

**International Day of Radiology 2015**  
**Interview on paediatric imaging**  
**Romania / Dr. Bogdan-Stefan Olteanu**



**INTERNATIONAL  
DAY OF  
RADIOLOGY**  
AN INITIATIVE OF THE ESR, ACR AND RSNA

**Paediatric imaging in Romania**

**An interview with Bogdan-Stefan Olteanu, senior radiologist at the Grigore Alexandrescu Emergency Hospital for Children in Bucharest.**

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

**Bogdan-Stefan Olteanu:** Paediatric imaging is the most challenging part of radiology; the patients may be 18 years old and 100kg, newborns weighing less than 1kg, or even unborn foetuses – or anywhere inbetween. They may be sleeping newborns, crying babies, toddlers using only one word (“no!”), frightened children, cheeky teenagers, etc.

Paediatric imaging helps us to diagnose and treat all kinds of diseases affecting any body parts from head to toe, by using all imaging modalities: ultrasound (US), plain x-ray and fluoroscopy, computed tomography (CT), magnetic resonance imaging (MRI), etc.

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

**BSO:** The first radiology department in a children’s hospital in Romania was founded exactly 100 years ago. Since then, a lot of radiologists have dedicated themselves wholly or in part to paediatric imaging, even if such a subspecialty never existed. In the last 20 years, and increasingly so in the last couple of years, paediatric radiologists have become more and more visible in the professional community.

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

**BSO:** We effectively use all imaging modalities to examine children. Teenagers are examined almost like adults. For newborns and babies, we use a lot of US and some x-rays, but we still sometimes need fluoroscopy and occasionally CT or MRI. Age is only one factor that influences the choice of modality; the disease and the clinical situation are even more important factors.

**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?**

**BSO:** The risk related to x-ray use in diagnostic imaging is very low but it exists. Compared with the level of natural radiation, a chest x-ray is equivalent to a few days of atmospheric exposure, but for some CTs or for a barium enema the equivalent is up to about 2–3 years. Such a high-dose examination may raise the life-long average risk for cancer from about 40% to 40.1%; if the exposure was made during childhood, the risk is estimated to increase to 40.2% or even 40.4%.

Safety measures start when an examination is recommended: the clinician and the radiologist should be sure that the examination is really needed for the correct treatment, and that other satisfactory alternatives do not exist. Technical factors should be taken into account to reduce radiation doses, and setting a routine with children is essential for obtaining diagnostic images with the lowest possible doses.

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

**BSO:** With classical radiographic units it was not possible to over-expose significantly, because that resulted in images that were too dark. More attention should be paid to modern, digital radiography and CT.

The radiologist and the radiographer should be aware of the technical options and equipment vendors should ideally include them in the basic configurations: additional beam filtering, easily removable anti-scatter grid, high sensitivity screens or detectors, automatic exposure, high KV techniques, CT with adaptive exposure, and dedicated paediatric protocols for all age groups.

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

**BSO:** The relative perception of the risk of radiation exposure versus the risk of the disease under investigation varies a lot. Some parents are afraid of radiation in cases of a simple chest x-ray for suspected pneumonia, "because the child had another x-ray six months ago". Others insist on getting a head CT in case of minor trauma "to be sure that nothing is wrong". They usually don't have the correct information but wrong preconceptions, which mass media have worsened in the last few years. Referring physicians sometimes complicate those perceptions even further by focusing all the patient's expectations on the recommended investigation.

It is very difficult to address this issue, especially in tense situations, for instance in the emergency room. I always try to give short, clear and correct information, to give my advice but let them decide. The best scenario is to discuss the indication with the clinician before the referral, so the patients receive the same information from both doctors, which improves credibility.

Radiologists can refuse to perform radiation-based imaging if the referral is not in line with the guidelines, but we rarely do that.

**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?**

**BSO:** What we most need more of, is what we have the least of: time. You have to explain the procedure to children and parents, show them the environment, answer their questions and address their unexpressed fears (known from other patients). It is essential to have dedicated and talented personnel. We have developed a sort of routine for that preparation and so we have been able to decrease the patient age at which we can perform MRI without sedation.

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

**BSO:** In my hospital, about 75,000 imaging exams are performed each year. It is a university, emergency, children hospital – the oldest children's hospital in the country, and now with 400 beds. I cannot estimate the total number in the country, but there are surely millions of imaging exams every year.

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

**BSO:** In the last 25 years, we have experienced a significant recovery from the big delay we used to have. But, compared with more developed countries, there are still things to be done in order to assure at least a good basic standard throughout the country, including equipment, maintenance, personnel and guidelines.

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

**BSO:** Radiology in general and paediatric radiology in particular regained their correct positions in the medical consortium. Echography (US) has developed a lot because of new technologies and clinical experience; it is no longer dominated by clinicians but more and more linked to radiology. Paediatric imaging is a multi-modality endeavour, and an increasing number of diagnoses are established in the radiology department.

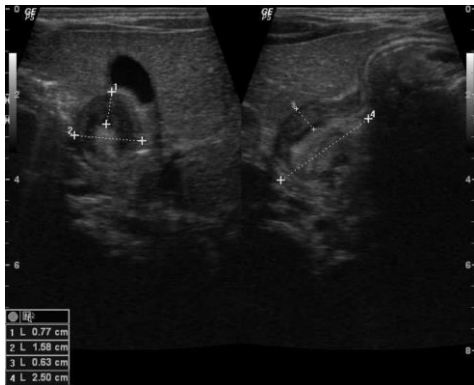
**ESR: Where do you see the next developments in your field?**

**BSO:** Technology is constantly developing, but I think, or I should say I hope, that the drift towards more evidence-based and more personalised medicine will come first. The first step is almost done, as radiologists are now increasingly clinically oriented, in contrast to the drift of clinicians toward investigation and technology over the past decades. And with imaging's upcoming functional capabilities, I dare say that the future of medicine will be imaging, with genetics and biochemistry its only competitors (but also possible allies).



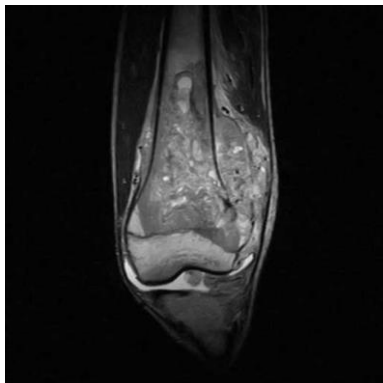
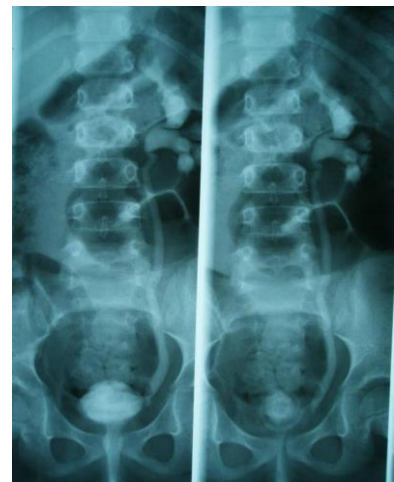
**Bogdan-Stefan Olteanu** is a senior radiologist at the Grigore Alexandrescu Emergency Hospital for Children in Bucharest. He obtained his medical degree in 1992 from the faculty of medicine of the Carol Davilla University of Medicine and Pharmacy in Bucharest, where he subsequently completed a PhD in 2007. He has also spent time at the Claude Bernard University in Lyon, France, during his postgraduate studies.

Dr. Olteanu is vice president of the Romanian Group of Paediatric Radiology (GRP-SRIM) and has been appointed expert evaluator by the EC Research Executive Agency. He is a member of the European Society of Radiology, the European Society of Paediatric Radiology, the International Society for Magnetic Resonance in Medicine and the French-Speaking Society of Paediatric and Prenatal Imaging.



The hypertrophic pyloric stenosis (thickening of the muscle controlling the outlet of the stomach) can be diagnosed by ultrasound.

For the diagnosis of vesico-ureteric reflux (flow-back of the urine from the bladder toward the kidney), fluoroscopy during micturition is still the first choice.



For evaluation of a tumour arising from bone, an MRI is to be done after the plain x-ray.