International Day of Radiology 2015
Interview on paediatric imaging
Lithuania / Prof. Eglė Stašienė

INTERNATIONAL DAY OF RADIOLOGY
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Paediatric imaging in Lithuania

An interview with Eglė Stašienė, chief of the Radiology Department at the Children's Hospital Affiliated to Vilnius University Hospital Santariskiu Clinic.

European Society of Radiology: What is paediatric imaging? What age are the patients, and how is it different from regular imaging?
Eglė Stašienė: Paediatric radiology is a field of radiology for children from birth up to 18 years old. The main difference between general radiology and paediatric radiology is that in the latter there is a tighter connection with the patient and their carers. Working with children takes more time, patience, attention, experience and accuracy. Quality and safety are hallmarks of paediatric radiology with regard to the medical use of ionising radiation, thus all paediatric patients are exposed to radiation only after justification of practice and optimisation of protection, which are two basic principles of radiation protection. There are special protocols and algorithms used when examining children, especially when they are exposed to radiation.

ESR: Since when has paediatric imaging been a specialty in its own right?
ES: In Lithuania, paediatric radiology is not separated from general radiology as a subspecialty. During the radiology residency, resident doctors can work together with radiologists who work with paediatric patients for a couple of months. Children can represent 90% of a radiologist's patients if he or she chooses to work in a children's hospital.

ESR: Which imaging modalities are usually used to examine paediatric patients? Does this change depending on the age of the patient?
ES: The most frequent and general routine imaging examination is plain chest x-ray. There is no big difference in performing this examination on adults or paediatric patients; however, depending on the age of the patient and ability to follow instructions, different positioning or fixation methods might be used, and the examination might be performed in inspiration or expiration mode.
In our hospital we perform several imaging examinations that are mostly used only for paediatric patients, such as leg length x-ray, mechanical axis, spine x-ray in standing position for scoliosis and many more. According to the disease and indications, first choice examinations are ultrasound and magnetic resonance imaging (MRI), which do not use ionising radiation.

ESR: Some imaging techniques, like x-ray and computed tomography (CT), use ionising radiation. What risk does this radiation pose to paediatric patients? What kind of safety measures are in place to protect children?
ES: Children are more radiosensitive to the induction of some important malignancies than adults. The younger children are, the more radiosensitive they are; therefore our hospital adheres to the ALARA (As Low As Reasonably Achievable) principle. No examination is performed without the indications being explained by physicians. Radiologists and technicians are obliged to perform the examination using particular parameters that reduce ionising radiation dose as low as possible while maintaining satisfactory imaging quality. Collimation, optimal scan parameters (kV, mA, filters, timing etc.), individual

safety tools (shielding) and fixation for each individual patient are very important in conventional radiology.
We use automatic tube modulation for computed tomography; the CARE dose programme automatically selects appropriate parameters for individual patients and optimises the radiation dose.

ESR: Do general radiologists always use lower radiation doses when imaging children; are there any guidelines to follow?
ES: Radiologists always use low dose parameters when examining children. Our x-ray equipment is digital, thus it automatically selects the parameters according to the age and weight of a patient. We also use paediatric protocols for scanning. To keep the quality of the images high we have the IRIS (iterative reconstruction image space) software. The Specialists of Radiation Protection Centre regularly checks the parameters that are used in our x-ray equipment.

ESR: How aware are parents and relatives about the risks of radiation exposure? How do you address the issue with them?
ES: Patients and their parents are first informed by their physicians about x-ray examinations and have to sign an agreement. The clinician also explains the risk of performing or not performing the exam. Later on, the radiologist informs the patient or their carer about the risk of radiation exposure of a particular exam and how often it can be performed, and answers all the questions parents and patients might have. Information posters next to every examination room give additional information about the risk of radiation, possible safety tools, and radiation doses.

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?
ES: The age of a child is key when performing MRI. Children up to five are sedated during the examination. For older children, we have specific tactics such as:

- They are allowed to observe an examination
- We explain to them what they can expect during the examination and how it feels
- Parents are allowed to be present during the examination
- Children are allowed to take their favourite toys to the examination room (if it does not affect the quality of the exam)
- The optimal protocol is chosen in order to shorten the time of the procedure

It is also very important to create a child-friendly environment, for instance having specific installations, painted walls, colourful lighting and cheerful furniture; however it takes a big part of a budget and we try to prioritise obtaining better equipment first.

ESR: How many imaging exams are performed on paediatric patients in Lithuania each year?
ES: There are two specialised paediatric radiology departments in Lithuania at the moment: the Children's Hospital in Klaipeda and the Children's Hospital Affiliated to Vilnius University Hospital Santariskiu Clinic. In 2014, 59,984 radiographic films, 1,568 CT scans, 2,605 MRI scans, and 34,189 US examinations were performed at our hospital.

ESR: Access to modern imaging equipment is important for paediatric imaging. Are hospitals in Lithuania equipped to provide the necessary exams?
ES: In Lithuania, a working group is currently trying to create a radiological help optimisation programme by 2020. This programme pays special attention to equipment budget in hospitals that provide inpatient services for children.

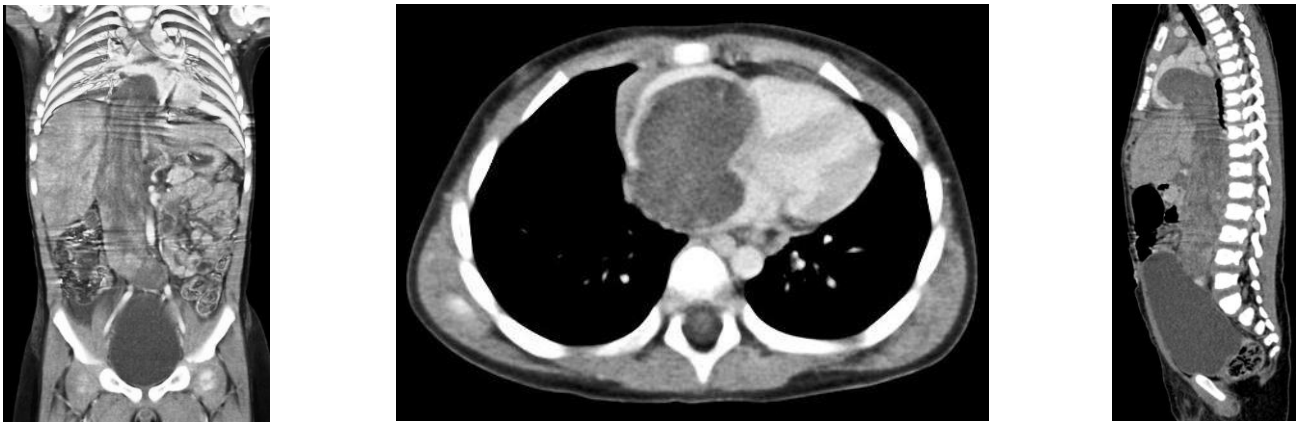
Every child has a right to the newest and best available examination equipment, thus this year our hospital is buying a 1.5 Tesla MRI scanner which offers the possibility to perform examinations under general anaesthesia. We currently have a 0.35 Tesla MRI scanner, which is not satisfactory.
Since 2010, the US diagnostics department has been included in paediatric radiology departments in order to optimise radiology services; US diagnostics used to be autonomous departments. Our future goal is to acquire the newest US equipment to be able to perform contrast-enhanced ultrasound in difficult and complicated cases.

ESR: What has changed in paediatric radiology during your lifetime?
ES: I have been working in the paediatric radiology department of the Children's Hospital since 1997, the year I completed my radiology residency. Since then, our hospital has had a CT scanner, which was renovated several times (at the moment we have a CT scanner with 64 slices). All x-ray machines are digital. Since 2009, we also have an MRI scanner. A picture archiving and communications system (PACS) has been installed to archive all our images. There are also plans to install patient digital records. The newest technologies lead to close cooperation with IT specialists, and increase radiologists' dependence on computers and networks.

ESR: Where do you see the next developments in your field?
ES: The biggest aim of paediatric radiologists is to image gently and use the lowest possible radiation methods and tools. For this reason, it is important to enable better access to MRI and US examinations. It is of key importance to have qualified personnel and radiology technicians. Improved iterative reconstruction image programmes will enable us to get the best image quality with the lowest possible radiation when using x-rays and CT scanners. Other aims of paediatric radiology include creating child-friendly environments in hospitals and educating the public, among others.

Eglė Stašienė *is head of the paediatric radiology department at the Children's Hospital, Affiliate of Vilnius University Hospital Santariskiu, the largest children's hospital in Lithuania. She specialises in paediatric radiology and is mainly interested in paediatric oncology and neuroimaging. She aims to establish a paediatric radiology centre in Lithuania and gather together highly qualified paediatric radiology specialists.*
She has authored or co-authored more than 20 original papers and has participated in many Lithuanian and European radiology and paediatric radiology courses and meetings.
Dr. Stašienė is a committee member of the Lithuanian Society of Radiology and a member of the Advisory Committee of the Ministry of Health on Radiology optimisation.

Case 1:
Male patient, 8 months old. Diagnosis: poorly differentiated neuroblastoma of left adrenal gland with cystic metastases in liver, spleen and visceral pleura.



Case 2:
Male patient, 2 years and 10 months old. Diagnosis: monophasic high grade (G3) synovial sarcoma of inferior vena cava penetrating the right atrium.