International Atomic Energy Agency Scientific Forum

A Decade of Action on **Cancer Control** and the Way Forward

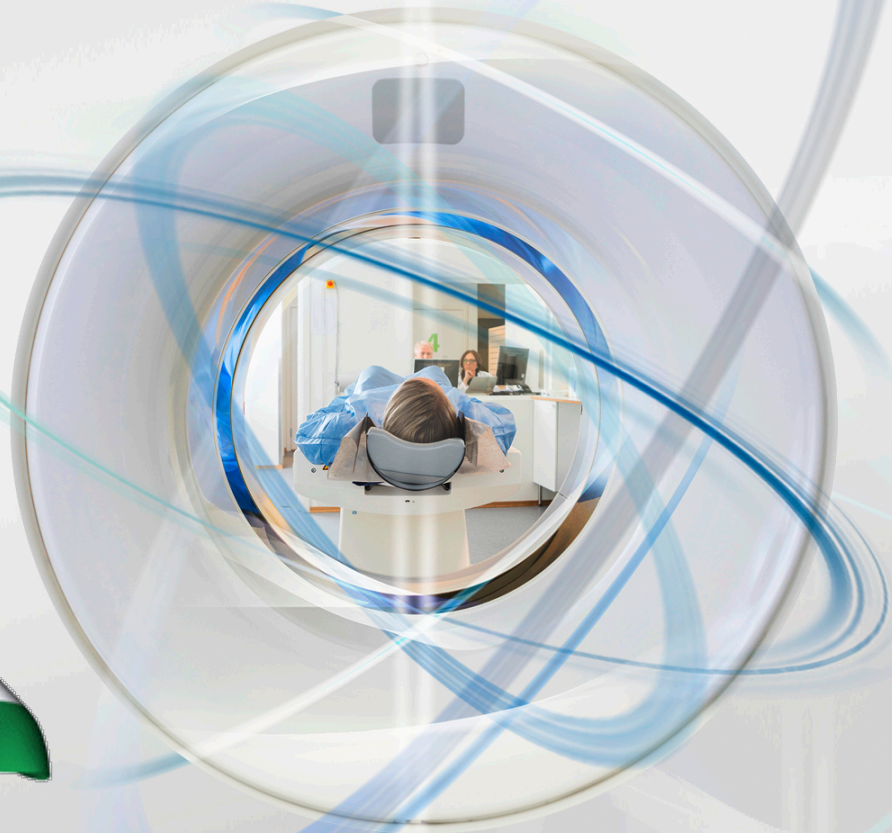
IAEA
International Atomic Energy Agency
Atoms for Peace and Development

17—18 September 2019
Vienna International Centre
Board Room D, C Building, 4th Floor

Using the full range of IAEA services to improve cancer control in Jordan

Akram Al-Ibraheem MD, FEBNM, FANMBN

KING HUSSEIN CANCER FOUNDATION
KING HUSSEIN CANCER CENTER



In memory of a brave & devoted leader; Mr. Yukiya Amano's visit to King Hussein Cancer Center , Jordan in 2017

"Transferring peaceful nuclear technology to developing countries has been a priority for the Agency since the start. Improving cancer control in developing countries is an especially important part of our work" ***Mr. Y. Amano***

HRH Princess Ghida Talal presenting KHCCs' Trophy to Mr. Amano

Jordan

Population

Population: 9,531,712

Geography

Distances: 570 km north to south

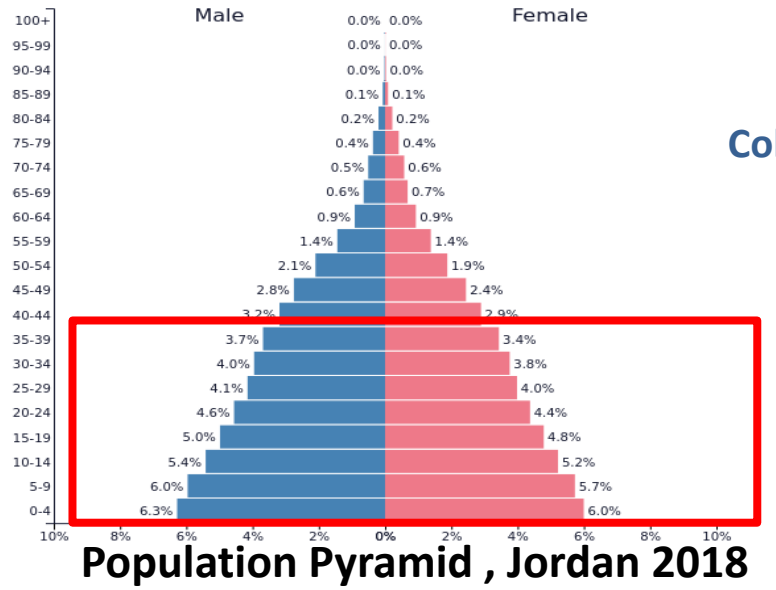
Health Indicators

Life expectancy @ birth =74.3 Years (Male 72.7, Female 76.0)

Socioeconomic Indicators

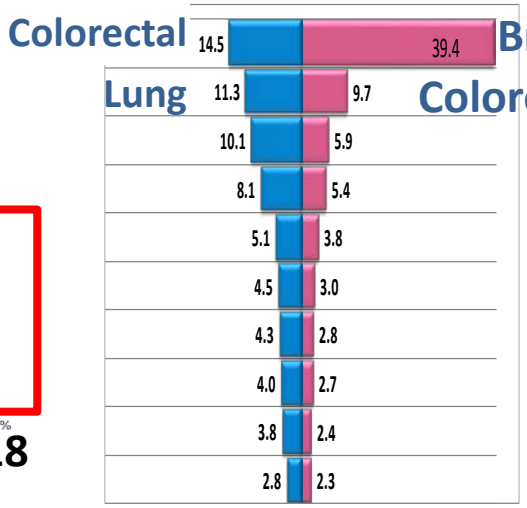
Unemployment rate: 18.7%

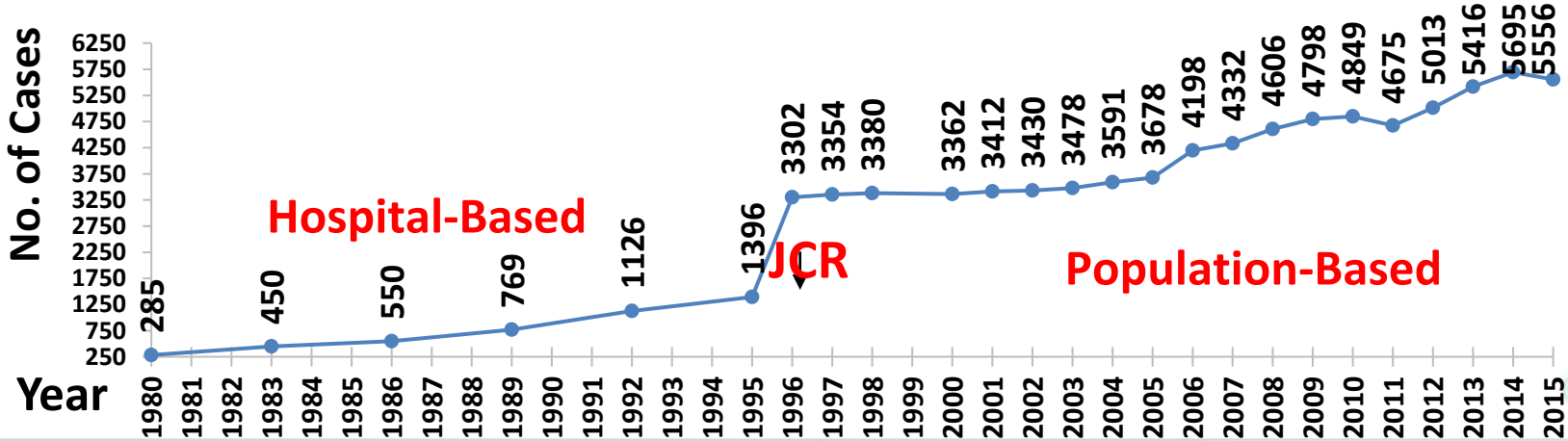
GDP: 3258.50 USD per capita



Population Pyramid , Jordan 2018

Common Cancers Among Jordanians





IAEA Efforts to Combat Cancer in Jordan

The IAEA has assisted Jordan in the development and applications of nuclear science and technology for its **socio-economic development** in several areas:

- ☑ Human Health;
- ☑ Food and Agriculture;
- ☑ Water Resources Management; and
- ☑ the Development of a Robust Infrastructure for Nuclear Energy

Utilizing Nuclear Technology in Control of Cancer:

Diagnosis & **Treatment**

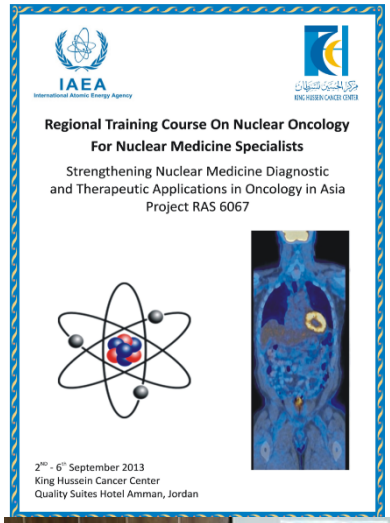
This is achieved through

- ❑ Capacity Building
- ❑ Equipment
- ❑ Research
- ❑ Technical Advise &Quality Assurance & dosimetry

Close collaboration, closer care: IAEA and KHCC in Jordan signing Practical Arrangement ICNMP

Capacity Building; Professionals in Radiation Medicine, Nuclear Medicine & Radiation Oncology & Radiology

- Regional Training courses (RTC)
- Scientific Visits & CME
  - ➢ Technologist
  - ➢ Physicists
  - ➢ Physicians
- Workshops
- Conference
- ARSNM



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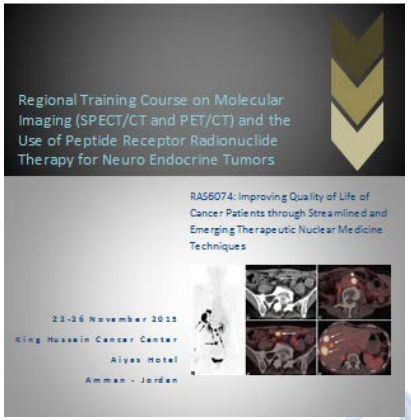


Cost-sharing IAEA-KHCC Project
First SPECT/CT in Jordan

- SPECT/CT machine has been installed at KHCC and started in June 2019
- About 5000 diagnostic nuclear studies will be performed on this machine annually

- Added value:

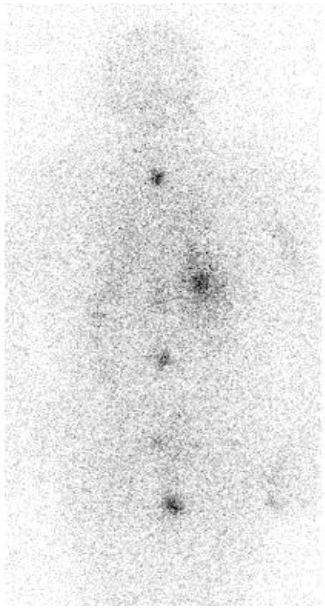
➢ Improvement in the accuracy of staging of different cancers

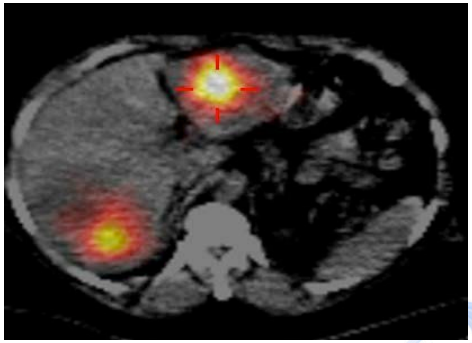
➢ Treatment planning

➢ Accurate treatment evaluation and proper follow up

➢ Advanced training for NM professionals to meet the goals of the ICNMP

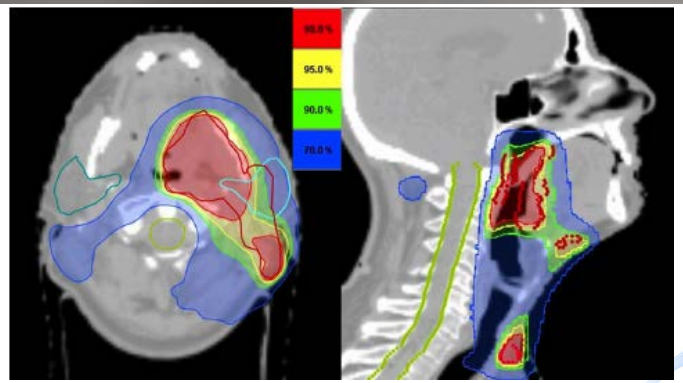
Medical imaging is one of the specialties with the highest innovation rate





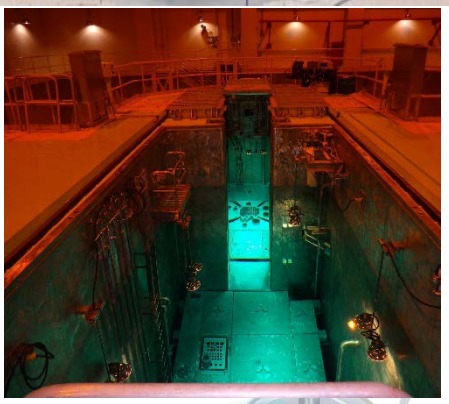
IAEA Secured the Donation of State-of-the-art LINAC to MoH

- By Elekta, an international oncology equipment manufacturer
- Al-Bashir hospital is the only public hospital in Amman which provides cancer treatment
- The radiotherapy unit at the hospital lacks the human and infrastructural capacity to meet the increased demand
- Once the new equipment is delivered, the radiotherapy facility will improve cancer treatment services (IMRT), with the aim of treating at least 6000 patients a year
- Delivery later this year, will provide life-saving cancer treatment to low-income Jordanians and refugees



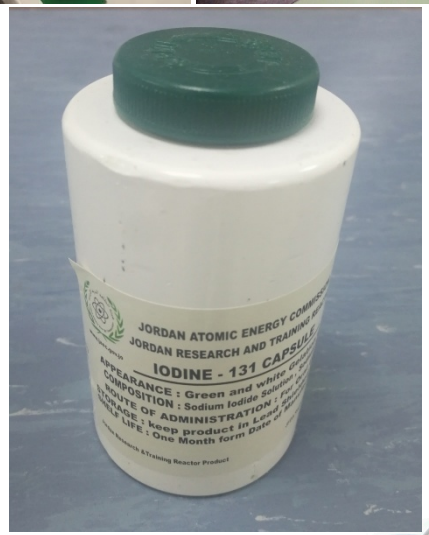
IAEA's Support for the Jordan Research & Research Reactor JRTR

- Close cooperation from *early* phase of the JRTR project, with all concerned national authorities:
  - ☑ **The Operator**: Jordan Atomic Energy Commission – **JAEC**
  - ☑ **The Regulator**: The Energy & Minerals Regulatory Commission - **EMRC**
- Several technical meetings, expert and peer-review missions, based on **IAEA Safety & Security** standards since 2009 and continuing through today
- Support to the **Regulator/EMRC**:
  - ☑ Development of national regulations, and establishment of a licensing process for research reactors;
  - ☑ Support regulatory review of the JRTR safety analysis report;
  - ☑ Support of Security Requirements; and
  - ☑ Development of regulatory inspection program for research reactors



IAEA's Support for the JRTR

- Support to the **Operator/JAEC**:
  - ☑ Review of safety features of the bidding specifications;
  - ☑ Evaluation of the reactor design safety & security provisions;
  - ☑ Management system for construction and commissioning;
  - ☑ Training program for operating personnel;
  - ☑ QA and Safety in construction;
  - ☑ Review of commissioning program;
  - ☑ INSARR mission: Focusing on commissioning results and preparation for routine operation



Enabling Jordan to Domestically Produce a Wide-Range of Radiopharmaceuticals, that were not Previously Possible in Jordan

IAEA Support to Strategic research & Quality Assurance in Jordan

- ✓ CRPs are instrumental to build capacity in research in IAEA MS
- ✓ Providing opportunities for scientists and institutions at KHCC to conduct more strategic research
- ✓ The IAEA contributes to quality assurance and patient safety in NM & radiotherapy

RESEARCH 4 LIFE®
an EANM initiative

EARL FDG PET/CT accreditation 2015

This is to certify that the

King Hussein Cancer Centre, Amman al Jubeiha
Scanner: Siemens Biograph mCT flow

is granted accreditation according to the requirements and specifications indicated in the EANM guidelines (FDG PET and PET/CT: EANM procedure guidelines for tumour PET imaging: updated version). FDG PET/CT accreditation ensures similar performance of PET/CT systems within a multicentre setting by harmonising acquisition and interpretation of PET/CT scans. Accredited PET/CT centres of excellence can compare, exchange and combine FDG PET/CT findings, including SUVs, since data are collected and processed in a standardised manner. The regular submission and approval of QC data, as required by EARL, is a condition for the maintenance of the accreditation.

Vienna, June 17, 2015

Prof. Dr. Klaus Tatsch, MD
CEO of EARL

Andrea Bauer, M.A.
CEO of EARL

European Journal of Nuclear Medicine and Molecular Imaging
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ORIGINAL ARTICLE

Check for updates

Introducing FDG PET/CT-guided chemoradiotherapy for stage III NSCLC in low- and middle-income countries: preliminary results from the IAEA PERTAIN trial

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Abstract

Purpose Patients with stage III non-small-cell lung cancer (NSCLC) treated with chemoradiotherapy (CRT) in low- and middle-income countries (LMIC) continue to have a poor prognosis. It is known that FDG PET/CT improves staging, treatment selection and target volume delineation (TVD), and although its use has grown rapidly, it is still not widely available in LMIC. CRT is often used as sequential treatment, but is known to be more effective when given concurrently. The aim of the PERTAIN study was to assess the impact of introducing FDG PET/CT-guided concurrent CRT, supported by training and quality control (QC), on the overall survival (OS) and progression-free survival (PFS) of patients with stage III NSCLC.

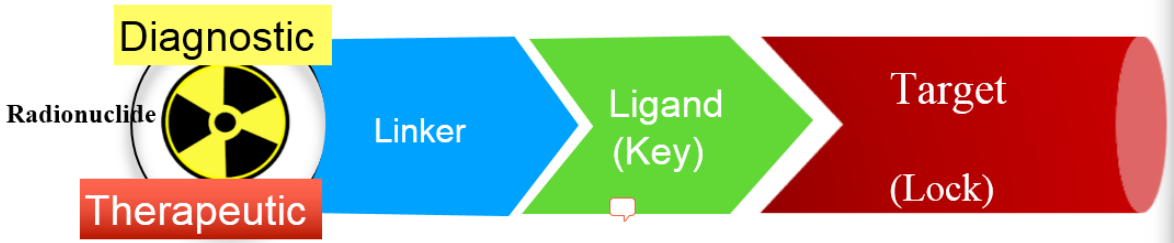
Methods The study included patients with stage III NSCLC from nine medical centres in seven countries. A retrospective cohort was managed according to local practices between January 2010 and July 2014, which involved only optional diagnostic FDG PET/CT for staging (not for TVD), followed by sequential or concurrent CRT. A prospective cohort between August 2015 and October 2018 was treated according to the study protocol including FDG PET/CT in treatment position for staging and multimodal TVD followed by concurrent CRT by specialists trained in protocol-specific TVD and with TVD QC. Kaplan–Meier analysis was used to assess OS and PFS in the retrospective and prospective cohorts.

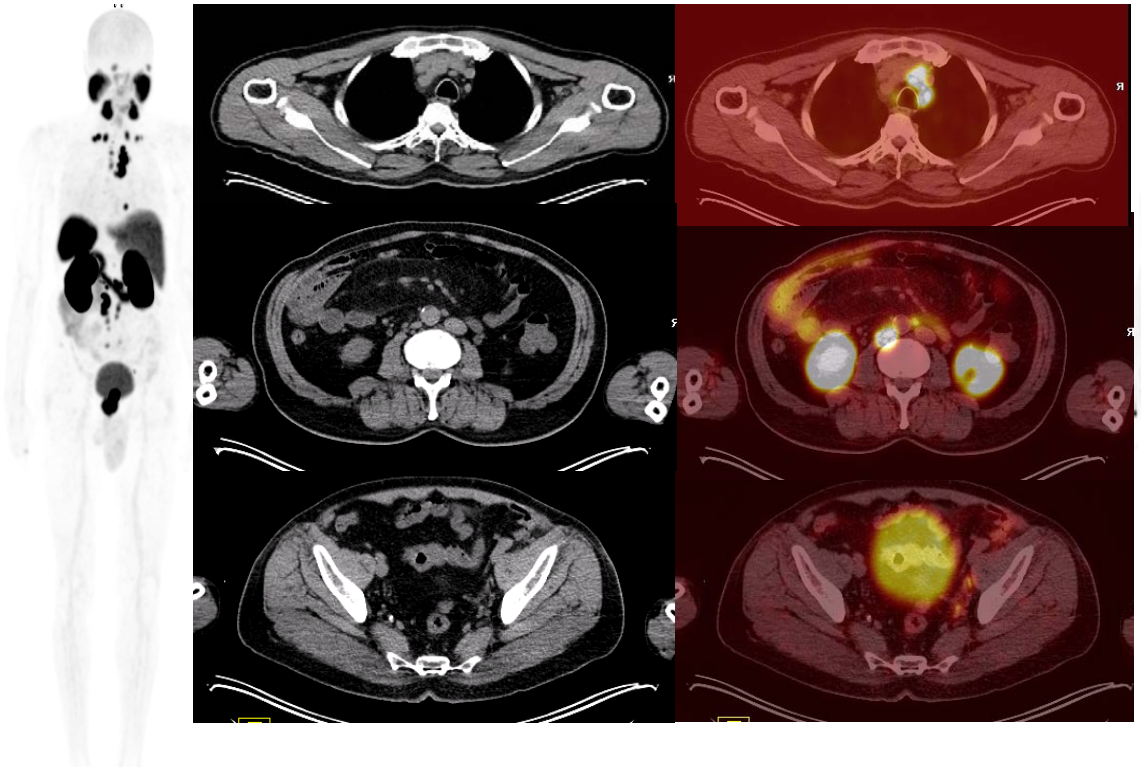
Results Guidelines for FDG PET/CT image acquisition and TVD were developed and published. All specialists involved in the PERTAIN study received training between June 2014 and May 2016. The PET/CT scanners used received EARL accreditation. In November 2018 a planned interim analysis was performed including 230 patients in the retrospective cohort with a median follow-up of 14 months and 128 patients in the prospective cohort, of whom 69 had a follow-up of at least 1 year. Using the Kaplan–Meier method, OS was significantly longer in the prospective cohort than in the retrospective cohort (23 vs. 14 months, $p = 0.012$). In addition, median PFS was significantly longer in the prospective cohort than in the retrospective cohort (17 vs. 11 months, $p = 0.012$).

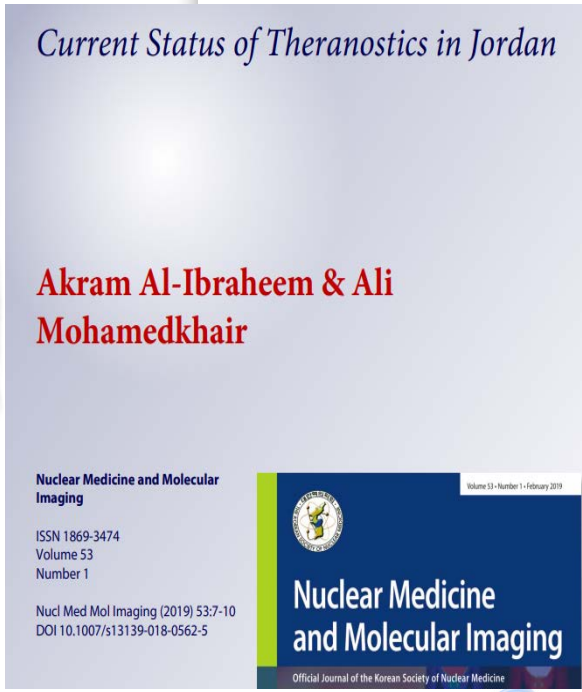
Conclusion

In the PERTAIN study, the preliminary results indicate that introducing FDG PET/CT-guided concurrent CRT for patients with stage III NSCLC in LMIC resulted in a significant improvement in OS and PFS. The final study results based on complete data are expected in 2020.

Theranostics in Jordan





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