IAEA Technical Cooperation Programme

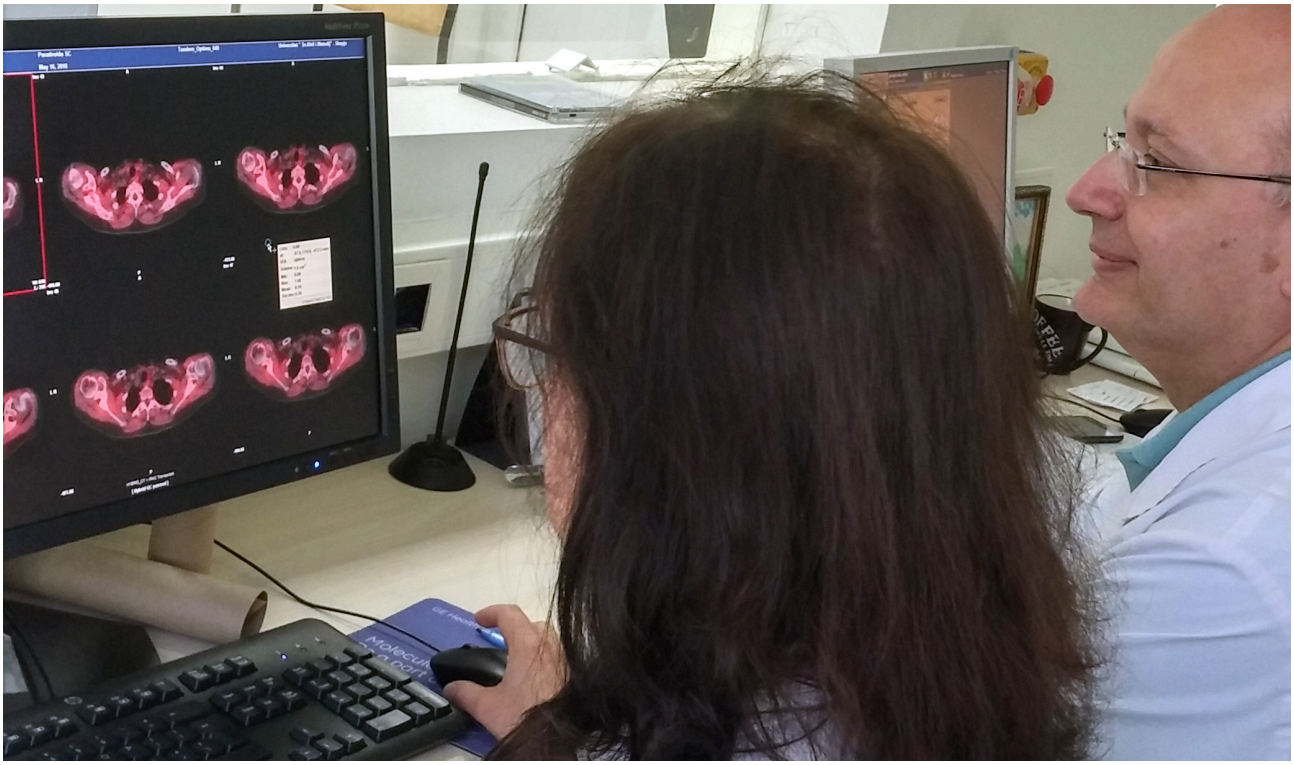
Advancing diagnostics for cardiovascular disease and cancer in the former Yugoslav Republic of Macedonia

The challenge

For the last 20 years, circulatory system and neoplastic diseases have been the two major causes of mortality in the former Yugoslav Republic of Macedonia. The continuing rise in the number of individuals affected by circulatory diseases is a serious socioeconomic and healthcare problem. In 2013, the Government of the former Yugoslav Republic of Macedonia launched a 'Programme for Prevention of Cardiovascular Diseases (CVDs)', with the primary goals being to achieve timely identification of CVDs, reduce mortality and invalidity, improve secondary and tertiary levels of care and strengthen the healthcare system. The Government subsequently implemented a 'National Strategy for Prevention, Treatment and Control of CVD, 2014-2020', and the Ministry of Health identified the modernization and upgrading of the healthcare sector and the establishment of a sustainable, integrated and efficient health information system as key steps in achieving its strategic priorities. The Ministry also aims to achieving better health status, better quality of healthcare and health services, and increased accessibility for the population.

The project

In support of the Government's efforts, an IAEA technical cooperation project has supported the introduction of single photon emission computed tomography–computed tomography (SPECT-CT) hybrid imaging at the Institute of Pathophysiology and Nuclear Medicine, Medical Faculty Skopje, which is a part of the University Clinical Centre 'Mother Theresa'. This is the largest and the sole tertiary healthcare centre in the country. IAEA support aimed to establish modern nuclear diagnostic capabilities at the national level in the



Doctors at the Institute of Pathophysiology and Nuclear Medicine, the University Clinical Centre 'Mother Theresa' analyse SPCET-CT images. (Photo: Venjamin Majstorov/ Ss.Cyril and Methodius University Skopje)

18-04700

fight against CVDs and cancer. The skills and knowledge of staff were expanded through various trainings supported by the project, and fellowships for three physicians, two physicists and two technicians were successfully organized in three different nuclear medicine centres in Italy, Croatia and Israel. Expertise was also made available in the form of clinical lectures and lectures in medical physics, and assistance was provided for the finalization of the SPECT/CT protocols, which were adopted at the Institute of Pathophysiology and Nuclear Medicine immediately.

The project also provided the Institute with a shielded laminar flow hood with an additional dose calibrator for the hot lab, as well as the SPECT-CT system.

The Government and Ministry of Health supported the installation of infrastructure and provided a new room for the gamma camera in the Institute building, taking all the necessary precautions for radioactive safety. Shielding calculation, security and monitoring, and entrance control were all adapted for the new technology system. This ensured optimal installation performance, and fulfilled all the applicable national regulatory requirements prior to issuance of a license by the regulatory authority.

The impact

Upon their return to Skopje, staff who had benefitted from fellowships shared their new knowledge and experience with their colleagues. This helped to improve imaging protocols and the processing of SPECT/CT hybrid imaging at the Institute.

A scientific visit to Austria for the project counterpart led to the successful introduction of CT-based improvement of the myocardial perfusion imaging in the Institute. A further scientific visit to Mexico provided a radiopharmacist with new knowledge on labelling new tracers with technetium, and this process has been implemented as a daily routine in the Institute.

The provision of equipment for the hot lab, together with the SPECT-CT system, have enhanced diagnostic nuclear capability for the early detection of CVD at the Institute and in the country.

PROJECT INFORMATION

Project No: MAK6015

Project title: Improving the Practice of Nuclear Medicine by the Introduction of SPECT/CT Hybrid Imaging at the University Clinical Centre “Mother Theresa”

Duration: 2016-2017 (2 years)

Budget: €604 000

Contributing to:

Partnerships and counterparts

The counterpart of the project was the Institute of Pathophysiology and Nuclear Medicine, Medical Faculty Skopje, University Clinical Centre “Mother Theresa”.

Facts and figures

SPECT/CT can provide additional information on image interpretation in around 20-50% of cases, depending on the underlying pathology. In most cases hybrid imaging improves anatomical localization of abnormal and physiological uptake leading to improved diagnostic certainty and image interpretation in patients with CVD and malignant diseases. The introduction of a new generation of collimators (part of a gamma camera which filters for radiation) dedicated for cardiac imaging will enable 50% dose reduction in patients referred for myocardial perfusion imaging without affecting the quality of the studies.

The science

SPECT-CT hybrid imaging has many advantages over SPECT alone in chronic diseases, such as CVD and cancer, that are primary areas of interest for this project.

Nuclear medicine, by using radiotracers, provides unique information about the function and metabolism of the organs, but anatomical localization is insufficient. To overcome this limitation, anatomical imaging with CT was added and dual-modality SPECT-CT systems have been gradually introduced. These are now becoming standard in routine clinical practice. The main benefit of SPECT-CT is increased sensitivity and specificity compared with single modalities, since the number of unclear findings can be significantly reduced.

www.iaea.org/technicalcooperation