

**International Day of Radiology 2015
Interview on paediatric imaging
Kazakhstan / Prof. Tairkhan Dautov**



**INTERNATIONAL
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Paediatric imaging in Kazakhstan

An interview with Tairkhan Dautov, chief of the department of radiology at the National Scientific Centre for Cardiac Surgery in Astana.

European Society of Radiology: What is paediatric imaging? What age can the patients be, and how is it different from regular imaging?

Tairkhan Dautov: Paediatric imaging is a special branch of radiology for patients under 14. It brings together committed radiologists and radiographers, who follow additional safety rules and appropriate training to perform these examinations.

Imaging in children should be specifically tailored so that the required information is obtained with the smallest number of images and the least radiation possible, with the aim of performing the most appropriate test first.

It is strongly recommended that the technical staff liaise with radiologists prior to taking plain x-rays if these are performed infrequently in practice or if there are any concerns regarding a particular request. It is also recommended that the technical staff liaise with radiologists prior to performing computed tomography (CT) examinations.

ESR: Since when has paediatric imaging been a specialty in its own right?

TD: The training of paediatric specialists in Kazakhstan was initiated by three Romanian paediatric radiologists: Dr. Mariana Radulescu of Maria Skłodowska Curie Paediatric Hospital in Bucharest; Dr. Goldis Gheorghe of Fundei Hospital in Bucharest; and Dr. Vlad of the Paediatric Hospital in Iasi.

In Kazakhstan, the Scientific Research Institute of Paediatrics and Paediatric Surgery, one of the oldest hospitals, was opened in 1932. Since the 1970s, a special paediatric section has been in place in the radiology unit of this hospital. After the creation of this institute, every hospital in Kazakhstan was reorganised and paediatric departments and maternity hospitals were created. Paediatric radiology has been accepted as a specialty in its own right ever since.

ESR: Which imaging modalities are usually used to examine paediatric patients? Does this change depending on the age of a patient?

TD: Ultrasound (US) and magnetic resonance imaging (MRI) are preferable as general imaging modalities in paediatric radiology. Contrast CT can be used on a child who is less than six years old, without anaesthesia, depending on availability and urgency. If a child is less than three months old, a special beanbag can be used to hold the patient in position for an approximately 30 minute-long scan. Children aged between four and ten can usually undergo an MRI examination with appropriate patient preparation, for instance, when one of their parents stays near them or when music is being played. For an older child, the MRI examination can usually be performed as for an adult.

ESR: Some imaging techniques, like x-ray and CT, use ionising radiation. What risk does this radiation impose on paediatric patients? What kind of safety measures are in place to protect children?

TD: All radiation-based procedures are regulated by safety culture in radiology and are based on the rules and acts of the Health Ministry and *EuroSafe Imaging* guidelines. The repeated use of CT imaging increases a child's exposure to radiation, overall radiation accumulation and cancer risks. Physicians and radiologists can considerably reduce these risks with proper justification, optimisation and dose limitation. For instance, for CT, it is recommended that radiologists consider US or MRI as

an alternative. For plain x-rays and CT, the overall imaging coverage should be limited to the area of interest and special shields must be in place to protect other body parts.

ESR: Do general radiologists always use lower radiation doses when imaging children; are there any guidelines to follow?

TD: A general radiologist follows a safety checklist. These guidelines on radiation safety result from a consultation with the radiation safety officer.

ESR: To what extent are parents and relatives aware about the risks of radiation exposure? How do you address the issue with them?

TD: All parents and relatives should be informed about the risks of radiation exposure, and alternative ways should be suggested. If an alternative modality cannot be applied, the appropriate paediatric x-ray examination should be performed.

ESR: Undergoing an imaging examination, especially a long procedure like MRI, can be an uncomfortable and sometimes frightening experience for some children. How can it be made more bearable?

TD: Unfortunately, an MRI procedure lasts for several minutes and the noise can make the experience uncomfortable and sometimes frightening for some children. To avoid such situations, we sometimes allow parents to stay near the child throughout the test.

ESR: How many imaging exams are performed on paediatric patients in Kazakhstan each year?

TD: More than 660,000 plain x-ray, 700,000 ultrasound, 44,000 CT and 30,000 MRI examinations were performed in paediatric imaging in Kazakhstan in 2014. The population of Kazakhstan is about 16 million people.

ESR: Access to modern imaging equipment is important for paediatric imaging. Are hospitals in Kazakhstan fully equipped to provide the necessary exams?

TD: Every hospital in big cities in Kazakhstan and most regional central hospitals perform CT examinations. The big hospitals and central hospitals have MRI machines. There are CT, MRI and x-ray suites in the National Centre of Maternity and Childhood in Astana, and in the Scientific Research Institute of Paediatrics and Paediatric Surgery in Almaty. Regional central hospitals are equipped with special paediatric immobilisers.

ESR: What has changed in paediatric radiology during your lifetime?

TD: Since I started my career, innovative methods and tools in radiology have been created and are being used intensively. The revolution in the creation of machines for radiology, such as US, MRI, digital x-ray and CT, has allowed radiologists to perform safe, comfortable and patient-oriented examinations. In paediatric radiology, the fast techniques of MRI and high-quality ultrasound have greatly reduced the need for radiation exposure.

ESR: Where do you see the next developments in your field?

TD: I foresee new developments such as multislice CT technologies, which are very fast and safe. The most important thing is not only the quality of visualisation but also preventive prognosis. In the near future, precise CT perfusion techniques will help radiologists to perform early and quantitative diagnosis of disorders.

Tairkhan Dautov is chief of the radiology department at the National Scientific Centre for Cardiac Surgery in Astana. He previously worked as head radiologist in the healthcare department of Astana City and chief of the radiology department at the Presidential Hospital. He has a major interest in cardiac CT, MRI of congenital heart diseases and MRI perfusion of the heart. His research has resulted in 140 publications. Dr. Dautov is very keen on advancing training of radiologists in his country. He has been the local organiser of the European School of Radiology Astana Tutorial since 2014, and serves as scientific supervisor for 15 residents. He is currently Vice-President of the Radiological Society of Kazakhstan.

