

Structure and Activities of Nuclear Medicine in Kuwait



Abdelhamid H. Elgazzar, MD, FCAP, Azuwuiké Owunwanne, PhD, and
Saud Alenezi, MD, FRCPC

The practice of nuclear medicine in Kuwait began in 1965 as a clinic for treating thyroid diseases. The practice developed gradually and until 1981 when the Faculty of Medicine established the Division of Nuclear Medicine in the Department of Radiology, which later became a separate department responsible for establishing and managing the practice in all hospitals of Kuwait. In 1987, a nuclear medicine residency program was begun and it is administered by Kuwait Institute for Medical Specializations originally as a 4-year but currently as a 5-year program. Currently there are 11 departments in the ministry of health hospitals staffed by 49 qualified attending physicians, mostly the diplomats of the Kuwait Institute for Medical Specializations nuclear medicine residency program, 4 academic physicians, 2 radiopharmacists, 2 physicists, and 130 technologists. These departments are equipped with 33 dual-head gamma cameras, 10 SPET/CT, 5 PET/CT, 2 cyclotrons, 1 breast-specific gamma imaging, 1 positron-emitting mammography, 10 thyroid uptake units, 8 technegas machines, 7 PET infusion systems, and 8 treadmills. Activities of nuclear medicine in Kuwait include education and training, clinical service, and research. Education includes nuclear medicine technology program in the Faculty of Allied Health Sciences, the 5-year residency program, medical school teaching distributed among different modules of the integrated curriculum with 14 didactic lecture, and other teaching sessions in nuclear medicine MSc program, which run concurrently with the first part of the residency program. The team of Nuclear Medicine in Kuwait has been active in research and has published more than 300 paper, 11 review articles, 12 book chapters, and 17 books in addition to 36 grants and 2 patents. A PhD program approved by Kuwait University Council would begin in 2016.
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Historic Background

The practice of nuclear medicine in Kuwait began in 1965 by opening a clinic in Department of Medicine in one of the Ministry of Health hospitals. The clinic treated few cases of thyrotoxicosis and thyroid cancer with ^{131}I radioiodide. In 1968, the first well-designed Department of Nuclear Medicine was established in Kuwait Cancer Control Center (KCCC) of the ministry of health with the installation of the first rectilinear scanner. In 1972, nuclear medicine team from Poland came to Kuwait including a consultant nuclear medicine physician, radiopharmacist, and technologists; and they carried the diagnostic static scans. An image of ^{99}Tc -sulfur colloid of the

liver produced in 1974 using the rectilinear scan is shown in Figure 1.

In 1978, two gamma cameras and an uptake probe were installed. One full-time nuclear medicine physician was permanently appointed to run the practice. $^{99}\text{Mo}/^{99\text{m}}\text{Tc}$ generator from Amercham Company, London, UK, was delivered on weekly basis. Other radiopharmaceuticals used at that time were ^{67}Ga -citrate, ^{201}Tl thallium chloride, ^{131}I iodide, ^{32}P -orthophosphospahte, ^{131}I -Rose Bengal, and ^{133}Xe xenon gas. A Nuclear Medicine Thyroid Clinic was established in KCCC to perform radioiodide thyroid uptake and thyroid scanning in addition to the treatment and follow-up of the thyrotoxic patients from all areas of Kuwait. The management of thyroid cancer patients using radioiodine therapy was performed by the Head and Neck Cancer Unit in the Department of Radiotherapy in KCCC.

In 1981, the Faculty of Medicine, Kuwait University recruited Professor Hussien Abdel-Dayem from the United States to be the Head, Division of Nuclear Medicine,

Department of Nuclear Medicine, Faculty of Medicine, Kuwait University, Safat, Kuwait.

Address reprint requests to Abdelhamid Elgazzar, MD, FCAP, Department of Nuclear Medicine, Faculty of Medicine, Kuwait University, PO Box 24923, Safat, Kuwait 13110. E-mail: Aelgazzar49@hotmail.com

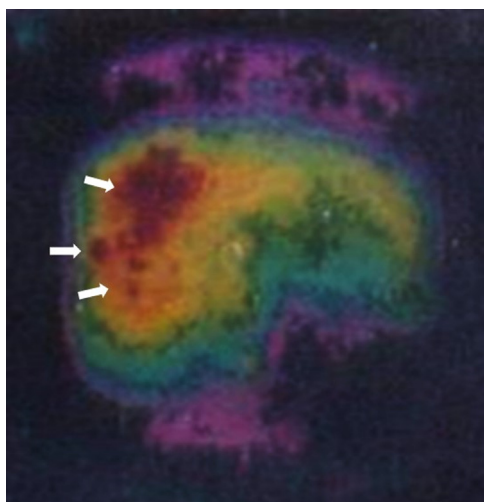


Figure 1 Rectilinear scan of the liver in 1974 showing multiple metastases (arrows).

Department of Radiology. In 1982, a radiochemist and a nuclear medicine physicist joined the division. In 1984, the Faculty of Medicine approved the establishment of a separate Department of Nuclear Medicine in the faculty. The department recruited two more clinical nuclear medicine faculty staff, a radiopharmacist, and another physicist. The academic Department of Nuclear Medicine was responsible for developing and running the nuclear medicine service in the Ministry of Health hospitals in the entire country. The Departments of Nuclear Medicine at Mubarak Al-Kabeer Hospital, Amiri Hospital, Military Hospital, Organ Transplant Center, and Chest Diseases Hospital were then established between 1984 and 1987. The unit at Chest Diseases Hospital was established through a grant from Kuwait University.

The Department of Nuclear Medicine at Mubarak Al-Kabeer (used as the main teaching hospital), had three gamma cameras, a radiopharmacy laboratory, and an in vitro nuclear medicine laboratory that included nuclear hematology laboratory and radioimmunoassay. The nuclear hematology services provided Schilling test, red cell mass, red cell survival, red cell sequestration test, RBCs labeling by Tc-99m or Cr-51, and WBCs labeling by In-111 oxine or Tc-99m HMPAO. The radioimmunoassay provided infertility studies and many hormonal radioassays. As early as 1982, Central Radiopharmaceutical Laboratory was established at KCCC to buy and distribute radiotracers and generators to all departments in the country. Two Kuwaiti physicians were sent to United Kingdom for postgraduate training in Nuclear Medicine.

In 1985, Nuclear Medicine Technology Training Program was established in the Department of Radiologic Sciences, Faculty of Allied Health Sciences and Nursing headed by Dr Azuwuiké Owunwanne. This extensive technology program provided two academic years of the university general requirements and basic sciences (Mathematics, Physics, Chemistry, Pathology, Anatomy, Physiology, etc.) and another two academic years dedicated to clinical nuclear medicine including procedures, radiopharmacy, nuclear medicine physics that included instrumentation, computer applications, and

research in nuclear medicine. The Department of Nuclear Medicine at the Faculty of Medicine continued to be in charge of the administration and management of the technology training program till 1997. All of the current Chief Nuclear Medicine Technologists in the various hospitals are graduates of the program. Some of the graduates proceeded to do graduate studies and obtained PhD degrees and are among the faculty staff of Nuclear Medicine Section of the Department of Radiologic Sciences, Faculty of Allied Health Sciences.

In 1987, a nuclear medicine residency program administered by Kuwait Institute for Medical Specializations (KIMS) was begun under the leadership of Professor Hussien Abdel-Dayem. It was a 4-year program. Unfortunately, in the summer of 1990, Iraq invaded Kuwait and consequently briefly interrupted the nuclear medicine programs and development. However, in June 1991, Professor Azuwuiké Owunwanne returned to Kuwait and began rebuilding Kuwait Nuclear Medicine that included the Nuclear Medicine Specialty Training and the Nuclear Medicine Technology Program. Two Kuwait Board of Nuclear Medicine (KBNM) examinations were successfully conducted in 1992 and 1993. The first was on October 17-22, 1992; all the three candidates successfully passed both the written and oral examinations and thus became the first diplomates of KBNM. The second was on October 18 and 19, 1993. Of the five candidates, four successfully passed both the written and oral examinations. Of the seven successful candidates four were Kuwaitis, one each an Egyptian, Palestinian, and Jordanian.

Starting in the mid-1990s, several gamma cameras as well as other facilities were added. Currently Kuwait has a total of 33 gamma cameras and 5 PET/CT in 11 departments. The Council of Nuclear Medicine became independent from Radiology in 2009 as it was under the council of radiology after liberation in 1991. The Kuwaiti Society of Nuclear Medicine and Molecular Imaging was consequently established as an independent one in 2010 and it became a member of the World Federation of Nuclear Medicine.

Presentations were routinely made to referring clinical physicians of different clinical specialties, and along with this, integrating nuclear medicine in the curriculum of the medical school succeeded to increase awareness of the practicing physicians of the nuclear medicine procedures and their effect on patient management. A booklet written by Dr Gaber Ziada and Professor Abdelhamid Elgazzar containing simple information regarding nuclear medicine procedures for referring physicians was published by Kuwait University press.¹

Current Structure of Nuclear Medicine in Kuwait

The current structure of nuclear medicine in Kuwait can be summarized as comprising of an academic department in the university and a Council of Nuclear Medicine in the Ministry of Health that consists of the heads of the departments in the ministry hospitals. Additionally, there is a Faculty of Nuclear Medicine at KIMS responsible for the postgraduate training of physicians in the specialty. The Chairman of the Department of

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