECG Skills
Yasmin Allidina, CNMT

Educational Objectives: Upon completion of this course, the attendee should be able to:
1. Explain disease states of the myocardium, including stunned and hibernating, and recognize the differences represented in myocardial perfusion imaging patterns.
2. List several drugs used in the management of cardiac disease and understand what effects, if any, they have on stress testing.
3. Recognize normal and abnormal ECG rhythms.

Summary: To develop a complete understanding of myocardial perfusion imaging patterns, the session begins with a review of cardiac disease states. Patient images will be presented to demonstrate stunned and hibernating myocardium. The next lecture will provide a review of common drugs used in the treatment of coronary artery disease, with an explanation of how these medications may interfere with stress testing. The session ends with a review of basic ECG skills for the technologist involved in stress testing. This course is designed for technologists involved in performing nuclear cardiology studies. Fundamentals as well as advanced techniques will be discussed.

Organizers: Brenda McSherry, CNMT; and Donna M. Natale, CNMT

Moderator: Donna M. Natale, CNMT

Co-Moderator: Annette Ryan, CNMT

NUCLEAR CARDIOLOGY II

9:45AM–11:15AM **Room 713 A/B**
CME: 1.5 **VOICE: 1.5**

9:45AM–10:30AM
Cardiac Pathways
D. Douglass Miller, MD

10:30AM–11:15AM
Logistical Issues in the Nuclear Cardiology Laboratory
Wendy Bruni, CNMT

Educational Objectives: Upon completion of this course the attendee should be able to:
1. Discuss various methods of evaluating and diagnosing patients presenting to the emergency room with acute chest pain and compare associated costs, predictive values and outcomes.
2. Explain advantages and disadvantages of different imaging protocols and tracers and how they affect laboratory management efficiency.

Summary: To provide the technologist with an understanding of different approaches used to accurately evaluate patients with acute chest pain, the session begins with a comparison of several possible combinations of diagnostic testing. Cardiac catheterization, exercise stress testing and nuclear stress testing will be discussed. A comparison of costs, predictive values and patient survival and outcomes will be included. The next lecture will compare different imaging protocols and tracers, including one-day, two-day, dual isotope, ^{201}Tl, ^{99m}Tc and chest pain imaging. This lecture will include a discussion of technologist responsibilities, laboratory logistics and patient throughput. This course is designed for technologists involved in performing nuclear cardiology studies. Fundamentals as well as advanced techniques will be discussed.

Organizers: Brenda McSherry, CNMT; and Donna M. Natale, CNMT

Moderator: Vicki Sharp, CNMT

Co-Moderator: Lynn Sillaman, CNMT

GASTROINTESTINAL AND RENAL IMAGING

9:45AM–3:45PM **Room 709**
CME: 4.5 **CPE: 4.5** **VOICE: 4.5**

9:45AM–11:15AM
GI Motility Scintigraphy—Recent Advances
Brian P. Mullan, MD

11:15AM–12:30PM
Lunch

12:30PM–1:15PM
Blood-Pool Imaging Agents—Recent Development
Ronald J. Callahan, PhD

1:15PM–2:00PM
Scintigraphic Evaluation of the Hepatobiliary Tract—Current Applications
Gary L. Dillehay, MD

2:00PM–2:15PM
Break

2:15PM–3:00PM
Renal Studies for Diagnosing Hypertension and Obstruction
Eva V. Dubovsky, MD, PhD

3:00PM–3:45PM
Diuresis Renography—The Well-Tempered Renogram
James J. Conway, MD; and Susan C. Weiss, CNMT

Educational Objectives: Upon completion of this forum, the attendee should be able to:
1. Discuss gastrointestinal motility scintigraphy and describe new advances in gastrointestinal motility quantitation.
2. Describe red blood cell labeling techniques, risks and limitations and review new product developments that address the risk issues.
3. Review hepatobiliary tract imaging and identify examples of biliary atresia, bile leaks, obstruction and current quantitative applications.
4. Recognize clinical indications and quantitative renal techniques utilized in the evaluation of hypertension and obstruction.
5. Identify the principles of diuretic renography, the technical aspects and common pitfalls and how to analyze the findings for an appropriate interpretation.

Summary: The intent of this continuing education forum is to introduce physicians and technologists to current advances and applicable techniques in the area of gastrointestinal and renal scintigraphy. Emphasis will be placed on enhanced techniques in gastrointestinal motility, hepatobiliary imaging and red blood cell labeling, as well as adult and pediatric renal procedures.

Organizer/Moderator: Carol J. Schutz-Ferino, CNMT

Co-Moderator: Rosemarie McGraw, CNMT

PERFORMANCE SPECIFICATIONS, ACCEPTANCE TESTING AND QUALITY CONTROL OF SCINTILLATION CAMERAS

9:45AM–11:15AM **Room 705**
CME: 1.5 **VOICE: 1.5**

Performance Specifications, Acceptance Testing and Quality Control of Scintillation Cameras
Edward M. Smith, ScD

Educational Objectives: Upon completion of this course, the attendee will be able to:
1. Define the primary performance specifications of the scintillation camera and explain how they are measured and how they affect quality control.
2. List the components of acceptance testing and explain how they affect the quality control program.
3. List the components and reasons for performing quality control.
4. Discuss the economics and scheduling of quality control.
5. List the quality control measurements that must be made daily, weekly and periodically for planar and SPECT imaging systems and explain how they are performed.

Summary: This presentation covers the evaluation of gamma camera performance from the point of initial purchase and installation through the usable life of the equipment. In addition, the explanation of performance specifications will enable one to evaluate imaging systems in order to select the most appropriate camera for a given clinical situation. Acceptance testing, the quality control procedures performed on a newly installed imaging system, will be described for both planar and SPECT cameras. Routine ongoing quality control testing also will be presented, including test purpose, recommended frequency of performance, procedure, acceptable outcome and causes of unacceptable quality control results. This course is designed for technologists involved with the purchasing, acceptance testing and continuing quality control of gamma cameras.

Organizer/Moderator: Richard D. Gillon, CNMT

NUCLEAR CARDIOLOGY III

12:30PM–2:00PM **Room 713 A/B**
CME: 1.5 **VOICE: 1.5**

12:30PM–12:50PM
Attenuation/Scatter Correction
Michael White, CNMT

12:50PM–1:20PM
Gated SPECT
April Russell, CNMT

1:20PM–2:00PM
Fundamentals of 511-keV Imaging
Chin K. Ng, PhD

Educational Objectives: Upon completion of this course the attendee should be able to:
1. Explain principles of attenuation and scatter correction and discuss imaging protocols, including acquisition and processing techniques.
2. Discuss acquisition and processing techniques for obtaining high-quality gated SPECT studies, including proper identification of errors and artifacts.
3. Explain the basics of 511-keV imaging, including camera specifications, imaging guidelines and FDG cardiac imaging.

Summary: The session begins with a discussion of current methods being employed for attenuation and scatter correction of cardiac images. Acquisition and processing protocols, along with case studies, will be presented and compared to conventional imaging studies. Next, a review of acquisition and processing techniques, along with case presentations of gated SPECT studies, will be presented. Last, the fundamentals of 511-keV imaging and FDG cardiac imaging will be presented. Camera specifications, quality control requirements and imaging protocols will be included. This course is designed for technologists involved in performing nuclear cardiology studies. Fundamentals as well as advanced techniques will be discussed.

Organizers: Brenda McSherry, CNMT; and Donna M. Natale, CNMT

Moderator: Brenda McSherry, CNMT

Co-Moderator: Janice Preslar, CNMT

THE TRAINING OF CLINICAL INSTRUCTORS IN PROBLEM-BASED LEARNING FACILITATION AND ASSESSMENT TECHNIQUES: A WORKSHOP

12:30PM–5:00PM **Room 706**
CME: 4.0 **VOICE: 4.0**

The Training of Clinical Instructors in Problem-Based Learning Facilitation and Assessment Techniques: A Workshop
Wanda M. Mundy, EdD, CNMT; and Gregory G. Passmore, PhD, CNMT

2:00PM–2:15PM
Break

3:45PM–4:00PM
Break

Educational Objectives: At the completion of the workshop, the clinical instructor attendee will be able to:

1. Describe and differentiate among the three primary types of concept maps.
2. Construct a concept map from conceptions prominent in their own clinical area of expertise.
3. Define and differentiate among the two primary types of knowledge constructed using a vee heuristic.
4. Construct a vee heuristic from knowledge pertaining to their own clinical area of expertise.
5. Integrate a concept map into a vee heuristic as part of their conceptual knowledge base.
6. Use the map and/or vee heuristic to describe knowledge about the relationship between concepts and methods.
7. Develop a scoring rubric.
8. Participate in a remediative interaction using the map and vee heuristic as the teacher–student interaction guide.
9. Identify various educational objectives associated with problem-based learning (PBL).
10. Learn how to use questioning techniques.
11. Use the concept map and/or vee heuristic to structure knowledge and guide reasoning in a PBL practice session.
12. Use the concept of map and/or vee heuristic to identify areas of incomplete knowledge structures and unsuccessful reasoning in a PBL practice session.

Summary: This workshop is designed to train clinical instruction affiliates in PBL. The PBL environment has been shown to be an effective learning environment. This workshop will focus on proven facilitation techniques and the use of the learning interventions known as concept maps and vee diagrams as individual assessment instruments. These two-dimensional graphic representations of the student's knowledge base and relationships give the instructor insight into what difficulties the student may be having. The properly trained clinical instructor then will be able to facilitate the student group's learning process, as well as assess each student's conceptual and methodological understanding of clinical procedures conducted in the clinical environment, while simultaneously providing the student with individualized misconception remediation.

Organizer/Co-Moderator: Kristen M. Waterstram-Rich, MS, CNMT

Moderator: Miriam K. Miller, CNMT, FSNMTS

REGISTRY REVIEW

12:30PM–5:00PM **Room 708**

Registry Review
Kathy Thompson, CNMT

2:00PM–2:15PM
Break

3:45PM–4:00PM
Break

Educational Objectives: At the completion of this presentation, the attendee will be able to:

1. Identify the Nuclear Medicine Technologist Certification Board (NMTCB) examination components to include commonly performed tasks, equipment and procedures.
2. Identify the problem-solving skills that must be applied when taking the NMTCB examination.
3. Identify the Nuclear Regulatory Commission (NRC) regulations that apply to commonly performed tasks, equipment quality control and procedures.
4. Identify areas of personal strengths and weaknesses in order to efficiently prepare for the NMTCB exam.

Summary: This course is designed to identify personal strengths and weaknesses in order to efficiently prepare for the NMTCB exam. The purpose of this session is to identify NMTCB exam components to include commonly performed tasks, equipment and procedures.

Organizer: Kristen M. Waterstram-Rich, MS, CNMT

Moderator: Ann-Marie Alessi, CNMT

TECHNICAL CONSIDERATIONS OF COLLIMATED AND COINCIDENT IMAGING OF FDG

12:30PM–2:00PM **Room 705**
CME: 1.5 **VOICE: 1.5**

Technical Aspects of Collimated and Coincident Imaging of FDG
L. Stephen Graham, PhD, FACR

Educational Objectives: Upon completion of this presentation, the attendee will be able to:

1. Describe the design of collimators intended for use with FDG imaging on SPECT cameras.
2. List advantages and limitations of performing FDG imaging on a gamma camera equipped with high-energy collimation.
3. Explain modifications made to dual-head gamma cameras to enable these systems to perform FDG imaging.
4. Discuss the rationale for the major acquisition parameter differences between SPECT and PET imaging on a coincident gamma camera, to include window selection and collimation/filters.
5. Explain the concept of coincident detection and describe acquisition considerations regarding coincidence timing and direction of photon travel.

Summary: This course is intended to introduce the attendee to two techniques used to image FDG on gamma cameras: high-energy collimation and coincident detection capabilities on dual-headed systems. Modifications to nuclear medicine cameras that enable imaging by either of the two methods will be explained. Advantages and limitations of the methods, relative to each other and to FDG imaging on true PET systems, will be discussed, as will parameters for performance of an FDG study on a coincident detecting gamma camera. Upon completion of this presentation, the attendee should possess a basic comprehension of the technical factors employed to perform FDG imaging on a gamma camera. This course is intended for technologists, physicists and physicians who are performing or considering FDG imaging on a gamma camera.

Organizer: Richard D. Gillon, CNMT

Moderator: David J. Perry, CNMT

Co-Moderator: Deborah L. Perry, CNMT

STAKING YOUR CLAIM: SUCCEEDING IN A CHANGING PAYER ENVIRONMENT

2:15PM–3:45PM **Room 713 A/B**
CME: 1.5 **VOICE: 1.5**

Staking Your Claim: Succeeding in a Changing Payer Environment
Gail M. Rodriguez, MA

Educational Objectives: Upon completion of the program, the attendee will be able to:
1. Understand Medicare reimbursement policies for radiopharmaceuticals and nuclear medicine procedures.
2. Assist their institution in coding correctly and thereby help ensure appropriate levels of reimbursement.
3. Recognize the trend toward managed care in both public and private payers and the implications for nuclear medicine.

Summary: This program is designed to provide information on how radiopharmaceuticals and nuclear medicine procedures are reimbursed. The attendee will receive specific training on correct coding for Medicare claims with an emphasis on how to use this knowledge to obtain appropriate reimbursement. This information will be discussed within the context of the changing managed care environment. As managed care and capitated payment arrangements evolve, it is critical that nuclear medicine professionals understand the systemic constraints of these changes and be able to succeed under them.

Organizer: Patti L. Corrigan, CNMT

Moderator: Kathleen A. Tuttle, CNMT

Co-Moderator: Kathleen M. Krisak, CNMT

NRC REGULATIONS UPDATE

2:15PM–3:45PM **Room 707**
CME: 1.5 **CPE: 1.5** **VOICE: 1.5**

NRC Regulatory Update
James E. Carey, Jr., MS

Educational Objectives: Upon completion of this presentation, the attendee will be able to:
1. Describe changes in Nuclear Regulatory Commission (NRC) regulations governing the release of patients administered therapeutic doses of radiopharmaceuticals.
2. Provide the instructions that should be given to patients who are discharged from nuclear medicine following administration of a therapeutic radiopharmaceutical.
3. Perform calculations to determine maximum therapeutic dosages of ^{131}I that may be administered to nonhospitalized patients.
4. Provide the instructions that should be given to patients undergoing nuclear medicine procedures who are actively breast-feeding at the time of the study.
5. List the trigger criteria and actions associated with performance of nuclear medicine procedures on patients who are actively breast-feeding.

Summary: This course is intended to familiarize the attendee with recent changes in NRC regulations. New regulations that govern the release of patients who have been administered therapeutic doses of radiopharmaceuticals will be covered, to include the calculation of maximum allowable discharge dose and the provision of release instructions to the patient. In addition, updates regarding the dosing of breast-feeding patients will be presented. Upon completion of this presentation, the attendee will be better prepared to implement policies for compliance with these new regulations.This course will benefit any nuclear medicine professional interested in regulatory compliance.

Organizer: Richard D. Gillon, CNMT

Moderator: David J. Perry, CNMT

Co-Moderator: Deborah L. Perry, CNMT

HOT NEW IDEAS AND DEVICES

2:15PM–3:45PM **Room 705**
CME: 1.5 **CPE: 1.5** **VOICE: 1.5**

2:15PM–3:00PM
Uses of Intraoperative Probe
Raghuveer K. Halkar, MD

3:00PM–3:45PM
Treatment of Painful Bone Metastases
Donald A. Podoloff, MD

Educational Objectives: After attending this course, the attendee should be able to:
1. Explain the basis for the present uses of intraoperative probes, including tumor localization and sentinel lymph node concept.
2. Compare and contrast different probes.
3. Discuss the preparation and biodistribution of radiopharmaceutical used.
4. Decide to image or not to image.
5. Describe the technique.
6. Discuss present trends and future possibilities.
7. Recognize the differences in radiopharmaceuticals used in treating the pain of patients with bone metastases.
8. Understand the clinical course in patients with bone metastases.
9. Compare the various radiopharmaceuticals used to find metastatic tumors in surgical patients.
10. Understand the physics and biology involved in using intraoperative probes.

Summary: The main purpose of intraoperative probe use is to minimize surgical morbidity and operating time. High target-to-background ratio is the key, and proper understanding of preparation and biokinetics of pharmaceuticals and characteristics of different probes will help the technologist achieve high rate of success in the use of intraoperative probes. This course is designed for physicians and technologists involved in the treatment of patients with prostate cancer and those with metastatic bone pain. In addition, a look at what the future of radionuclide therapy holds will be discussed.

Organizer: Carol V. Bonanno, CNMT

Moderator: Traci Youssi, CNMT

Wednesday, June 10

NUCLEAR IMAGING OF MUSCULOSKELETAL DISORDERS

8:00AM–11:15AM **Room 709**
CME: 3.0 **CPE: 3.0** **VOICE: 3.0**

8:00AM–9:30AM
Musculoskeletal Imaging in Equine Medicine
Gregory A. Beroza, DVM

9:30AM–9:45AM
Break

9:45AM–11:15AM
Imaging of Musculoskeletal Infections
Christopher J. Palestro, MD

Educational Objectives: Upon completion of this course, the attendee should be able to:

1. List various nuclear medicine procedures for diagnosing musculoskeletal infections and the advantages and disadvantages of each.
2. Review acquisition and processing parameters for bone SPECT imaging.
3. Recognize the role nuclear medicine plays in the evaluation of musculoskeletal disorders in an equine patient and in veterinary medicine.

Summary: This session will provide information about numerous facets of musculoskeletal imaging in both human and equine patients. Information also will be presented on the most sensitive radiopharmaceuticals and procedures to use for infection imaging. In addition, this session will provide an educational experience about the use of nuclear medicine procedures in veterinary medicine.

Organizer: Ann-Marie Alessi, CNMT

Moderator: Kathleen M. Krisak, CNMT

Co-Moderator: William Wood, CNMT

ITEM WRITER'S WORKSHOP I: FIRST-TIME WRITERS

8:00AM–9:30AM **Room 703**

Item Writer's Workshop I: First-Time Writers
Nancy S. Sawyer, CNMT; and Anthony W. Knight, MBA, CNMT

Educational Objectives: Upon completion of this course, the attendee should be able to:
1. Develop multiple-choice questions following the principles and conventions of multiple-choice item writing.
2. Recognize common problems associated with multiple-choice questions.
3. Apply these principles to the classroom exams and/or item writing.

Summary: This presentation is made by the Nuclear Medicine Technologist Certification Board (NMTCB) to provide guidance for writing and preparing examination items. The emphasis will be on writing items for computer adaptive testing on the content of the NMTCB exam. This workshop is useful for the classroom instructor, new NMTCB item writers and anyone else who is charged with writing test questions: such as, in-service presentations, Joint Commission of Allied Health Organizations (JCAHO) competency validation, continuing education lectures, etc. Handouts and workshop activities will include examples of well-written and poorly written questions, how to critique items and how to write questions for computer exams.

Organizer: Kristen M. Waterstram-Rich, MS, CNMT

IMAGING WITH NEW RADIOPHARMACEUTICALS II

8:00AM–11:15AM **Room 713 A/B**
CME: 3.0 **CPE: 3.0 (L01)** **VOICE: 3.0**

8:00AM–8:45AM
Verluma Imaging in Small-Cell Lung Cancer—Technical and Clinical Considerations
Samuel Kipper, MD

8:45AM–9:30AM
FDG Imaging in Neoplastic Disease—Technical and Clinical Considerations
Jerry L. Prather, MD

9:30AM–9:45AM
Break

9:45AM–10:30AM
Monoclonal Imaging and Therapy in Non-Hodgkins Lymphoma
Michael J. Blend, PhD, DO

10:30AM–11:15AM
Cancer Therapy with Monoclonal Antibodies
Bob Sharkey, PhD

Educational Objectives: After attending this course, the attendee should be able to:
1. Identify new radiopharmaceuticals used in evaluating patients with neoplastic disease.
2. Define patient preparation needed for each study.
3. Determine correct imaging parameters for each radiopharmaceutical.
4. Recognize the clinical utility of each radiopharmaceutical in determining the extent of disease.
5. Understand the imaging systems used in FDG imaging.
6. Understand the use of monoclonal antibodies in imaging and therapy.

Summary: This course is designed for physicians and technologists involved in the diagnosis of known or suspected neoplastic diseases. Discussions will include the utility of PET imaging, therapy with monoclonal antibodies and imaging of lung cancer.

Organizer: Carol V. Bonanno, CNMT

Moderator: Gracia A. Garrido, CNMT

NUCLEAR MEDICINE: A PERSONAL VIEW

8:00AM–9:30AM **Room 705**
CME: 1.5 **VOICE: 1.5**

Takayasu's Disease and Gallium-67 Imaging—A Case Study
Sandra H. Wachsman-Amir, ARRT(N)

Educational Objectives: After attending this course, the attendee should be able to:
1. Understand the clinical course and treatment of Takayasu disease.
2. Learn the role of nuclear medicine in the diagnosis of Takayasu disease.
3. Recognize the importance of being proactive in the practice of nuclear medicine technology.

Summary: This course is designed for physicians and technologists. It is the true story of a nuclear medicine technologist's struggle to save the life of her husband who was suffering from a rare disease.

Organizer/Moderator: Carol V. Bonanno, CNMT

CLINICAL RESEARCH IN NUCLEAR MEDICINE

8:00AM–11:15AM **Room 707**
CME: 3.0 **CPE: 3.0** **VOICE: 3.0**

8:00AM–8:45AM
Introduction to Concepts and Definitions of Clinical Research with Highlights of Brain Research Being Performed at Yale University
Eileen O. Smith, MBA, CNMT

8:45AM–9:30AM
Clinical Research Trials: How They Are Conducted and How to Get Your Institution Involved
Rita Kaurs, MSHSA, MT(ASCP), NMT(ASCP)

9:30AM–9:45AM
Break

9:45AM–10:30AM
Newer Radiopharmaceuticals on the Market: Indications, Applications and Protocols
Suzanne M. Wisniewski, CNMT, NRTN

10:30AM–11:15AM
How to Write a Scientific Abstract
Monica C. Geyer, CNMT

Educational Objectives: Upon completion of this course, the attendee should be able to:
1. Describe how to write and present a scientific abstract.
2. Identify the sequence of setting up an experiment to answer a clinical question.
3. Define common terminology and acronyms used in clinical research, such as NDA, INDA, FDA, consent form and principal investigator.
4. Relate aspects of brain research being performed at Yale University.
5. Discuss how clinical research trials are conducted.
6. Identify ways in which to involve their institution in clinical research trials.
7. Explain the indications, applications and protocols of more recently released radiopharmaceuticals such as Octreoscan and OncoScint.

Summary: This course is intended for nuclear medicine technologists who want to expand their knowledge and be able to participate in clinical research. Speakers will focus on specific examples of nuclear medicine research and development as well as how technologists can be an integral part of the process. Included is review of basic research terms and acronyms with an introduction to brain research currently being conducted at Yale University. In addition, those attending will learn about the conduct of clinical research trials and how to get their institutions involved in such trials. Attendees also will learn about the results of research by reviewing the indications, applications and protocols of several radiopharmaceuticals that are relatively new to the field of nuclear medicine. The final speaker will elaborate on how to set up an experiment to answer a clinical question, write and submit a scientific abstract and give tips on what to include in an oral presentation.

Organizer/Co-Moderator: Monica C. Geyer, CNMT

Moderator: Paul Mosebach, CNMT

ALL YOU WANTED TO KNOW ABOUT THE X, Y, Zs IN MANAGEMENT, BUT YOU WERE AFRAID TO ASK

9:45AM–11:15AM **Room 705**
CME: 1.5 **CPE: 1.5** **VOICE: 1.5**

All You Wanted to Know About the X, Y, Zs in Management, But You Were Afraid to Ask
Mark H. Crosthwaite, CNMT

Educational Objectives: Upon completion of this course, the attendee will be able to:
1. Identify and describe the different theories of management.
2. Apply the appropriate management theory to a specific working environment.
3. Identify your management style.
4. Differentiate between leadership and management.
5. Review Maslow's Hierarchy of Need.
6. Determine the needs of your employees.
7. Apply a model for motivating employees in the workplace.
8. Review the theories of communication.

Summary: The purpose of this lecture is cover basic concepts in management, initially beginning with three theories of management (x, y and z). Individual management style will be evaluated through self-assessment exams. Elements of effective communication will be reviewed and identified. Theories on motivation and employee satisfaction also will be covered.

Organizer: Patti L. Corrigan, CNMT

Moderator: Mark H. Crosthwaite, CNMT

ITEM WRITER'S WORKSHOP II: EXPERIENCED WRITERS

9:45AM–11:15AM **Room 703**

Item Writer's Workshop II: Experienced Writers
Nancy S. Sawyer, CNMT; and Anthony W. Knight, MBA, CNMT

Educational Objectives: Upon completion of this course, the attendee should be able to:
1. Demonstrate an understanding of the principles and conventions of writing multiple-choice items.
2. Design multiple-choice items that effectively sample the desired knowledge domain.
3. Evaluate the quality of newly written items using identified standards.

Summary: This interactive workshop is designed by the Nuclear Medicine Technologist Certification Board (NMTCB) to provide an opportunity for experienced item writers to apply their expertise. The presenters will suggest a number of nuclear medicine topics for which attendees will be asked to create original multiple-choice items. Well-written items will be considered for possible inclusion in future NMTCB registry examinations.

Organizer: Kristen M. Waterstram-Rich, MS, CNMT

Abstract Author Index-1998

Abstract Subject Index-1998