

MINUTES OF THE MEDICAL ISOTOPES COMMITTEE

AIR1.941130.051e

1. PLACE: Conference Room, Radiation Therapy
2. TIME: 1600 Hours
3. MEMBERS PRESENT: Colonel H.T. Cerha, Committee Chairman, Director, Professional Svcs.
Major G.W. Hinzman, Alternate Member, Dept. of Radiology
Major P.H. Weiss, Chief, Nuclear Medicine Service
Major F.J. Connolly, Committee Secretary, Radiation Physicist
4. MEMBERS ABSENT: Colonel F.R. Lecocq, Chairman, Dept. of Medicine
Colonel G.R. Meng, Chairman, Dept. of Surgery

5. OLD BUSINESS:

a. Major Connolly stated that the renewal application to the USAEC Byproduct Material License No. 34-04682-01 regarding the use of radiopharmaceuticals in Nuclear Medicine was handcarried for approval and coordination of members of the Medical Isotopes Committee on 9-10 August 1972. Subject application was submitted through channels for approval on 11 August 1972. At the time of submission, the application was incomplete since the experience summaries of three members of the Committee were not available. These summaries are now available and will be forwarded to the USAEC by Major Connolly.

b. Major Francis J. Connolly (HSRT) was appointed Radiation Protection Officer for the USAF Medical Center, vice Mr. James W. Lewis, effective 29 August 1972.

6. NEW BUSINESS:

a. The applications (Form AEC-313a, Preceptor Statement) of Major Gary W. Hinzman (HSR), Major Phillip H. Weiss (HSR) and Major Harvey W. Scholl (HSR) were submitted and these radiologists were approved by the Committee as users of radiopharmaceuticals in humans subject to the criteria specified by the AEC Licensing Guide - Medical Programs, Appendix C, "Acceptable Training and Experience for Medical Uses of Byproduct Material."

b. Major Harvey W. Scholl, Jr. (HSR) was also approved by the Committee as a user of the Cobalt-60 teletherapy unit for medical treatment of patients. Major Connolly is to take the appropriate action to reflect this change in the USAEC license governing the use of the Cobalt-60 teletherapy unit.

c. Major Weiss submitted a proposal to the Committee for the use of Fluorine-18 sodium fluoride for bone scanning, and the proposal was approved by the Committee. Action is to be taken by Major Connolly to have an amendment to the USAF Radioactive Material Permit No. 2-0002 prepared and submitted through channels for approval.

d. Major Weiss also submitted a proposal to the Committee for the use of Indium-111 DTPA (diethylenetriamine pentaacetic acid) in cisternography, and the proposal was approved by the Committee. Major Connolly is to take the necessary action to prepare and submit an amendment to the USAF Radioactive Material Permit No. 2-0002 for the use of this item.

e. Major Connolly noted that the current USAF Med Can Reg 160-12, "Approval of Individual Users of Medical Isotopes," 19 Jan 1971 does not conform with the present criteria specified by The AEC Licensing Guide - Medical Programs, "A Guide for the Preparation of Applications for the Medical Use of Radioisotopes," Appendix C, "Acceptable Training and Experience for Medical Uses of Byproduct Material," dated April 1972. It


was suggested that in lieu of revising the USAF Med Cen Reg 160-12 and attempting to keep the regulation current with the AEC guidelines, the regulation should be deleted and the USAF Med Cen Reg 168-1, "Boards and Committees," Attachment 2, Medical Isotopes Committee, be amended to reflect that physicians desiring to use radioisotopes in humans have the minimum experience recommended by the most current AEC Licensing Guide.

7. UNANNOUNCED BUSINESS:

Major Connolly reported that Sgt Hafner, Radioisotope Technician, Nuclear Medicine Service will be leaving the service in December 1972 (pending an early-out for school) or February 1973. A trained and qualified technician will be needed to replace him. Colonel Cerha requested that the NCOIC, Nuclear Medicine Service submitted a letter to him through Colonel Swaim, Chief, Dept. of Radiology specifying the exact requirements for the position and the availability of training programs for the specialty.

8. The meeting adjourned at 1700 hours.

9. The next meeting will be at the call of the Chairman or the Secretary of the Committee.



HARRY T. CERHA, Colonel, USAF, MC
Chairman, Medical Isotopes Committee
Director, Professional Services



FRANCIS J. CONNOLLY, Major, USAF, BSC
Secretary, Medical Isotopes Committee
Radiation Physicist

APPROVED:

JOHN R. GREENE, Colonel, USAF, MC
Commander

DISTRIBUTION: HS, HSRT, AMB, AFLC (SGPR)

A G E N D A

MEDICAL ISOTOPE COMMITTEE

DATE: Wednesday 27 September 1972

TIME: 1530 Hours

PLACE: Conference Room, Radiation Therapy, Basement

OLD BUSINESS:

1. Renewal application to the USAEC Byproduct Material License No. 34-04682-01 regarding the use of radioisotopes in Nuclear Medicine was handcarried for approval and coordination of members of the Medical Isotopes Committee on 9-10 August 1972. Subject application submitted through channels for approval on 11 August 1972.

2. Change 3 to USAF Med Cen Reg 168-1 on the Medical Isotopes Committee was published on 25 July 1972.

3. Major Francis J. Connolly (HSRT) appointed Radiation Protection Officer for the USAF Med Cen, vice Mr. James W. Lewis, effective 29 August 1972.

NEW BUSINESS:

1. Approval of Major Gary W. Hinzman (HSR), Major Phillip H. Weiss (HSR) and Major Harvey W. Scholl (HSR) as users of radiopharmaceuticals.

2. Approval of Major Harvey W. Scholl, Jr. (HSR) as user of the Cobalt-60 teletherapy unit.

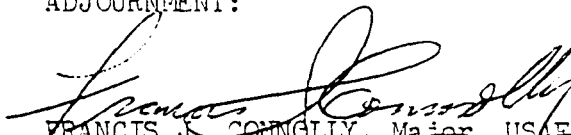
3. Proposal for the use of Fluorine-18 for bone scans. Dr. Weiss will present the proposal.

4. Proposal for the use of Indium-111 DTPA (Diethylenetriamine Pentaacetic Acid complex) for CNS cisternography. Dr. Weiss will present the proposal.

5. Discussion on possible changes to USAF Med Cen Reg 160-12, "Approval of Individual Users of Medical Isotopes," to conform with the current AEC Licensing Guide - Medical Programs, dated April 1972.

UNANNOUNCED BUSINESS:

ADJOURNMENT:


FRANCIS J. CONNOLLY, Major, USAF, BSC
Radiation Physicist
Secretary, Medical Isotopes Committee

1 Atch
List of Members of Med.
Isotopes Comm.

REQUEST FOR AMENDMENT TO AF PERMIT: Fluorine 18

1. Byproduct material: ^{18}F
2. Chemical Form: Sterile, pyrogen-free sodium fluoride.
3. Source of nuclide: Medi + Physics (Emeryville, California) or other suppliers complying with 2.
4. Dosage range: 1 to 4 mCi.
5. Possession limit: 10 mCi.
6. Dosimetry: Absorbed bone dose 0.12 rad/mCi.

REQUEST FOR AMENDMENT TO AF PERMIT: FLUORINE-18'

I INTRODUCTION

Bone scanning is an accepted technique for detection of metastatic malignancy to bone. It is considerably more sensitive than bone radiography in detection of occult disease, allowing earlier recognition of spread, more accurate assessment of staging, and more optimal approach to treatment of local lesions by the radiotherapist.

Bone scanning is also quite useful for the evaluation of non-neoplastic bone and joint disease including arthritis, Paget's disease, osteomyelitis, fibrous dysplasia, and fracture.

II RADIOPHARMACEUTICALS

The most commonly used nuclide is ^{85}Sr . The high radiation absorbed dose to bone (4-5 rad for a 250 uCi dose) limits the use to patients with proven malignancy. In addition, significant excretion through the gut necessitates scanning at 48 hours after frequent enemas, a protocol of significant discomfort to the patient. The small dose severely limits the information content of the scan.

The use of $^{87\text{m}}\text{Sr}$, a generator-produced nuclide is hampered by slow blood clearance and resultant high blood background, somewhat negating the advantage of increased administered dose possible because of the shorter half-life.

Fluorine-18 is desirable because of its high photon yield and short half-life, allowing administration of millicurie amounts with acceptable body radiation burdens. It is rapidly cleared from blood with resultant excellent target to background ratios. The scan images are of high information content. Because of the low radiation absorbed dose, this nuclide is suitable for study of non-neoplastic conditions. In addition, the patient is scanned 2 hours after administration without the necessity for laxatives. The high information content means that more of the skeleton can be imaged in a reasonable time, increasing diagnostic yield. For example, using a total body scanner, the entire axial and appendicular skeleton can be imaged in approximately one hour (compared to 1 hour for the pelvis with ^{85}Sr).

III TECHNIQUE

Sterile, pyrogen free $\text{Na } ^{18}\text{F}$ is administered intravenously or orally and the patient scanned in 2 hours. Fluids are forced to encourage voiding since ^{18}F is excreted primarily via the urinary tract and the absorbed dose to the bladder can be diminished in this fashion.

IV REFERENCES

1. Blair, M., et al., Fluorine-18, A New Isotope for Bone Scanning, J. Nuc. Med. 3:332 (1962).
2. Edelstyn, G.A., et al., The Radiological Demonstration of Osseous Metastases: Experimental Observations, Clin. Radiol. 18: 158 (1967).
3. Benua R.S., et al., Use of F-18 Sodium Fluoride Bone Scans to Determine the Extent of Disease in Lymphoma, J. Nuc. Med. 12:340, (1971)

REQUEST FOR AMENDMENT TO AF PERMIT: 111-In-DTPA

1. Byproduct material 111-In
2. Chemical Form: 111-In-DTPA (diethylenetriaminepentaacetic acid) in aqueous solution, sterile, pyrogen-free.
3. Source of nuclide: Diagnostic Isotopes, Inc. (Upper Saddle River, N.J.) or other suppliers complying with 2.
4. Dosage: 0.2 to 0.5 mCi
5. Possession limit: 2 mCi
6. Dosimetry: Organ Dose: Rads/0.5 mCi

Whole body	0.275	
Spinal cord	6.10	(8.7)*
Brain	1.04	
Gonads	0.36	
Bladder	0.7	

* 131-I-HSA (125 uCi dose)

I. INTRODUCTION

Cisternography provides a unique understanding of cerebrospinal fluid dynamics and is a sensitive indicator of altered formation, flow, and reabsorption of CSF protein. A significant advantage over pneumoencephalography lies in the fact that radionuclide cisternography does not disturb CSF dynamics, while the introduction of air destroys the physiologic condition of a single fluid phase.

Some indications for nuclide cisternography are listed in TABLE I.

TABLE I

1. Obstructive Communicating Hydrocephalus (NPH, Hakim-Adams)
2. CSF Leak
3. Cerebral atrophy
4. Shunt patency

II. RADIOPHARMACEUTICALS

The most commonly used tracer is high specific activity I¹³¹-I-Human Serum Albumin ("RISA"). It is undesirable because of the high radiation dose to the cord necessitating small microcurie doses. It also suffers from less than optimal photon energy (364 KeV) resulting in inefficient collimation and low counting efficiency. In addition, the presence of albumin is undesirable since it has been implicated in the production of aseptic meningitis.

^{99m}Tc - Albumin (^{99m}Tc-HSA) is more suitable because of greater photon yield, more desirable photon energy (140 KeV), and short half-life, allowing millicurie doses to be used. However, a number of disadvantages preclude its routine use: It must be prepared just before use (because of the 6 hr T_{1/2} of ^{99m}Tc) and the user assumes responsibility for sterility and pyrogen testing. It is also not optimal for studying adults where examination up to 72 hours after injection is sometimes necessary.

¹¹¹In-DTPA has a number of desirable characteristics. The photon yield and photon energies are more desirable than those of I¹³¹-I-HSA, allowing larger administered doses than tolerable with I¹³¹-I-HSA. It is delivered in a closed vial, sterile and pyrogen-free. It contains no albumin, at least theoretically reducing the risk of aseptic meningitis.

III. TECHNIQUE

The studies will be done with, and at the request of a consulting neurologist neurosurgeon who will perform the intrathecal injection (or shunt injection). Records will be kept on all patients and any reactions noted and filed with the supplier.

IV. REFERENCES

1. Harbert, J.C., Radionuclide Cisternography, Seminars in Nuclear Medicine, 1, No. 1. 1971

2. Harbert, J.C., et. al., The Dosimetry of ¹³¹I-HSA Cisternography, J. Nuc. Med 11: 534, 1970.

3. Heinz, E.R., et. al., Abnormal Isotope Cisternography in Symptomatic Occult Hydrocephalus, Radiol. 95: 109, 1970.

27 September, 1972

Major Phillip H. Weiss, USAF (MC)