International Day of Radiology 2015
Interview on paediatric imaging
Turkey / Prof. Zeynep Yazici

INTERNATIONAL DAY OF RADIOLOGY
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Paediatric imaging in Turkey

An interview with Zeynep Yazici, professor of radiology and head of the division of paediatric radiology at Uludag University Hospital in Bursa.

European Society of Radiology: **What is paediatric imaging? What age are the patients, and how is it different from regular imaging?**
Zeynep Yazici: Paediatric imaging covers both foetal imaging and imaging of children from birth up to 18 years. Paediatric radiologists are interested in new findings and progress in all areas of imaging and related fields. Although the technology is the same as in regular imaging, the methodology, apparatus and auxiliary equipment are modified for children and foetuses. Sedation or general anaesthesia and low radiation dose methods are more preferred compared to adult imaging.

ESR: **Since when has paediatric imaging been a specialty in its own right?**
ZY: In Turkey, paediatric radiology became an officially recognised subspecialty in 2011. However, years before that, some radiologists had started to dedicate their practices to paediatric imaging in many universities and state training and research hospitals.

ESR: **Which imaging modalities are usually used to examine paediatric patients? Does this change depending on the age of the patient?**
ZY: Although it depends on the clinical indications, ultrasound and magnetic resonance imaging (MRI) are frequently preferred for children's imaging to avoid radiation exposure from x-ray or computed tomography (CT). For foetal imaging, ultrasound and MRI should be used. The younger the children are, the more non-ionising radiation methods should be preferred, to prevent cancer risk.

ESR: **Some imaging techniques, like x-ray and CT, use ionising radiation. What risk does this radiation pose to paediatric patients? What kind of safety measures are in place to protect children?**
ZY: Radiation exposure is particularly important in children since they are more sensitive to the oncogenic effects of radiation than adults, due to their immature and rapidly developing body systems and greater post-exposure life expectancy. In our country, as in many other countries, CT is used extensively in diagnostic radiology and its use is growing steadily. The most effective way to reduce radiation dose from imaging techniques is to decrease the number of studies using ionising radiation, especially CT scans. Whenever possible, alternative imaging techniques such as ultrasound and MRI should be recommended.
When performing imaging that uses ionising radiation, the goal should be to keep the radiation dose as low as reasonably achievable. In routine practice, radiation dose levels can be reduced by using new technologies and equipment, and tailoring scan parameters according to the size of the patient. The use of multiphase examinations should be limited in children when possible. Radiation shielding procedures should be used whenever appropriate. In addition, continuing education of all personnel involved in imaging that uses ionising radiation is needed to keep them aware of the risks of radiation and how to optimise dose for each individual patient.

ESR: **Do general radiologists always use lower radiation doses when imaging children; are there any guidelines to follow?**
ZY: Unfortunately, general radiologists do not always use lower radiation doses when imaging children. They often pay little attention to tailoring imaging protocols which have been developed for adults to suit children. Even if they are aware of children's inherent sensitivity to ionising radiation, they do not have enough knowledge of the methods to reduce dose and there aren't any national guidelines to be followed in our country.

ESR: **How aware are parents and relatives about the risks of radiation exposure? How do you address the issue with them?**
ZY: In general, parents and relatives are not really aware of the risks of radiation exposure. They are informed verbally about this issue before imaging in only a few imaging centres. Most of the written informed consent sheets do not include the radiation risks.

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?**
ZY: Sedation or anaesthesia of young children during long procedures like MRI is only done in tertiary hospitals, since the required specialised equipment and staff are not accessible in all imaging centres. Fast scanning methods are usually used to reduce scanning time. Coaching and informing the children about the procedure can also help. MRI-compatible distraction techniques such as audio systems and movie goggles are not readily available in most imaging centres. If possible, a parent or an adult relative almost always accompanies the child into the scanner room.

ESR: **How many imaging exams are performed on paediatric patients in Turkey each year?**
ZY: I don't know the exact number. But, 87,397 paediatric imaging exams were performed at my institution in 2014 for a population of 2.8 million. Turkey has 78 million inhabitants, and the proportion of children aged 18 or younger represents 30% of the total population.

ESR: **Access to modern imaging equipment is important for paediatric imaging. Are hospitals in Turkey equipped to provide the necessary exams?**
ZY: Not all hospitals throughout the country are equipped to provide all the necessary exams. There are few dedicated children's hospitals and most of them also do not have well equipped radiology departments. In general, university hospitals and state training and research hospitals have better and more modern equipment. According to statistics, there were 10.4 MR machines and 14.1 CT scanners per million inhabitants in 2012. These ratios are not ideal but not bad. However, these machines are not evenly distributed throughout the country.

ESR: **What has changed in paediatric radiology during your lifetime?**
ZY: In the last 15 years, some radiologists have started to devote their practice to paediatric imaging in many universities and state training and research hospitals. Those radiologists established a working group of paediatric radiology in the body of the Turkish Society of Radiology ten years ago. The members of this group played a very important role in the recognition of paediatric radiology in Turkey and paediatric radiology became an officially recognised subspecialty in 2011. In the same year, 33 radiologists were officially appointed as paediatric radiologists and authorised to give fellowship training, based on their education and experience of paediatric radiology and their contribution to paediatric radiology literature. The radiologists who were able to succeed in the exam held by the Ministry of Health started a two-year fellowship training programme in those institutions. The first paediatric radiologists of this training programme graduated this year. In addition, the first Society of Paediatric Radiology was founded in Turkey last year. During the last two decades, new generation equipment and more detailed imaging analysis have been adapted for paediatric imaging.

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

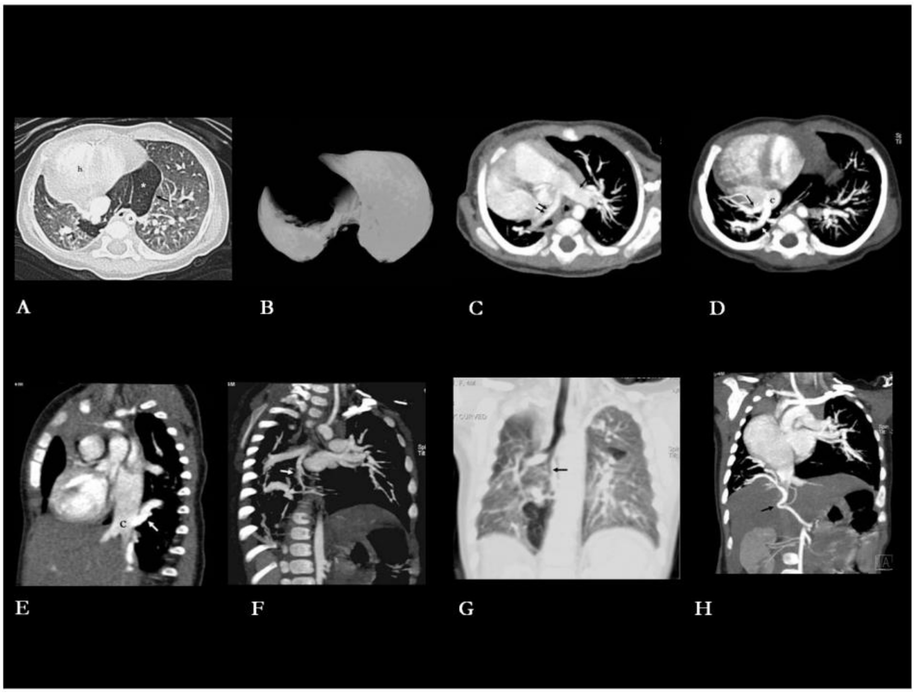
ZY: The radiologists who graduated from those fellowship programmes will increase the recognition of paediatric radiology and the awareness of the different requirements of paediatric imaging compared to adult imaging throughout the country. With the initiative of the Turkish Society of Radiology, the structured residency training programme in radiology, which includes a rotational placement in paediatric radiology, will become widespread. Collaboration between the national society of paediatric radiology with its international counterparts will help to expand the knowledge base and improve patient care.

Zeynep Yazici *is head of the division of paediatric radiology and professor of radiology at the Faculty of Medicine at Uludag University, Bursa, Turkey.*

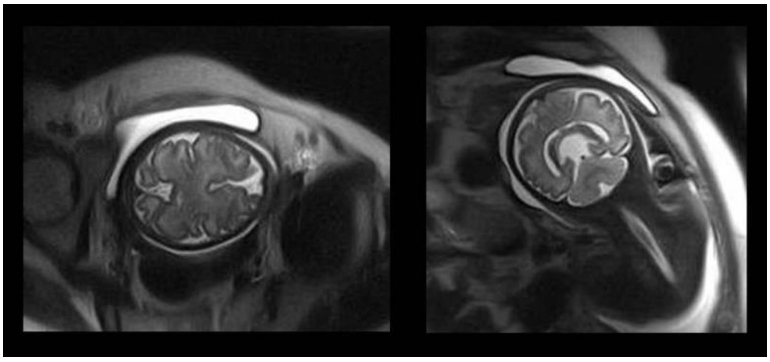
She specialises in paediatric radiology and has experience in orbital and musculoskeletal imaging. She is interested in clinically driven studies dealing with diagnostic imaging in those fields.

She has been a member of the Executive Board of the Turkish Society of Radiology since 2013.

Prof. Yazici has authored or co-authored more than 40 peer-reviewed papers in English and Turkish. She is one of two authors of the only book on paediatric radiology in Turkish, and has written a number of chapters in textbooks.



Horseshoe lung associated with scimitar syndrome. A four-month-old girl. Axial CT image (A) and 3-D volume-rendered CT image (B) demonstrate fusion of the posterobasal portions of the right and the left lungs via a parenchymal isthmus behind the heart (h) and in front of the aorta (a) to form the HL (asterisk). There is a pleural line (arrow, A) between the two lungs. The heart (h) is displaced to the right because of the right lung hypoplasia. Axial slab MIP CT angiogram (C) shows the right pulmonary artery (double arrows) smaller compared to the left pulmonary artery (arrow). Axial (D) and oblique sagittal (E) slab MIP CT angiograms demonstrate two scimitar veins (arrows) uniting into a common trunk immediately before their confluence into the IVC (c). Oblique sagittal slab MIP CT angiogram (F) shows a small branch (arrow) from the right pulmonary artery supplying the HL. Coronal slab minimum-intensity projection CT image (G) shows the bronchi to the HL (arrow) arising from the right lower lobe bronchi in a pattern similar to the arterial supply. Axial slab MIP CT angiogram (H) shows a systemic arterial supply (arrow) from the celiac artery to the hypoplastic right lung.



Syntelencephaly (middle interhemispheric variant of holoprosencephaly). A 34-week foetus. Axial and coronal HASTE images of the foetal cranium show absence of the middle portion of the falx and interhemispheric fusion between the posterior frontal and parietal regions.