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HIGHLIGHTS FROM THE SECOND SINO-AMERICAN NUCLEAR MEDICINE CONFERENCE, BEIJING, CHINA

The Second Sino-American Nuclear Medicine Conference was held August 18-20, 1991 in Beijing China. The following is an account of the scientific highlights as reported by Frans H. M. Corstens, MD, who attended the conference as an invited speaker. Dr. Corstens is chairman of the department of nuclear medicine at the University Hospital Nijmegen, The Netherlands.

THE SECOND SINO-AMERICAN NUCLEAR Medicine Conference brought nearly 150 physicians and scientists to Beijing, China in August 1991. In-



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vestigators at the conference represented China, Korea, Singapore, Taiwan, Hong Kong, Burma, The Netherlands, and the U.S. The conference was co-sponsored by the Chinese Society of Nuclear Medicine (CSNM) and the Chinese-American Society of Nuclear Medicine (CASNM) and took place at the Cardiovascular Institute and Fuwai Hospital of The Chinese Academy of Medical Sciences.

The conference was organized by CASNM President Ban An Khaw, PhD and CASNM Secretary Koon Yan Pak, PhD, and by their CSNM counterparts, Xiang Tong Lin, MD and Xiujie Liu, MD. Honored guests attending the opening ceremonies included Professor Chong-Ying Wang, general secretary of the Chinese Nuclear Society; Professor Yu-Hua Dai, vice-president of the Chinese Academy of Medical Sciences; and Professor Shi-Chen Wang, honorary president of CSNM.

In an awards ceremony, Samuel Yeh, MD of Memorial Sloan-Kettering Cancer Center, New York, was named "Outstanding Chinese American Nuclear Medicine Clinician/Scientist," and an equivalent award was given to Chien Chou, MD of the Beijing University Medical College (PUMC), Chinese Academy of Medical Sciences, Beijing. Monty Fu, chairman of the board of Syncor Corporation, was named "Outstanding Chinese American Nuclear Medicine Entrepreneur."

As a satellite meeting of the Sino-American Conference, Shanghai Medical University held a mini-symposium on August 14, 1991. Professor Xiang Tong Lin, vice-president

of the university was the moderator and Dr. Koon Yan Pak of Centocor was co-moderator of the event, which was entitled "Frontiers of Nuclear Medicine." Eighty physicians and scientists participated in this mini-symposium.

CASNM was founded in 1977. In China, CSNM was formed in 1980. The two societies held the First Sino-American Conference in 1986 in Wuxi, China. CSNM publishes *The Chinese Journal of Nuclear Medicine* and in 1984 helped establish the Capital Nuclear Medicine Center, which operates under the auspices of the Chinese Academy of Medical Sciences.

The population of mainland China exceeds 1.2 billion; about 8 million people live in Beijing and 12 million in Shanghai. These two cities alone have over 100 hospitals using radio-nuclides—importing facts to keep in mind when considering the status of nuclear medicine in China in terms of volume of studies performed, number of operating gamma cameras, and other indicators.

Radiopharmaceuticals

According to statistics presented at the conference by Bo-Li Liu, PhD, Department of Chemistry, Beijing Normal University, the amount and variety of radiopharmaceuticals produced in China have increased dramatically over the last two decades. Total sales rose from 150,000 yuan in 1968, to over 22 million yuan in 1988 (1 yuan = \$.20).

Two types of technetium-99m (^{99m}Tc) generators are produced in China. Compounds such as HMPAO, ECD, MIBI, MAG-3 and the like are often synthesized locally, and many are prepared for clinical use. Strong efforts are underway to develop cyclotron products such as gallium-67 (^{67}Ga), thallium-201 (^{201}Tl), indium-111 (^{111}In), iodine-123 (^{123}I), carbon-11 (^{11}C), nitrogen-13 (^{13}N), and fluorine-18 (^{18}F). Some of these, like ^{201}Tl , have been released for use in practice. Reactor-produced iodine-131 (^{131}I) still plays a key role in Chinese nuclear medicine today, especially in the study of thyroid (sodium iodide) and kidneys (hippurate), brain (amphetamine), adrenals (MIBG) and tumors (antibodies). Research efforts are currently underway in yttrium-90 (^{90}Y) and samarium-153 (^{153}Sm) labeled bone-seeking agents.

A highlight of the presentations on radiopharmaceuticals was a report by Theodore S.T. Wang, PhD, Columbia University, New York, on a promising new approach for labeling monoclonal antibodies with metallic radionuclides using cyclodextrins. These oligosaccharides are toxicologically harmless compounds and form a wide variety of inclusion compounds

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with molecules that fit in their cavities. Using this methodology the liver uptake of monoclonal antibodies appeared to be considerably lower compared to conventional radiometallic labeling techniques.

Instrumentation

The first Chinese gamma camera was produced in 1981. At present there are 35 Chinese gamma cameras in use in hospitals throughout the country. Besides these Chinese-manufactured cameras, many non-Chinese camera systems are also in operation throughout China. Approximately 50 single photon emission computed tomography (SPECT) systems are in use. According to Zhong Yun Pan, MD, the first prototype positron emission tomography (PET) system has just begun operation. Yongjie Jin, representing the engineering physics department of Tsingua University in Beijing, reported on the completion of a gamma camera data processing system based on a 286 or 386PC microcomputer. The GCCS-89 system consists of a microcomputer with co-processor, enhanced video system, keyboard with track ball, graphic printer and data acquisition interface. Clinical evaluation of this system was performed at Fuwai Hospital, Beijing. A comparative study, presented by Yanqun Wang, between the GCCS-89 and a Siemens Microdelta system showed excellent concordance in measuring left ventricular ejection fractions.

James J. Zhang, PhD, representing a group at Thomas Jefferson Hospital in Philadelphia, Pennsylvania demonstrated a system that links functional images from PET or SPECT with high-resolution anatomic images from computed tomography (CT) or magnetic resonance imaging (MRI) in one co-register. The resulting images are intended to provide better information for treatment planning that would otherwise be available from the modalities operating separately.

Research into three-dimensional SPECT images to overcome relatively poor count statistics and compete with achievement in CR and MRI was presented by Professor Chan Park of Thomas Jefferson University, Kai H. Lee, PhD of the University of Southern California, and Honggang Liu of Shanghai Medical University.

Nuclear Cardiology

The development of nuclear cardiology in China was addressed by Xiujie Liu, MD of the Cardiovascular Institute and Fuwai Hospital, The Chinese Academy of Medical Sciences, Beijing.

Non-imaging cardiac probes are being constructed in China, and at the present time more than 70 are available for the evaluation of left ventricular ejection fractions. ^{201}Tl is in wide use for diagnosis and management of coronary artery stenosis. Over the last several years efforts have been focussed on the development of $^{99\text{m}}\text{Tc}$ labeled compounds such as MIBI and

CPI. To date more than 3,000 patients have been studied with these compounds and SPECT and ECG-gated SPECT. In a study of 23 patients by Jiahe Tian and others at the Chinese PLA Hospital in Beijing, gated SPECT studies resulted in better sensitivity in the detection of segmental defects compared to ordinary SPECT.

Ban An Khaw, PhD, of Harvard University Medical School and Massachusetts General Hospital, gave an overview of the past, present and future role of monoclonal antibodies in the diagnostic imaging of cardiovascular diseases. His studies demonstrated that negative charge modification of monoclonal antibody enabled earlier visualization of experimental myocardial infarction with lower background activities in normal myocardium, liver and kidneys. These observations may pave the way to a new generation of agents for specific immunotargeting.

Koon Yan Pak, PhD of Centocor Inc. in Malvern, Pennsylvania presented studies of $^{99\text{m}}\text{Tc}$ labeled anti-GMP 140 Fab' S12 fragments in rabbits, indicating its potential to delineate cardiovascular diseases in which activated platelets play a role. These agents may have use as localizers of atherosclerotic plaques, along with clots and emboli.

Nuclear Neurology

Since 1973 many modalities in nuclear neurology have been introduced and evaluated in China. Conventional brain scanning and radionuclide cisternography date back to 1973. Conventional brain imaging is still performed for tumor detection in areas where x-ray CT or MRI are unavailable. Recently $^{99\text{m}}\text{Tc}$ HMPAO and ECD have been applied in more than 2500 patients.

Zhong Yun Pan, MD of Ist Hospital, Beijing Medical



Terracotta warriors excavated near Xi'an, China, from the tombs of Qin Shi Huang, China's first emperor. Participants in the Sino-American Nuclear Medicine Conference had the chance to tour China's ancient monuments and modern cities.

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University, presented data on regional cerebral blood flow quantification using ^{99m}Tc HMPAO in 60 normal volunteers subjected to various physiologic stimuli.

Over the last years, several neuroreceptor imaging agents have been prepared such as ^{131}I -IBZP, a dopamine D1 receptor agent, and ^{131}I -G-O18, a derivative of gastrodigenin.

Chengmo Zhu and others at Ruijin Hospital, Second Shanghai Medical University, studied the *in vivo* distribution of ^{99m}Tc -HMPAO and ^{99m}Tc -ECD in eight healthy volunteers and 100 patients with brain disorders. This study found more rapid elimination of the latter agent, a better performance of brain SPECT than x-ray CT, and the added value of a semi-quantitative analysis over visual inspection.

Nuclear Endocrinology

The status of studies of the thyroid in China was discussed by Xiang Tong Lin, MD, Hua Shan Hospital, Shanghai Medical University. Over 300 microprocessor guided gamma counters were produced in China in 1989. Physician in three large cities, Beijing, Shanghai, and Tianjing, have introduced routine screening programs for congenital hypothyroidism. Some 15 commerial RIA centers, operating in several provinces and cities, test for thyroid related hormones.

Jixiao Ma of Shanghai's Sixth Peoples Hospital reported on the results of adrenal cortical imaging with ^{131}I -6-cholesterol in 1440 patients studied over the last 18 years. To overcome problems related to excretion of the agent by the liver and subsequent appearance in the gut, which hampers image interpretation, Dr. Ma used an herbaceous leaf, Fan Xie Ye, for bowel preparation, with quite satisfactory results.

Radioimmunoimaging

Chien Chou, MD of PUMC Hospital, The Chinese Academy of Medical Sciences, Beijing presented data on the clinical application of radioimmunoimaging in the detection of tumors. The first clinical report of radioimmunoimaging in China was presented at the Second National Conference on Nuclear Medicine in 1984. Since then many institutions have applied radioimmunoimaging throughout the country. Among the most widely used antibodies are anti-AFP and anti-CEA preparations labeled with ^{131}I . Recently, antibodies against specific cell-associated antigens were raised in mice and studied in clinical trials. Just a few months prior to the conference, the PUMC Hospital utilized a human IgM anti-breast cancer monoclonal antibody. Recently installed advanced SPECT systems made favored imaging possible, however, the unavailability of ^{111}In and ^{123}I has hampered state-of-the-art radioimmunoimaging.

An outstanding paper was presented by Jinglan Deng of Xijing Hospital, The Fourth Military Medical University, Xi'an, on the therapeutic efficacy of an ^{131}I labeled monoclonal anti-

body against gastric carcinoma showing twice the effective inhibition of tumor growth in nude mice compared to normal murine ^{131}I -IgG.

J. Tang of the Cancer Institute, Chinese Academy of Medical Sciences, reported on a clinical study in 27 patients with malignant and benign ovarian tumors using ^{99m}Tc labeled C-50 (anti-CEA). Specificity for malignancy appeared to be excellent.

Infectious Disease

The research group of the University Hospital Nijmegen, The Netherlands, presented results of clinical studies using ^{111}In labeled human nonspecific polyclonal immunoglobulin G to localize foci of infection and inflammation. The performance of this new agent was very good in all categories, including bone and joint infections, joint prosthesis infections and patients with granulocytopenia and fever, in whom scintigraphy with autologous labeled leucocytes is impossible. In a comparative study, ^{111}In -IgG performed significantly better than ^{111}In -leucocytes.

Therapy with Radionuclides

From 1958 to the present approximately 100,000 Chinese patients with hyperthyroidism have been treated with radioactive iodine. Therapeutic applications with newly developed radiopharmaceuticals received ample attention at the conference. Tian-Zhi Tan from the West China University of Medical Sciences, Chengdu, presented a paper on ^{153}Sm labeled EDTMP. The results from 120 patients appeared highly promising.

David Chen, MD of the University of Southern California, Los Angeles, shared his groups experience with ^{89}Sr -Chloride in 29 patients with metastatic bone pain. There was a good response rate with no significant hematologic side effects. In the majority of patients however, pain recurred within 2-3 months after initial response.

Scientific Cooperation

In formal opening remarks at the conference, Xian Tong Lin, MD, the president of the Chinese Society of Nuclear Medicine, stated the goals of the meeting: to promote scientific cooperation and to present advanced nuclear medicine research, but also to foster "understanding and friendship" between scientists from China and the United States. The conference succeeded in these goals. Chinese nuclear medicine has accomplished much, and in many places those accomplishments have been achieved with limited tools.

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