Ground-breaking applications of functional imaging techniques can help radiologists play their part in the fight against the emerging obesity pandemic. In particular, MR elastography is showing promise in the early detection of disease, attendees were told at Saturday’s State-of-the-Art Symposium.

Obesity-related illness worldwide is having a huge direct impact on healthcare costs, and indirectly affects individual loss of productivity and its related socio-economic problems as many obese patients are deemed unfit to work. It presents an obstacle to the population’s physical, mental and financial well-being that healthcare providers can’t afford to ignore.

One such associated disease is non-alcoholic fatty liver disease (NAFLD), which ranges from relatively benign, simple steatosis – fatty accumulation in under 5% of hepatocytes – to a more severe condition called non-alcoholic steatohepatitis (NASH), in which there is fatty accumulation plus lobular inflammation, hepatocyte ballooning and perivenular fibrosis, and which may also lead to cirrhosis, according to Prof. Valérie Vilgrain, chair of imaging at Beaujon Hospital, Paris, France.

Importantly, very recent data suggest that the first cause of hepatocellular carcinoma (HCC), the primary liver cancer, is not due any more to alcohol intake or viral hepatitis but to a metabolic syndrome in which obesity plays an important role. Furthermore, an increasing incidence of HCC, including those found incidentally, and benign liver tumours linked to obesity constituted a challenge for radiology and oncology departments.

Nevertheless, NAFLD patient surveillance using imaging techniques would help to detect HCC and hepatocellular adenomas.

“Now our task as radiologists is to diagnose liver steatosis and quantify it, which is easy,” she said, pointing to diagnosis through a number of modalities including ultrasound, CT, MR spectroscopy and the lesser known controlled attenuated parameter (CAP), a measure of ultrasound attenuation on the fibroscan which correlated with pathological grades of steatosis.

“It is much more difficult to identify the dangerous subtype, NASH, defined pathologically with inflammation and fibrosis, which are harder to detect on imaging,” she added.

At present, the latest development in obesity imaging is the application of functional quantitative imaging to detect inflammation and fibrosis. There is growing evidence that one such new technique, functional MR elastography, can differentiate NASH among NAFLD patients. The technique determines liver stiffness, as stiffness increases in early NASH even with no fibrosis and it further increases with the severity of the disease.

Already used routinely in Vilgrain’s hospital and in dedicated centres, there is an argument for implementing MR elastography wherever obese patients are managed; not only is there a higher liver-specific mortality among NASH patients when compared to the general population, there is also a higher cardiovascular mortality, and such differentiation could influence management strategies at an earlier stage.
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Expert Courses

These courses are specially designed for delegates who are already familiar with the theory of and literature on the topic. To reflect this, lecture times are reduced, in order to allow more time for practical learning. The lectures that are held will focus on tips and tricks.

- Management of Resistant Hypension: Renal Artery Denervation
  Paris, France, April 14-15
  Hôpital Européen Georges Pompidou

- Prostate Embolisation
  Zaragoza, Spain, May 30-31
  Hospital Clinico Universitario CIBA

- Practical Approach to HIFU
  Milan, Italy, June 6-7
  European Institute of Oncology

- Strokes Intervention
  The Hague, Netherlands, November 14-15
  Haga Teaching Hospital

For more information, please visit www.esir.org/esir2014

Fundamental Courses

Fundamental courses cater for those doctors who are either beginning their IR career, or who wish to refresh or broaden their existing portfolio. Lectures will focus on both theory and clinical application, with sufficient time also given to hands-on learning.

- Embolisation in Acute Haemorrhage
  London, United Kingdom, May 9-10
  Royal London Hospital

- Peripheral Arterial Disease
  Homburg, Germany, May 23-24
  University Hospital Saarland

- Genital Urinary Interventions
  Prague, Czech Republic, October 17-18
  Institute for Clinical and Experimental Medicine

- Venous Access and Dialysis
  Marseille, France, December 11-12
  CHU Timone – University Hospital

For more information, please visit www.esir.org/esir2014
Diagnosing chronic back pain requires more than just looking at an image

Chronic low back pain is the most common cause of disability between the ages of 45 and 65, which means that it is something that radiologists will have to deal with during their careers. When they do, they should be able to read films properly.

But reading films alone will not be enough to make the correct diagnosis, and an image without clinical examination is nothing, according to Prof. Afshin Gangi, chairman of radiology and nuclear medicine at the University Hospital of Strasbourg, France, who chaired the dedicated Refresh Course on Saturday.

"Please don’t report anything without having seen the patient first. When the clinical examination is not consistent with what you see, you should report it exactly like this; it’s extremely important. Imaging alone, without clinical examination, is not telling you anything, the pain could be anywhere. Examine your patient, read the film at the same time, then suggest what to do. The pain could have multiple causes," he said.

Dr. David Wilson, a consultant radiologist at BMJ Healthcare Oxford Clinic, UK, agreed. "The moment you start to use the imaging as your end point, you’ll start making mistakes," he said to a packed audience, in his talk, Wilson focused on sacroiliac joint syndrome, a condition with a considerable amount of pain and poor clinical signs. He stressed the role of interventional procedures in the diagnosis and treatment of this condition.

Radiologists first need to remember that the anatomy of the region is complicated: "The joint has an almost S shape, it is curving like a snake in two directions," he said. Part of the joint is fibrocartilage and hyaline cartilage, a solid structure that does allow some flexibility. Ligamentous structures in this area are complex, deep and thick. "Those of you doing interventional procedures in this area will be passing your needle through very thick fibrous material before you get down to the joint," he said.

The clinical signs of sacroiliac joint syndrome include localised tenderness, compression across the pubis, and distraction. All of these are techniques that physiotherapists, rheumatologists and surgeons may be using and they may become convinced that these are excellent techniques. But, sadly evidence in literature shows the exact opposite," he pointed out.

These tests have very poor predictive value, and there is no single test that is consistently valid, according to Wilson. A clinical examination alone is clearly not enough.

"Imaging can help in the assessment of the syndrome. With a sensitivity of 85%, MRI seems to be the most appropriate tool. Conventional radiographs have poor sensitivity and should not be used except for trauma. CT is particularly good at detecting erosions and inflammation, but, unlike MRI, it does not show bone oedema, one of the earliest signs of the disease. SPECT has a modest sensitivity of 40% to 70%, and there is only limited data on PET.

Some patients have mechanical problems, which will not show on imaging. Patients with severe chronic pain do not require an imaging examination. In these cases, radiologists can do tests to assess the origin of the pain and then offer appropriate treatment. For this, they need to place a needle directly into the joint to inject a steroid/inflammatory mixture.

"This is tricky because of the anatomy of the joint. We all have problems with it," Wilson said. The needle has to take different angles according to which point one attacks. Image guidance is crucial in this area, and blind injection is with a 95% accuracy of placement, ‘even worse than throwing a coin’. There is some debate around the use of ultrasound, but it has yielded poor results to date with 40% accuracy of placement.

Up until two years ago, Wilson used fluoroscopy. Unfortunately things did not always go well. ‘Extravasations are very common, they represent about 60% of the attempts we have made.’

The problem with CT is the radiation involved, as there needs to be both front and rear examinations. Fusion CT or MR with ultrasound may be the answer. ‘Sacrolilac joint imaging is now almost like chessing: I can put the needle in the joint without feeling the edge. I’ve never done that before, it’s great, it doesn’t irritate the patient or me.’
Serbia ‘comes home’ to European fold as its contribution gets official recognition

Serbian radiologists have warmly welcomed the chance for greater visibility at the ECR and in European radiology at large – visibility which until recently has been lacking, despite the country’s scientific contribution to the discipline.

Yesterday’s ESR meets Serbia session, opened the session by underlining Serbia had long ago created a pivotal place for itself in European radiology.

For Serbian radiology it is an extraordinary opportunity to present our achievements and our potential,” Lučić said.

Demonstrating that the conflict in the former Yugoslavia is long since blood behind them, cooperation between the radiological communities across Serbia, Croatia, Slovenia, Bosnia-Herzegovina, Macedonia, and Montenegro is thriving, he added. Last year the first regional MRI School took place in Bosnia-Herzegovina for young trainees across the region.

Participants at the ESR meets Serbia session gave an impressive overview of the practice of radiology in their country.

Saturday’s ESR meets Serbia session began with a bittersweet experience outside the auditorium as delegates were offered a choice of spicy dark chocolate or caramel milk chocolate wrapped in the red, white and blue colours of the Serbian flag. A handy mix of ‘East meets West’ was prevalent in the cultural interludes as well as the scientific lectures, some of which highlighted how latest know-how can sometimes be challenged by modern Serbian specific socio-economic context and recent geo-political upheaval.

During today’s European Radiology editor announces editorial fellowship

The editorial fellowship programme aims to provide training in editorial skills, such as manuscript evaluation, manuscript editing, organisation of peer review, manuscript production and publishing, including electronic publication. This year’s successful candidate Dr. Giulia Zamboni, from Verona, Italy, Dr. Zamboni, a specialist in the field of gastro-intestinal and abdominal radiology, will spend three weeks at the editorial offices in Vienna and Munich.

ECR TODAY | SUNDAY, MARCH 9, 2014

BY FRANCES RYLANDS-MONK

During today’s European Radiology editorial board meeting, Prof. Maximilian F. Reiser announced the ESR’s new Albert L. Baert Editorial Fellowship. This was the first editorial board meeting for Prof. Reiser since he became editor-in-chief of European Radiology at the beginning of this year, taking over from Prof. Adrian K. Dixon.

The editorial fellowship was founded by Prof. Albert L. Baert and the European Radiology Private Foundation. Prof. Baert was editor-in-chief of European Radiology for 12 years, from 1996 to the end of 2007, and is now editor emeritus of the journal. The editorial fellowship programme aims to provide training in editorial skills, such as manuscript evaluation, manuscript editing, organization of peer review, manuscript production and publishing, including electronic publication. This year’s successful candidate Dr. Giulia Zamboni, from Verona, Italy, Dr. Zamboni, a specialist in the field of gastro-intestinal and abdominal radiology will spend three weeks at the editorial offices in Vienna and Munich.

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ESR President Prof. Guy Frija wished to underline that there was no such thing as small or large countries when it came to input because input was not related to country size.

To enhance interaction, discussions on hot topics in radiology have been arranged, where authors of the selected and best-scored posters in each field will discuss them with a moderator. All discussions take place in the EPOS® Area on the 1st level and ECR delegates are welcome to join, listen, and discuss with the experts.

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The first three lectures of the session, which was moderated by Prof. Peter Vock from Berne, Switzerland, and Dr. Cathy Owens from London, UK, focused on the main objectives of the campaign, as well as the Image Gently and Image Wisely campaigns.

In the fourth presentation, Dr. Peter Cavanagh, vice-president, clinical radiology, of the Royal College of Radiologists, talked about the lessons to be learned from the UK approach to patient safety in radiation protection.

"The UK has a long tradition in radiation protection," Prof. Peter Vock reminded a packed audience as an introduction.

"This talk is about riding on the back of giants. In terms of understanding, there’s a lot of people behind who know a lot more than I do," Cavanagh began, referring to Paul Shrimpton, Barry Wall and Dave Hart, all pioneers in radiation protection. "History is not perfect, but there are a lot of lessons we hope we could learn."

Besides a legal framework for radiation protection, there needs to be revised evidence-based guidelines so that clinicians know when they should be referring patients and what the benefits of referring patients are, he argued.

Team work at the national and local levels is essential to this task, and the UK has a good track record of team work between radiographers and radiologists, he said.

Three areas are central to the development of guidelines: dose management, to know which dose is being given to patients; justification, so that there is a system in place to justify dose use when there is an investigation; and optimisation, to get the best image possible.

"In terms of justification, we believe that Europe has to have guidelines," he said.

The RCR first published guidelines on radiation protection in 1989, and then every fourth year thereafter. While the first edition had 73 guidelines, the seventh and current edition contains as many as 307.

The RCR has engaged with 300 radiologists (10% of the RCR’s members), and a patient liaison group was also involved in the current edition. A lot of work has been poured into this project, and Cavanagh counted 3,000 facilitated hours, 1,000 project lead hours, 10,000 expert hours, as well as 100,000 references in raw search.

"However, producing the guidelines is not the aim of the process, it’s how we use them effectively," he said.

The sixth edition of the RCR guidelines was accessed by 1.3 million users. But the problem is that the guidelines are not always available at the moment when they are really needed by the clinician, he pointed out.

The UK also has a long history of patient dose monitoring. There is a systematic approach to measuring radiation dose, and surveys have been in place since the 1980s and 90s, Cavanagh said. "They originally worked for standard radiology, but now there are CT surveys and this gives us the national benchmark of how doses can be used."

Reference doses for conventional x-ray examinations in the UK were first proposed in 1989. The number of x-ray examinations there has more than doubled in the past 50 years, and CT has replaced radiography as the most common examination tool.

The multidisciplinary team approach is very important to controlling and optimising radiation dose. "In the UK, we have physicists working in our radiology department and they are involved at every level from clinical practice to equipment purchase, research, etc.," he said, adding that national organisations and the UK government also often collaborate to produce guidelines on how radiation should be used.

To conclude, Cavanagh acknowledged the importance of EuroSafe Imaging and other campaigns, which in his opinion need strong leadership champions, public pressure, clear interventions, measurement, local ownership and teamwork to be successful.
Hot Shots
from Day 3
Experts share strategies to help radiologists justify their imaging decisions

Evidence-based radiology, comparative effectiveness research, and health technology assessment all play a role in the radiologist’s decision-making nowadays. Radiologists must ensure that they are imaging patients at the right time using the right test, and they need to justify radiological examinations and imaging-based interventional procedures on the basis of the best available evidence. The dedicated Special Focus session today at ECR 2014 will teach attendees how to use evidence to justify imaging decisions in day-to-day clinical practice.

Evidence-based radiology is a relatively new approach designed to inform clinicians of the most appropriate technique to use in a given clinical scenario. It has always been an important topic, but people have recently become more aware of this theme and expect more justification from the physicians, according to Professor Myriam Hunink, who will chair the session. She is a professor of radiology and clinical epidemiology at the Erasmus University Medical Centre in Rotterdam, the Netherlands, and adjunct professor of health decision sciences at Harvard University, Boston, USA.

“It’s becoming increasingly en vogue, and more-and-more attention is being given to it, partly because people are insisting that there should be evidence before we do something. There’s a couple of reasons for that; the main reason being that people realise that there are risks associated with what we do in radiology. So we constantly need to make a smart decision by weighing these risks against the benefits,” she said.

Radiologists need to justify the risks, especially those related to ionising radiation exposure, before deciding on their imaging strategy. Not only patients, but also physicians, policy makers, ministries of health, health insurance companies and the organisations advising them are more aware of radiation-related risks, and they are paying more attention to minimising these risks than ever before.

“There have been a couple of reports in the media about the risks involved with the use of radiation. People have become aware of the fact that CT uses radiation and that if something goes wrong they could receive too much radiation. So radiologists really need to understand that the examination needs to be justified; it can’t just be done for nothing,” Hunink said.

Other potential risks, such as allerg-...
Childhood abdominal emergencies: what to do, and what not to do

Whether working in a specialised trauma centre or in a small or medium-sized general hospital, every on-call radiologist will encounter trauma cases, whether due to car and domestic accidents, or falls from heights. Following paediatric abdominal trauma, the tendency is to perform some form of imaging, although most children will be treated conservatively.

Today’s Special Focus session on childhood abdominal emergencies aims to outline what radiologists should know about emergency abdominal imaging in paediatrics, regardless of their specialty, and aims to familiarise them with what to expect from each modality. For trauma, CT can rapidly demonstrate abdominal injuries, together with thoracic and extremity injuries and brain injuries, and is the modality of choice in multisystem injured children, especially when intubated or suffering from a spinal cord injury. Abdominal trauma can be very disorientating and increasing discomfort, seat belt sign or bruising, and gross haematuria may predict a threatening abdominal injury and constitute indications for CT.

In the ideal world, there should be the organisation to perform an ultrasound in the ambulance by trained personnel, and reserve the CT scan for every haemodynamically stable child with a high impact injury and positive risk factors for abdominal injuries, or when extended focused assessment with sonography for trauma (FAST) is positive for unexplained fluid or rewatching jaundice that ‘may be’ graded,” said session speaker Dr Maria Raissaki, consultant paediatric radiologist at University Hospital of Iraklion, Greece.

CT is most useful in the detection and grading of the four killers: splenic, hepatic, pancreatic and pelvic injury. Also, in vascular injuries the arterial blush sign that suggests active extravasation of blood inside the traumatised organ or body part, indicates the possibility of rapid deterioration and ominous shock. Every radiologist should look for the arterial blush sign, even if there is no hypotension or other clinical evidence of active bleeding, according to Raissaki.

Besides, learning how to use CT, may prove useful in solid organ injuries, life-threatening bowel injuries and shock bowel, delays at today’s session will also hear how traumatic lesions following child abuse trauma, should be recorded by CT scanning.

CT provides objective documenta- tion that cannot be performed by ultrasound. CT sound is not invariably recorded and when it is, it can always be read or objectively evaluated by experts in court, because of their user dependency. This is why, according to Raissaki, CT – third party expert can read and provide an opinion, she stated.

Because of the stochastic effects of any exposure to ionising radiation, regardless of dose size, and the lack of ability to predict which children will be affected, radiologists must always justify CT. Choose a test that will help the child not the doctor, said Raissaki, adding that for children, non-contrast scans should be avoided in accordance with the As Low As Reasonably Achievable (ALARA) guidelines and CT must be performed with as few passes as possible.

Modern scanners with fast acquisitions can provide images that can distinguish normally enhancing organs, moderately high density haemorrhage and low density fluid areas without the need for a non-contrast scan. Around 50% of the dose can be used by using a single-phase CT scan, instead of a double-phase non-contrast/portal-phase contrast CT scan,” Raissaki said. Additionally, she is keen to point to the usefulness of ultrasound as the first and potentially only tool in the stable child.

“When the need for surgery is potentially low, and you are experienced with good equipment, start and finish with ultrasound. In many centres when the child is stable, they do an ultrasound first and proceed to CT only if they can’t find answers on the former modality,” she said. “Ultrasound also has a major role in the follow-up of known injuries, unless there is rapid deterioration.”

Because the chance of finding a significant injury in a low-impact trauma is small and because grade 1 injuries that may be missed by ultrasound are treated conservatively, aggressive imaging should be avoided when risk factors for intra-abdominal injuries are absent. “If you immediately write a child through to CT or CT instead of using ultrasound? You don’t have a Ferrari on an urban street,” Raissaki commented.

BLINDED BY ‘BLING’ – FEATURES OF CT

Focusing on the use of ultrasound as the initial and often final examination that obviates the need for CT and MRI, Dr Simon Robben, a paediatric radiologist at Maastricht University Medical Centre in The Netherlands, aims to reinforce appreciation of the detailed anatomy of children that can be visualised with ultrasound and demonstrate its capacity to depict motion such as bowel peristalsis, blood flow and the effect of compression.

“I am hoping my lecture will renew enthusiasm for ultrasound among general radiologists, in whom this enthusiasm has slowly faded, along with the basics of ultrasound, as they’ve been blinded by the ‘bling’ features of CT,” he said.

Ultrasound’s sensitivity and specificity is over 90% in diseases such as suspected intussusception, midgut volvulus, urinary tract abnormalities and appendicitis. As a case in point, Robben points to the virtually pathognomonic ultrasonic appearance of an intussusception that consists of multiple alternating hypo- and hypechoic concentric rings. Daily practice shows how central ultrasound is to abdominal non-traumatic emergency, according to Robben, who approved only two abdominal CT scans as the initial examination in children during 2013.

“An intussusception from the perspective of the parents can be quite different than from the perspective of the clinician,” he said. For instance, abdominal pain without any laboratory abnormalities without fever and without signs of peritonitis may be less alarming for the clinician than for the patient. Therefore ultrasound can be used to rule out serious diseases, justifying a wait-and-see policy. After all, time can be a very effective diagnostic tool.

Radiologist training should include learning which normal variants simulate disease, Robben stressed. For instance, a Riedel’s lobe of the liver may simulate hepatomegaly. Likewise, a duplicated collecting system of the kidneys may simulate either ipsilateral hydronephrosis or contralateral ectopia, and a small bowel intussusception may simulate a pathological biliary loco-intestinal intussusception. In addition, some diseases may simulate other diseases; a focal nephritis, for example, may simulate a Wilms tumour.

There are two important rules for experienced operators to follow, according to Robben. Firstly, an uncommon presentation of a common disease is more common than a common presentation of an uncommon disease. For instance, acute inflammatory changes in the right lower quadrant in a child with pylonephritis is more likely to be caused by common appendicitis than by inflam- matory growth of a Burkitt lymphoma.

Secondly, of the initial ultrasound findings do not correlate with the clinical presentation, then radiologists should proceed with the examination until they either do find a solid explanation or until they are sure that they have ruled out every pathology that might cause the complaints.

“Try to avoid unintentional blindness and instant gratification. After all, radiologists are physicians and sometimes more experienced than the on-call junior paediatrician. In a neonate with high clinical suspicion of renal vein thrombosis, it is not sufficient to merely demonstrate colour Doppler flow within the kidney but to visualise the vein itself and rule out the presence of a thrombus there,” Robben said.

Vascular injury in a five-year-old girl. A. Arterial phase. Arterial blush (arrow) is seen as a star-like shaped extravasation of contrast inside a large retroperitoneal haematoma (*). B. Portal phase. The extravasation (arrow) is larger. C: Sagittal maximum intensity projection (MIP) reconstruction shows the site of vascular injury and the extent of haematoma (*). (Provided by Dr. Maria Raissaki)

Special Focus Session
Sunday, March 9, 1600–1730, Room F2
SF 15c: Childhood abdominal emergency 2014: the dos and don’s

• Chairman’s introduction
  E. Alexopoulou; Athens/GR

• The acute abdomen: US is the answer
  S.G. Robben; Maastricht/NL

• The acute abdomen: CT is the answer
  A. Paterson; Belfast/UK

• Abdominal trauma: US is better
  V. Maia; Rome/IT

• Abdominal trauma: CT is better
  M. Raissaki; Iraklion/Greece

• Panel discussion
  US or CT in paediatric abdominal emergencies
CT-guided biopsies and contrast-enhanced CT monitor treatment response in lung cancer

Monitoring response to targeted therapies using dynamic contrast-enhanced (DCE-CT), as well as a discussion of CT-guided biopsies in lung cancer as a tool for histological subtyping and genetic analyses, will come under the spotlight today in a session led by some of Europe’s leading thoracic radiologists.

DCE-CT imaging represents a non-invasive tool for the monitoring of new targeted therapies, enabling timely assessment of therapeutic response before monitoring of changes according to RECIST criteria as used in routine clinical practice.

During today’s session, Dr. Nudzia Tacelli, consultant radiologist at the Department of Thoracic Imaging, Hospital Calmette, University Centre of Lille, France, will explain that recent advances in the molecular biology of lung cancer have shed light on different mechanisms driving carcinogenesis, and these represent attractive targets for new therapeutic agents. She plans to discuss why DCE-CT is a feasible option for non-small cell lung cancer (NSCLC), in view of the growing interest in drugs targeting tumour angiogenesis. Of note, DCE-CT provides functional information regarding the formation of new tumour blood vessels, and it can depict early change in lung cancer vascularity before tumour shrinkage.

As a consequence of these developments, general patterns of tumour growth, there are certain types of lung cancer treated with highly specific agents, and we radiologists need to adapt the tumour response assessment required with these new and future targeted therapies with the use of new imaging methods. We refer to DCE-CT called Tacelli. At her centre, pulmonologists are very active in the use of new diagnostic options for lung cancer and there is a common view to move from DCE-MRI to DCE-CT.

The choice of biopsy method is important. The choice of the appropriate tool for collecting tissue samples with respect to the final aim of prevention or treatment will also usually have a part to play in the choice of the guiding method and the choice of the biopsy needle for the procedure. Tacelli will also address how the patient can cooperate to aid the procedure in terms of respiratory manoeuvres and breath-hold. Finally, he will discuss the risk of complications, pointing out that knowledge of the respective risk factors and the possible technique of prevention or treatment by operators are essential. The main complications are pneumothorax and haemorrhage (haemoptysis), but both serious complications are pneumothorax and haemorrhage (haemoptysis), but both are rare in the lungs of the patients where the intervention is performed.

The decision to biopsy and the way it is done is taken in a multidisciplinary conference with respiratory physicians, surgeons, oncolo-gists, and radiologists,” stated Laurens, adding that recent profound advances in the treatment of NSCLC had encouraged clinical physicians to address the importance of accurate subtyping and molecular genotyping.

Guidelines from the American Thoracic Society, European Respiratory Society and the International Association for the Study of Lung Cancer have proposed recommendations for appropriate handling of small specimen regarding immunohistochemical and molecular studies. Because many lung cancer patients present with locally advanced unresectable stages, the only available material for diagnostic and therapeutic information is provided by biopsy specimens, and therefore CT-guided biopsies can enable sufficient tissue sampling for histological subtyping and genetic analyses, he said.

The choice of biopsy method is determined by location, size of the thoracic lesions and the risk factors for complications. CT-guided biopsy is preferred for peripheral tumours, and CT-guided percutaneous biopsy using coaxial automated core biopsy needles offer many advantages, he continued. Coaxial automated core biopsy needles provide more accurate subtyping and molecular genotyping than cytological diagnoses obtained from fine needle, and both methods provide similar rates of complications. Local skills and practices will also need to be taken into account as part of the choice of the guiding method and the choice of the biopsy needle for the procedure.

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Most radiologists don’t deal much with dental imaging – but that doesn’t mean they shouldn’t be aware of what to look for or know about the difference between dental MRI and cone-beam CT (CBCT), expert speakers believe.

In a session today ECR delegates will have a chance to learn all about dental imaging. When imaging the head and neck region with CT or MRI, teeth are always present, according to chairperson Dr. Julia Frühwald-Pallamar, an assistant professor in the radiology department at the Medical University of Vienna. On scans performed for other indications, radiopaque or radiolucent lesions of the jaw can be encountered, and familiarity with typical dental conditions is necessary to decide on the right therapy for patients.

The INs AND OUTs OF DENTAL MRI

“Obviously dental MRI is not yet applied in daily routine imaging of teeth or the periodontal apparatus,” said Prof. Stefan Rohde, from the Klinik für Radiologie und Neuroradiologie at Klinikum Dortmund, Germany. “However, inflammatory periodontal disease is the major cause of tooth loss in adults, the second most frequent pathology of the oral cavity, and an important cause of disability.”

Imaging in these patients is usually performed with 2D panoramic radiography CT, or CBCT. However, MRI may represent a complementary imaging technique to visualise particular pathological processes, especially inflammatory disease of the periodontal space, or teeth vascularisation after trauma, he said. His presentation will focus on the potential of high-resolution MRI in this new field and compare it with CT and CBCT.

Dentists may make special use of MRI in difficult situations, for example when conventional imaging fails to detect inflammatory or neoplastic processes at an early stage, because visualisation is only possible when resorption of the alveolar bone has already started. In addition, MRI offers an alternative technique especially in younger patients and in children to avoid radiation exposure, he added.

“MRI of the dental apparatus is technically challenging as the bony structures of the mandible and teeth given little or no MR signal,” Rohde said. Another concern is the problem of air content and metal artefacts in the oral cavity that limit the use of MRI in this special setting. As a principal finding of our experiments, MRI proved to be superior to MDCT (multidetector CT) and to CBCT in visualising periodontal structures like the periodontal space and the adjacent lamina dura. Surprisingly even cortical and trabecular bone were displayed better with MRI than with MDCT and CBCT. Therefore, I believe that MRI could become an important complementary imaging source of the jaw and teeth apparatus in pathologies of tissue investing and supporting the teeth.”

MRI could be useful to better characterise soft tissue processes, or detecting inflammatory or neoplastic pathologies at an early stage, he noted. Moreover, dynamic high-resolution MRI with a contrast agent might be an interesting option to visualise teeth vascularisation after trauma, or to monitor inflammatory changes under therapy, such as in patients with periodontal disease.

When asked what delegates will learn from his presentation, Rohde said, “Delegates should become aware of the fact that MRI is ordi- narily technically feasible and might be an alternative imaging technique in patients with infl ammatory or neoplastic lesions, periodontal lesions, or after teeth trauma.”

WHAT TO KNOW ABOUT CBCT

“The CBCT technique is well-known among dentists and oral radiologists, but it’s not as well known among general radiologists. It’s very important general radiologists are familiar with this technique and that they know the indications for its use, according to Dr. Anni Suomalainen, from the radiology department at Helsinki University Central Hospital in Finland.

CBCT is a radiographic imaging method that allows accurate 3D imaging of hard tissues. During a CBCT scan, the scanner rotates around the patient’s head (180°–360°), obtaining multiple sequential planar projection images by a 2D detector. The scanning software collects the data which are then processed to create a volumetric dataset with isotropic voxels with varying field-of-view.

The pitfalls with CBCT are artefacts, which are either physics-based, patient-related, or cone-beam related. For example, metal objects in the scan field can cause severe streaking artefacts and patient motion during the exposure can lead to lack of sharpness in reconstructed images.

“Low-dose CBCT examinations with high quality will be further developed, as well as artefact reduction algorithms,” Suomalainen said. “In addition, the use of CBCT devices in other fields of medicine will be increased, and with increasing research results, its use will be more evidence-based.”

After the presentation, ECR delegates will be familiar with the CBCT technique and will know about the indications for its use, Suomalainen added.

Special Focus Session
Sunday March 9, 14:00–15:30, Room P
SF 14c: Dental imaging

• Chairman’s introduction
  J. Frühwald-Pallamar, Vienna/AT
• Review of dentomaxillofacial anatomy with panoramic views and cone-beam CT
  A. Suomalainen, Helsinki/FI
• Pre-surgical and post-surgical imaging with MDCT and cone-beam CT
  A. Gabalstetter, Vienna/AT
• Dental MRI
  S. Rohde, Dortmund/DE
• Panel discussion:
  What is the impact of radiologists in dental imaging?

An example of cone-beam CT. In this instance, the lower left third molar (d. 38) was imaged after panoramic radiograph with CBCT. The arrows mark the mandibular canal. (Provided by Dr. Anni Suomalainen)

High resolution (3 tesla) MRI of a patient with an inflammatory endo-periodontal lesion at tooth 015 (arrow). Sagittal T2-weighted space (A). T2-weighted plus gadolinium (B). (Provided by Dr. Stefan Rohde)
Radiologists explore body composition imaging techniques

The study of body composition (BC) has become important in understanding and decoding not only diseases such as obesity and diabetes, but also processes like growth and aging, all of which impact health greatly. The dedicated Special Focus session today at the ECR will show delegates the importance of body composition for clinical practice, research and epidemiology, and teach them the advantages and limitations of imaging techniques in this still widely explored field.

BC analysis allows relative amounts of muscle, fat, bone and other vital parts composing the human body to be quantified, and characterised. In the last few years, interest in understanding a multitude of patho-physiological processes has grown rapidly – e.g. obesity, diabetes, and endocrine, gastrointestinal, renal, nervous and infectious diseases – as well as physiological and para-physiological conditions in athletes or growth and aging processes. The consequences of these diseases and processes on health can be serious for instance, the alterations in body fat content, and particularly body fat distribution, are associated with adverse metabolic effects and increased cardiovascular risk.

A wide range of non-radiological techniques such as bioimpedance, body mass index (BMI), bioelectrical impedance analysis and plenimetry (MRI, CT and MR) are considered to be among the most accurate approaches for the in vivo quantification of body composition, according to Giuseppe Guglielmi, professor of radiology at the University of Foggia, Italy. “BC analysis by DXA has been available for more than 20 years, however it has rarely been used clinically and has mostly been adopted in research settings including metabolic disease, dialysis, athletics, nutrition, a variety of paediatric conditions, and epidemiological studies,” said Guglielmi, who will chair the session.

DXA systems provide whole-body and regional estimates of three main components: bone mineral mass, lean body mass and body fat mass. They are non-invasive, widely available and relatively affordable measurement methods that can be applied to patients of all ages using minimal radiation. MRI and CT allow for the estimation of adipose tissue, skeletal muscle, and other internal tissues and organs with good results and promising improvements.

Indeed both techniques have a lot to offer in the management of obesity, a disease that affects more than a third of the population of the US and an increasing number of people worldwide. Along with a range of related conditions like heart disease, stroke, diabetes and certain types of cancers, obesity puts a huge strain on healthcare systems. In 2008, the annual estimate of obesity-related costs in the US was around 150 billion dollars per year and these people paid 1.500 dollars more than other patients for medical costs; figures that have most likely grown since then.

Physical activity and diet are important for addressing this new kind of epidemic and many techniques and methods exist to calculate how fat is distributed in the body all with their pros and cons. But whereas typical nutrition tests calculate how much fat is left, imaging offers the ability to not only locate and measure fat, but also to show how the disease changes during and after treatment, according to Dr. Dimitrios Karampinos, leader of the Body Magnetic Resonance Research Group at the Department of Diagnostic and Interventional Radiology at the Technical University of Munich, Germany. “It is really unique with imaging modalities is that they are able to tell us how much fat people have in their body and where it is located. Another interesting aspect is that we can monitor our patients under diet or increased physical activity, and understand with repeated imaging in this patient how fat amount and distribution change,” said Karampinos, who will also speak during the session.

CT is fast and efficient, and offers very high spatial resolution. But because it exposes the subject to ionising radiation, it is not suited to follow up the effects of interventions like diet and increased physical activity in a patient. Conversely, MRI is proving increasingly central in that area, according to Karampinos. “The big advantage of MRI is that we can study the same subject many times without exposing him or her to radiation. In addition, CT is mostly a single contrast technique it can give us primarily a single grey scale image to locate fat in the body. MRI gives us multiple contrasts in a single examination. In other words, we can run different pulse sequences to obtain different kind of information about the fat relating on the different MR properties of fat versus the water in the tissues,” he explained.

In his talk, Karampinos will first review the basics of how to manipulate MR contrast in order to segment fat regions using well-established T1-weighted imaging techniques. However, the main part of his talk will focus on discussing water-fat separation techniques, relying on the chemical shift difference between water and fat. These techniques were proposed a long time ago and have probably been used to separate water and fat qualitatively. There has recently been great interest among the MR community in making these techniques quantitative, aiming for a non-invasive measurement of the tissue fat content. “This is really an interesting option because, instead of needing a segmentation algorithm that says at a given location this is fat and this is water on a T2-weighted image, we now have a way to quantitatively measure fat content in any location inside the body. So we can now use MRI as a quantitative tool, which can also help us to check the effect of treatment more accurately,” he said. “For instance we can determine that a patient has 8% of fat in the liver at baseline and 4% after a four-week diet, and we can follow up fat content changes in any organ,” he said.

A quantitative measurement with MRI is always challenging. However, the accuracy and reproducibility of these techniques have been tested in the past couple of years, and now the time has come to start finding their applications through large multicentre studies so that the radiological community, along with obesity and metabolic physicians, can be shown that MRI has a very critical role to play, added Karampinos. At the end of his talk, he will also discuss the potential of quantitative water-fat MRI in the emerging application of measuring bone marrow fat content, and its association with bone health and metabolic disorders.

Knowledge of regional fat and lean body mass reproducibility seems to be important for a variety of fields, Guglielmi echoed. “Clinicians are increasingly recognising the cornerstone of success, an age-related decline in muscle function and mass, in terms of increased injuries, quality of life and fracture risk. Other researchers are focusing their attention on the nutritional status assessment of patients undergoing chemotherapy Cachexia, a frequent complication of cancer, may play a role in how patients tolerate treat-ment drugs and their outcome,” he said.

Although imaging techniques offer a differentiated and attractive answer for BC, they still need to find a definitive position in clinical practice. This is why every radiologist should attend the session today. Guglielmi said: “Since the clinical rules and potential applications of BC analysis still appear to be mostly unexplored, every radiologist should attend this session in order to expand research settings, create normal reference data, and rationalise the use of BC analysis in radiological practice.” he concluded.

#ECR2014E1 #SF15A

Sunday, March 9, 16:00–17:30, Room E1

Special Focus Session

Sunday, March 9, 16:00–17:30, Room E1

**Body composition:**

- a new string to the radiologist’s bow

- Chairman’s introduction
  - G. Guglielmi (Foggia/IT)
- Body composition: why and how?
  - J.B. Adams (Manchester/UK)
- Computed tomography: what does it measure and how?
  - J. Damasio (Innsbruck/GR)
- MRI: current and future applications
  - D.C. Karampinos (Munich/DE)
- DXA: technical aspects and application
  - A. Ruzzenich (Bologna/IT)
- Panel discussion:
  - How to rationalise the use of body composition analysis in radiological practice

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**Fat fraction map in the proximal femur of a young healthy male subject. Colored represents fat fraction values in %:** The fat fraction map enables the determination of the fat content in the red and yellow bone marrow. (Images provided by Dr. Dimitrios Karampinos)

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Professor Giuseppe Guglielmi from Foggia, Italy, will chair today’s session on body composition. A wide range of non-radiological techniques such as bioimpedance, solution techniques, bioimpedance and air displacement techniques, bioelectrical impedance analysis and dilution techniques, rely on the potential of quantitative water-fat MRI in the emerging application of measuring bone marrow fat content, and its association with bone health and metabolic disorders.
Future developments in MR-guided focused ultrasound

MR-guided focused ultrasound, or short MRgFUS, is a new therapeutic modality that allows selective destruction and heating of tissue in deep body areas under close image guidance control. High-intensity focused ultrasound (HIFU) is the only clinically viable technology that can be used to non-invasively achieve a local temperature increase deep inside the human body.

The effects of high-intensity focused ultrasound are based on simple physical principles. When sound waves are absorbed, the mechanical energy of the pressure wave is converted into thermal energy. This is negligible, or unnoticeable, in ultrasound imaging but at greater intensities the tissue becomes warmer. By using several transmitters at once rather than one, while making sure that the sound waves are all in phase at a specific location, high amplitude vibrations and, after a while, high temperatures increase can be seen. The dimensions of the sound wave’s focal point are of the order of the wavelength if a large aperture is used. Although these physical principles have been known for a long time, as well their potential in medical applications, there were a lot of technical difficulties to overcome, according to Prof. Christ Moonen from the University Medical Center Utrecht, the Netherlands.

“During the 1990s and 2000, the Fry brothers in Illinois already developed an ultrasound device for treating brain tumours. The idea was wonderful but, in those days it was not possible to see exactly where the focal point of the sound waves was located with respect to the brain structures.

Moreover, it was not really clear just how warm the tissue actually became. A major step towards clinical applications was taken during the 1990s in Lyon by Dominique Cathignol’s group. Prostate cancer was treated using an endorectal ultrasound transmitter. The positioning of the device was verified using ultrasound imaging. However, the temperature could not yet be measured, or at any rate not non-invasively,” said Moonen. It is a well-known fact that MRI is the best approach for identifying and locating abnormalities in soft tissue, but it might be less well known that it is also the only currently available method to non-invasively measure temperature changes inside the body. This is because temperature changes can affect the forces between neighbouring molecule scales inside the tissue, and that will show in the MRI signal. Temperature measurements using MRI make it possible to adjust the heating effect by modifying the delivered energy in the same way as a thermostat does. For the first time, MRI-guided HIFU can raise the temperature locally in the tissue and control it, automatically and non-invasively:

“This is important for the treatment since we have to make adjustments for variable perfusion, variable absorption of ultrasound and variable thermal insulation. If we heat tissue for a certain time, the tissue will die off once what we refer to in professional jargon as the lethal thermal dose has been exceeded. It does off immediately as a result of damage to proteins and membranes, we then refer to that as ablation. Sometimes, however, sometimes happen more slowly, sometimes even several days after heating, if biochemical reactions have to take place first. This is referred to as apoptosis,” Moonen explained on the usage of MRgFUS.

Afterwards MR imaging can be used to monitor treatment response, or an MRI contrast agent can be used to determine whether the therapy has actually been effective. Lesions can be detected by their dark core and the high signal activity around them. The dark core shows that the contrast agent can no longer penetrate it, as the tissue is no longer perfused. High signal activity around the edges of the lesion can be seen due to increased blood flow in these areas.

“There are several alternatives, but the approach using MRI-controlled sound waves has the great benefit of being entirely non-invasive. We therefore expect that there will be far fewer negative side effects. Also, the method is expected to be more precise because of the real-time MRI guidance. MRI-guided HIFU treatment of uterine fibroids is now an accepted approach with patients going home the day of the treatment,” said Moonen.

Besides all the positive effects, there are still technical difficulties and physical limitations to overcome. The spatial precision is limited by the ultrasound frequency and the ultrasound transducer needs to be as large as possible. Apart from perfusion, near-field and far-field heating can present risks that should be carefully evaluated in every case. Bone and gas regions in the beam path represent obstacles for the ultrasound beam paths as it can be heavily absorbed by the bone cortex, which can be problematic and result in unwanted heating. In other cases, such as tumour metastases in bone, such heating can be used for rapid pain relief. Ultrasound applications in the liver, kidney and pancreas are technically more difficult because of the movements caused by respiration and heart beat, as well as by the fact that the site partially reflects or absorbs sound waves. New techniques are being developed to provide solutions to these problems.

Currently, several applications of MRI-guided HIFU in oncology are being tested (e.g. breast, liver, kidney and pancreas) and technological advances should lead to higher treatment precision, rapid volumetric treatment, and better temperature control. But cancer care is not the only field in which MRI-controlled ultrasound may result in a new therapy. The technique has also been used successfully in the treatment of essential tremor (or action tremor) in Canada and the United States, resulting in a recent paper by Elias et al. in The New England Journal of Medicine. Immediately after the operation, the patients were able to hold a glass of water and drink it without for the first time in ten years. It is possible to use sound waves in conjunction with ultrasound contrast agents to temporality and locally open up the blood brain barrier, which is one of the biggest obstacles preventing effective medicines from getting into the brain. MRI-guided HIFU also has tremendous potential in local drug delivery in the brain and elsewhere, and can be used in combination with temperature sensitive drug nanocarriers.

Finally, when asked why he would recommend this session to ECR attendees, Moonen had this to say: “The Special Focus session on MRI-guided focused US will give an excellent insight into the basics, the technical developments and applications, as well as novel applications of the great new technique. Attendees learn that focusing ultrasound presents a huge range of possibilities in medical care. Planning, controlling and evaluating this by means of MRI makes the technique more precise and allows us to measure the effect. Local heating of tumours by ultrasound waves can kill off the tumour. The technique is only in its infancy and is still only being tested clinically at a small scale. But MRI-controlled ultrasound also has numerous potential applications in chemotherapy in combination with radiotherapy.”
**French radiologist discusses benefits of new cancer therapies**

**ECR Today** spoke with Eric de Kerviler, professor of radiology at Saint-Louis Hospital, University Paris Diderot, about the State of the Art Symposium Tumour response assessment in clinical practice, which he will chair today at the ECR.

**ECR Today: What are non-cytotoxic targeted therapies?**

Eric de Kerviler: Noncytotoxic molecular targeted therapies are treatments that have been developed against growth factor receptors and tumour angiogenesis. They are designed to interact with specific molecules, which are part of the pathways and processes used by cancer cells to grow, divide, and spread throughout the body. There is an overlap between cytostatic drugs and targeted therapies: some cytostatic drugs are not targeted, and hormone therapies used to treat breast cancer could also be called cytostatic therapy.

These therapies are increasingly used as a first-line treatment, at baseline or in cases of recurrence. Because many drugs are under development, they are given within the framework of clinical trials. However, many of these drugs have already become part of the recommended treatment. The first molecular target was the estrogen receptor for the female hormone oestrogen, which many breast cancers require for growth. Among other examples, let us cite imatinib, which has been approved to treat gastrointestinal stromal tumour and lymphomas, and vemurafenib for the treatment of certain patients with inoperable or metastatic melanoma.

**ECR: Who can benefit from these therapies?**

EdK: Predictive biomarkers capable of discriminating between individuals who will benefit from a given therapy from those who will not are key to personalised medicine. Patients with tumours demonstrating permanent biomarker expression can benefit from targeted therapy. Ophthalmologists, for example, in patients with B-cell lymphoma receiving rituximab. This monoclonal antibody is targeted towards a protein called CD20 located on mature B lymphocytes. In other patients, a particular genomic profile should be tested before giving the drug. This is the case with melanoma, in which vemurafenib is proposed only in patients with a BRAF mutation.

Many studies have shown an improvement in the survival of patients with advanced cancer when using targeted therapies. However, even in patients with a positive predictive biomarker, undergoing a targeted therapy that is likely to be effective, primary resistance is seen in about 30% of the cases, and disease occurrence occurs uniformly in patients with an initial response. Therefore, the long-term efficacy of this targeted therapy is yet to be established.

**ECR: How do you measure the efficiency of these therapies?**

EdK: Morphology-based criteria (RECIST), which were established in cytotoxic therapy trials, are not appropriate tools for assessing targeted therapy, in which tumour shrinkage is not necessarily observed. Endpoints such as PFS or TTF, which focus on progression rather than regressions, are appropriate and commonly used in clinical studies of targeted therapy. Quantitative non-anatomical imaging approaches can be used as a biomarker of cancer response to predict, or assess, the efficacy of treatment and look for changes in tumour biology. Tumour density on CT, vasculature on DCE studies, cellularity on DM or metabolism at 18F-FDG PET are some criteria commonly used for assessing tumour response.

**ECR: What molecular imaging modalities and biomarkers do you use to follow up therapy?**

EdK: The most promising and widely used modalities are PET and MRI (diffusion and perfusion). To a lesser extent, SPECT and PET density on CT or CE-US can also be used. More recently, elastography, which enables tumour stiffness to be evaluated, has been suggested as a reliable tool to predict and assess early tumour response. Many imaging biomarkers are already available and widely used with cytotoxic drugs. For instance, “FDG-PET is very useful for assessing therapeutic response in Hodgkin’s disease, as patients do not receive targeted therapy. Using the same non-specific radiopharmaceutical, some studies have shown a marked decrease in 18F-FDG uptake in small cell lung cancer after administration of an EGF antagonist. Some imaging biomarkers are more specific for evaluating the direct effect of EGF antagonists on tumour vasculature. However, anti-angiogenic therapies do not always result in reductions of blood flow in the short term, and DCE MRI kinetic response relationships are not universally strong across all tissues and with advanced drugs. Therefore, further research is needed to choose between or combine several imaging biomarkers.

**ECR: How promising are PET-CT dynamic contrast enhancement and diffusion-weighted imaging?**

EdK: Depending on the targeted therapy that is used, many changes may occur within tumours. However, imaging biomarkers needed to monitor tumour response should be usable by everybody and reproducible. This is the case for PET/CT, dynamic contrast enhancement studies and diffusion-weighted imaging. Nuclear medicine physicians now routinely use most recent PET tracers. Diffusion-weighted imaging is also done on every recent MR system, even though refinements in MR parameters are required, along with thresholds for identifying response. Lastly, DCE is now more widely used in breast or prostate protocols and should soon become part of the protocol for many tumours.

**ECR: What are the potential pitfalls of these techniques?**

EdK: While depicting an image of molecular characteristics of different tissues, PET can sometimes be imprecise in anatomical location. Also, if FDG is the most widely investigated radionuclide, it is not specific at all. Different levels of accumulation of 18F-FDG are reflections of diverse energetic needs, including inflammation, infection or tumour progression. There is, therefore, a true place for new radiopharmaceuticals associated with various metabolic pathways. On the other hand, MRI plays a more prominent role in following a tumour under treatment. However, many patients have metastases. In these patients, doing a whole-body examination using diffusion and perfusion is a real challenge. There are also many pitfalls in the interpretation of MR signal.

**ECR: When do you think these techniques will actually benefit patients?**

EdK: Most of these new techniques are under investigation in clinical trials. So far, clinical investigations have validated a reduction in 18F-FDG uptake that occurs in oncological tissues after anticancer treatment in various tumours, including lung cancer and malignant lymphoma, and is closely correlated with final outcome of therapy. Choi criteria are already used in the evaluation of gastrointestinal stromal tumours. Therapy-induced changes in ADC are under investigation in lymphoma, breast cancer, and rectal cancer receiving neoadjuvant chemotherapy. New anticancer agents will probably need to have specific response criteria.

**Patient receiving neoadjuvant chemotherapy for breast cancer. At second cycle, the mass has markedly decreased in size suggesting a good response. However, dynamic contrast enhancement demonstrates stable microvascular parameters (permeability and interstitial volume fraction) suggesting non-response.**

**State of the Art Symposium**

Sunday, March 9, 13:00-17:00, Room E2

« 3rd ECR-AIA Oncology Symposium »

**SA 15: Tumour response assessment in clinical practice**

- Chairman’s introduction
  E. de Kerviler; Paris/FR
- Endpoints for therapy response assessment: the oncologist’s perspective
  J. Carles; Barcelona/ES
- Revised RECIST guidelines: principles, practical applications and pitfalls
  L.S. Fournier; Paris/FR
- Criteria beyond RECIST
  Choi, RECIST, EASL-AASLD, PERCIST
- S. Gwyther; Redhill/UK
- Emerging biomarkers for response assessment: pros and cons
  M.C. Roethke; Heidelberg/DE
- Panel discussion: Personalised response criteria for personalised therapies

**Images provided by Prof. Eric de Kerviler**
The European Society of Neuroradiology (ESNR), chaired by Prof. Pia Maly-Sundgren, offers three levels of neuroradiological courses. The first level was successfully implemented in cooperation with the European School of Radiology (ESOR). The Galen Foundation Course on basic neuroradiology was held in 2013, by Prof. Cem Calli, in Izmir, Turkey.

The second level is the success story of European neuroradiology. The 12th Pierre Lasjaunias European Course on Neuroradiology (ECNR) is split into four one-week modules. The first and the third modules, under the co-directorship of Prof. T. Tali and Prof. A. Gouliamos, took place in Antalya, Turkey, in November 2012 and 2013, and the second module took place in Athens in April 2013. The fourth module will again take place in Athens in April 2014. More than 250 participants from different European countries and non-European countries (Middle East, South America, South Africa and North America) attended each module. The increased number of non-European participants clearly shows that European neuroradiology is on its way to assuming a leading role in education within and beyond Europe.

At the third level, a number of advanced courses were held in the fields of paediatric (Chair: Dr. Andrea Rossi), interventional (Chair: Prof. Michael Söderman), and spinal neuroradiology (Chair: Dr. Mario Muto). Traditionally during the ESNR annual meetings, the European Diploma in Neuroradiology (EDiNR) is awarded. Over the last four years, 51 colleagues received the Neuro Diploma in Bologna, Italy, 52 in Antwerp, Belgium, 61 in Edinburgh, UK, and 41 in Frankfurt, Germany. In 2013, for the first time, the ESNR awarded a diploma of higher qualification. Seven colleagues were given the European Diploma in Paediatric Neuroradiology (EDiPNR).

The ESNR has also taken the initiative to promote teaching in cooperation with other national societies. In 2013, four ESNR representatives (Prof. Paul Parizel, Prof. Turgut Tali, Prof. Majda M. Thurnher and Dr. Pedro Vilela) actively participated in the Neuroradiology Course during the 43rd Jornada Paulista de Radiologia in São Paulo, Brazil.

Since its foundation 45 years ago, one of the major goals of the ESNR has always been and will continue to be education. ESNR courses welcome all radiologists, from those who need basic knowledge, to those who want to learn to become neuroradiologists, as well as those with advanced knowledge of neuroradiology. The ESNR will continue to be devoted to education, as we honestly believe in Learn Advance Perform, to be the only teaching concept that works for us and serves our patients.

More information about the ESNR can be found at www.esnr.org

Professor Majda M. Thurnher from Vienna, Austria, is Vice-President of the ESNR.

ESNR and ESR team up to launch Board of Neuroradiology

The European Society of Neuroradiology – Diagnostic and Interventional (ESNR) was founded in 1969. Over the last decade, the society has grown from a 300-member society to a 4,000-member society. And it has now taken a major step towards advancing education in neuroradiology by establishing the European Board of Neuroradiology in conjunction with the ESR. The board will organize exams and issue certificates for the society’s already popular European Diploma in Neuroradiology.

The European School of Neuroradiology (ESNR), chaired by Prof. Pia Maly-Sundgren, offers three levels of neuroradiological courses. The first level was successfully implemented in cooperation with the European School of Radiology (ESOR). The Galen Foundation Course on basic neuroradiology was held in 2013, by Prof. Cem Calli, in Izmir, Turkey.
Changes in how hospital services are organised across Europe are arguably having a greater impact on radiology departments than on other clinical disciplines. In many countries, hospitals no longer operate as stand-alone entities, but as part of a local or regional network, as healthcare administrators respond to the pressures of increasing demand, static or shrinking budgets and an ageing population.

As providers of medical services to multiple clinical departments, radiologists are also adapting to their changing role of providing diagnostic expertise to colleagues working in institutions tens or even hundreds of kilometres away. However, some of the technologies that will help ESR members to deal with shifting demands on their time are on show in the commercial exhibition.

**GE HEALTHCARE** aims to improve the capability of medical staff throughout the hospital to work with colleagues across medical disciplines, administrative boundaries and even national frontiers. The company is demonstrating its new Centricity 360 concept – a cloud computing service rather than a product – intended to provide healthcare professionals with internet access to a wide range of distributed services and the ability to share patient information both securely and in real time.

"This is not a radiology service, it is much broader than that. It is intended to help connect all health-care professionals to work with colleagues to achieve better treatment for their patients. That isn’t just staff working in the same building but colleagues who are at home or work in a different hospital or a different country. It is not only radiology images that can be exchanged but all relevant studies in the hospital system such as cardiology or pathology exams," explained Bernard Algyeus, GE’s general manager for radiology IT in Europe.

In the radiology arena, Centricity 360 is a convergence between a traditional PACS and advanced visualisation technologies, he said. It will be launched in Europe during the first half of this year with a patient case transfer capability, and additional services will be added later. Eventually, the company hopes to develop the service as a ‘virtual meeting space’ for multidisciplinary team meetings.

The work tools available with the service are intended to help communities of specialists to collaborate more efficiently. Regionalisation is transforming the way that healthcare technology providers design their products, and we think we are ahead of the game,” Algyeus added.

Another vendor at the front of efforts to advance distributed radiology services is **SECTRA**. Its technical staff are keen to explain how the company is trying to strengthen one of the weak links in the chain of diagnostic services in many advanced health systems: problems in getting an opinion from a specialist pathologist on a biopsy sample. This is caused by a combination of dated technology in the form of glass microscope slides that can be broken or lost, and a shortage of pathologists in many countries.

"In some states or regions it can take several weeks for the referring physician to receive a report, and in oncology patients, that is just not acceptable," said Marie Ekström, general manager for radiology IT at Sectra.

Assisted by funding from Vinnova, the Swedish national research agency, Sectra is working with academic partners on a project to develop the technology needed to scan, store and display digitised histopathology images.

"With digital images and the advanced image analysis algorithms available today we can provide a more solid objective platform for the subsequent diagnostic conclusions. In addition, image analysis has the potential to add new examination possibilities not available in the analogue microscope," she explained.

At ECR 2014, Sectra staff are showing the results so far, although Ekström acknowledges that there are still considerable hurdles to overcome particularly in relation to handling the huge volume of digital data likely to be generated by a busy histopathology unit.

Meanwhile, **SIEMENS HEALTHCARE** is working to provide radiologists with a speedy workflow and greater diagnostic precision when working on MR and CT images. The new V4N.1 version of its syngo.via software, via the routine 3D and advanced reading software contains the General Engine package of automated and standardised applications. It features 'anatomical range presets', which provide a quick, precise and optimal view of key anatomical features without the need for the radiologist or technician to spend time choosing and creating projections manually, according to the firm.

Marc Lauterbach, vice-president for marketing with at the SYNGO business unit, believes a key benefit of the new edition of its Advanced Reading and advanced reading software syngo via is the inclusion of ALPHA (automated landmarking and parsing of human anatomy) technology.

"Landmarking is a well-established concept in the imaging industry but the parsing element is new and very exciting. ALPHA not only identifies anatomical landmarks but it really understands their meaning and those of adjacent structures. So it will automatically align images of, say, the shoulder joint in a trauma patient, to look along the axis of adjacent structures such as the humerus bone, looking for signs of a fracture," he noted.

The new edition is also designed to minimise potential delays in disseminating the results with its advanced reporting tool, which helps radiologists to create clear, well-structured reports for the referring physician. It offers standardised templates, making it easier to produce standard reports that can then be customised to individual needs. Also, findings from multiple different examinations can be consolidated into a single report through a simple drag and drop process, he added.

On the PHILIPS stand, staff are unveiling the latest refinements to its Intellispace technology. Intellispace is described as a thin-client solution requiring no dedicated workstation on which to perform the advanced analysis functions that it offers.

Our new version contains the CT trauma package which addresses the workflow challenges faced by radiologists. A CT scan is obviously the first priority for assessing a patient who may have head, spine or internal organ injuries following...
an accident. But a modern scanner may create 3,000 individual images in just 10 seconds and examining all that data is an impossible task for one person,” said Dr. Jerome Galbrun, head of marketing for Philips IntelliSpace portal. “We have produced software that can extract the relevant information quickly as possible and identify the critical areas. It’s the radiologist and surgeon need to look at in planning treatment.”

In addition, Philips has updated the service to include advanced applications for MR and nuclear medicine examinations in a vendor-neutral technology capable of processing images derived from any company’s scanner. Its ability to combine the results of CT, MR and PET imaging modalities will prove invaluable in monitoring treatment of oncology patients by providing objective and accurate data on how the size of the tumour has changed over time, he said.

Across the hall on the CARE-STROM stand, the company is showing its new generation Vue PACS as a work in progress designed to integrate images with reports and enable cost-effective teleradiology capabilities. A further highlight is the Vue Vendor Neutral Archive, a portfolio of solutions that store medical information in a non-proprietary interchange format that allows it to adapt to any enterprise or departmental information-sharing workflow and open standard. Clinicians have access to a unified view of their patients’ clinical information across disparate systems with a global or single access virtually anytime, anywhere, according to a company statement.

Another work-in-progress in Carestream’s planned enhancements to the digital breast tomosynthesis module on its Vue Mammo workstation intended to produce DICOM-compliant 2D synthetic views calculated from the 3D dataset.

The display systems manufacturer BARCO is also introducing a number of extensions to its product range. Lynda Demogollis, vice president for healthcare product marketing, drew attention to the performance of the company’s Mammo Tomosynthesis (MB) which she says is the only digital mammography display that has been designed specifically for breast tomosynthesis. “Featuring up to four times more brightness and double the lifetime of other mammography displays, it also presents up to 10% increased visibility of small microcalcifications,” she said.

Finally, AGRA is keen to impress on visitors to its stand the potential advantages of its latest Impax Agilis PACS, a departmental imaging platform designed to improve productivity, reduce cost and facilitate quality outcomes.

According to a statement, “This multi-modality and multi-departmental PACS, voice recognition and connectivity into one single system. IMPAX Agility streamlines navigation with a dynamic user interface and diagnostic tools to support enhanced productivity. A powerful task-based workflow engine helps to ensure that users follow the appropriate steps for each procedure and circumstance, from ordering to result communication through mobile apps.”

**Technology Focus**

### Healthcare IT

Healthcare IT is undergoing a painful evolution. Sparked by spiralling healthcare costs, healthcare providers are waking up to the reality that their sector is lagging behind. Radiology to date has tended to be ahead of the curve in adoption of healthcare IT, evident in the widespread implementation of Picture Archiving and Communication Systems (PACS). However, over-reliance on PACS and stubborn resistance to broader co-operation with other stakeholders is holding back IT development. Before we take a quick look at the dynamic challenges impacting this rapidly evolving industry.

**PACS**

PACS offered radiology a glimpse into the future. The ability to archive, query, annotate and share images across departments and clinics was the first building block of the digital hospital. “You’re at the forefront of cutting-edge technology, radiologists embraced PACS,” Jargon-heavy discussions about PACS as a work in progress designed to integrate images with reports and enable cost-effective teleradiology capabilities. A further highlight is the Vue Vendor Neutral Archive, a portfolio of solutions that store medical information in a non-proprietary interchange format that allows it to adapt to any enterprise or departmental information-sharing workflow and open standard. Clinicians have access to a unified view of their patients’ clinical information across disparate systems with a global or single access virtually anytime, anywhere, according to a company statement.

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**Big data**

Big data is changing healthcare. As the sheer volume of medical information grows, new solutions for the storage needs have emerged.

**REVENUES ($ millions) - includes new systems and maintenance**

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<th>Year</th>
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**THE CHALLENGE AHEAD**

Admittedly, seamlessly integrated HIS still has a long way to go, with only a few sub-regional or multi-hospital systems in place currently. Roll-out of such systems has huge barriers to face including patient confidentiality, public and private integration, governmental, state and hospital level regulation, not to mention the sheer out of upgrading existing IT and connectivity infrastructure to manage such a complex system.

Yet, scaling such challenges must begin with overcoming smaller barriers towards a common goal – HIE roll-out. Over-reliance on PACS as a storage solution is one such barrier that is simple to correct. The inherent design and concept of PACS was for departmental management of DICOM images. It was never intended for one-to-one file distribution. With this in mind, why are vendors still offering PACS solutions allowing to push enterprise PACS solutions? Why not instead use the experience gained through widespread PACS roll-out to drive the next generation of user friendly, smart VNA?

Hospital today is multi-format, vendor-neutral storage. They need seamless interoperability and flexibility between departments, sites and users. Most importantly, they need storage that will push them in the direction of a common goal greater use of big data. PACS has certainly played a significant part in driving healthcare IT integration. However, it is unlikely to play as significant a role in the future of healthcare IT.

### Conclusion

Big data is changing healthcare. As the sheer volume of medical information grows, new solutions for the storage needs have emerged. A further highlight is the Vue Vendor Neutral Archive, a portfolio of solutions that store medical information in a non-proprietary interchange format that allows it to adapt to any enterprise or departmental information-sharing workflow and open standard. Clinicians have access to a unified view of their patients’ clinical information across disparate systems with a global or single access virtually anytime, anywhere, according to a company statement.

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Multi-modality tumour tracking results page on Philips’ IntelliSpace Portal 6 shows the progress of tumours, calculated as RECIST, in numeric and graphical presentation, in addition to the volumetric images of the tumours in the body.

**Stephen Holloway is Associate Director at Medical Devices 6 Healthcare IT, HIS.**

**Forecast development: World radiology PACS vs. VNA (Revenues $ millions) - includes new systems and maintenance**

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<th>Year</th>
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Prof. Gabriel P. Krestin will assume the role of scientific director of the European Institute for Biomedical Imaging Research (EIBIR) after being nominated for the role during the organisation’s General Meeting yesterday.

Committed to radiology research, Krestin worked with the ESR to establish EIBIR, which aims to foster and strengthen biomedical imaging research in Europe and has been involved with the organisation since its founding in 2006. He also recently served as chairman of the General Meeting. Since its inception, EIBIR has developed into a key platform for supporting research networking activities, spreading good practice and promoting common initiatives and interoperability in the field of biomedical imaging research. Stakeholders in the EIBIR network have also continued to grow and include European research institutes, shareholder organizations and industry partners.

ECR Today spoke with Krestin to hear some of his thoughts about EIBIR and his ideas for the future of the organization.

ECR Today: Looking towards 2014, what activities and initiatives would you like to see begin this year?

Gabriel Krestin: We will have to strengthen the strategy and further extend the activities of EIBIR in the coming year. For now, I hope that at least some of the applications to the first call for proposals in the Horizon 2020 research funding framework of the EC will go into the second phase. That would keep the EIBIR office very busy in the coming months but would also give a new boost to EIBIR’s role as coordinator and administrator of biomedical imaging research in Europe. Furthermore, I hope that some new joint research initiatives will start in image-guided interventions, radiation therapy planning, and neuroimaging. Moreover, the intention is to set up a virtual contract research organisation that will enable multicentre imaging trials, initiated by researchers or by industry, to be performed.

ECRT: In the longer term, how do you think EIBIR will contribute to biomedical imaging research within Europe?

OK. The ultimate goal for the years to come is for EIBIR to become, and to be recognised as, the most efficient and effective research support organisation for all biomedical imaging related research in Europe. I would like to see EIBIR known by every radiologist and every researcher involved in imaging research. The more requests and questions EIBIR receives, and hopefully solves, the better I hope that the newly appointed Scientific Advisory Board of EIBIR will play a proactive role in encouraging multidisciplinary collaboration, initiating innovation and development of new technologies, and proving the effectiveness of the established ones. I also hope that the commitment of the increasing number of EIBIR shareholders will further this kind of collaboration.

ECRT: What are some of the challenges that the organisation will face in the future?

OK. Sustainable funding is and remains the main problem for EIBIR. While EIBIR services have led to a high number of positively reviewed and funded European projects, the upfront costs for such services are quite high and not refundable from dedicated project costs. So these EIBIR expenses have to be covered by the membership fees and industry contributions. Therefore, I would like to encourage every European organisation interested in research to become an active member of EIBIR. In that way we will be able to extend our services and start to initiate and support larger multicentre studies in which EIBIR provides support with study design, monitoring and data management.

ECRT: As EIBIR’s scientific director, what are you most looking forward to about your new role?

OK. I am very much looking forward to working together with the enthusiastic and expert EIBIR office team under the guidance of Monika Hierath and with the members of the Scientific Advisory Board. Their input will be needed for initiating new ideas and for supporting EIBIR with expert opinions in all research policy questions that may affect imaging research and innovation in Europe.

EIBIR appoints new scientific director

EIBIR promises another year of high-quality educational activities

Professionals in magnetic resonance meet in cities all over Europe to share their expertise and knowledge and to contribute to the high standards of the European Society for Magnetic Resonance in Medicine and Biology (ESMRMB) educational programmes.

Assured and encouraged by highly appreciated positive feedback in 2013, we are determined to keep our high standards.

School of Mri

Physicians and MR technologists/radiographers are cordially invited to 10 advanced clinical English language courses.

Course duration: 2-5 days

Interactive character with 50% of the total teaching time used for repetitions in small groups

- Professional and didactically experienced teachers
- Accredited by UEMS/EACCME with up to 15 credits per course
- Maximum 65 participants per course

Lectures on Mr

MRphysicists and other basic or clinical scientists are warmly welcome to 6-10 courses in 2014.

Course duration: 2 – 5 days

- 80% of the total teaching time is used for repetitions, exercises, and practical demonstrations
- Accredited by EFOMP
- Maximum 50 participants per course

Hands-on Mr

MRI technologists, radiographers and interested physicians should know that two courses are planned in 2014.

Course duration: 2-5 days

- VENDOR specific hands-on training on the scanner and workstations
- Accredited by UEMS/EACCME with up to 10 credits per course
- Maximum 30 participants per course

Teach the Teacher

Clinical Mr

The EIBIR is proud to announce the first training course of its Teach the Teacher Programme in 2014. The EIBIR and ESMRMB together offer young academic radiologists from emerging countries a two-month fellowship in one of the world’s leading MR centres to be trained as an ESMRMB/EIBIR certified teacher in a specific field of applied MRI (e.g. musculoskeletal, cardiac, abdominal MRI).

ESMRMB Annual Scientific Meetings

After celebrating its 30th Annual Scientific Meeting in Toulouse in 2013, the ESMRMB is delighted to announce its Joint Meeting with the International Society for Magnetic Resonance in Medicine (ISMRM) on May 26-30, 2014, Milan, Italy. Discover 6000 clinicians, physicists, engineers, biochemists and technologists from more than 70 countries around the world for the premier meeting in the global MR community.

The EIBIR and the Scientific Programme Committee chair for 2014, Marion Smits, would also like to invite you to the Annual Scientific Meeting 2015. Another exciting programme will be put together with the Committee Members and enriched by your participation. We are looking forward to welcoming you to Edinburgh, UK, on October 3–5, 2015.

Find out more at www.esmrmb.org and join us on Facebook and Twitter.

EIBIR Session at ECR 2014

Sunday, March 9, 1600-1730, Room P

Encite Based Insights for Molecular Imaging in Guidance of Therapy

Chairman: M. Heemskerk; Rotterdam/NL

- Introduction
  - M. Heemskerk; Leiden/NL
- A dual-modality gene reporter for in vivo imaging
  - I. Blinc; Cambridge/UK
- MR imaging for pancreatic cells transplantation
  - M. Hájek; Prague/CZ
- Optical imaging in the clinic
  - O. Clément; Paris/FR
- Mesenchymal stem cells constructs for image-guided cell therapy in myocardial ischemia and digestive fistulas
  - K. Brindle; Cambridge/UK
- Is cell imaging relevant for the clinic? Lessons to be learned from pre-clinical research
  - M. Neeman; Rehovot/IL
- Discussion

#ECR2014p

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EMAN works toward long-term goals

Medical diagnostic procedures constitute by far the greatest man-made source of ionising radiation exposure to the general population. Although the benefit for the patients exposed will normally outweigh the risk associated with the radiation, there is concern that patients may undergo radiological examinations that will not have any positive impact on their clinical assessment, or that unnecessarily high doses of radiation could be delivered with regard to the diagnostic outcome.

Moreover, the increasing use of ionising radiation in the medical sector also has an impact on occupational radiation exposure. In order to strengthen radiological protection in the field of medicine and promote a patient safety culture, a variety of stakeholders have to be addressed and involved, pinpointing the specific roles of the different health professionals as well as education, training, organisational and ethical aspects. To support the task regarding optimisation of procedures, the European Commission funded the EMAN (European Medical ALARA Network) Tender Project that formally ended in October 2012. After the successful conclusion of the EC-funded Tender Project, the three professional organisations involved – the European Society of Radiology (ESR), European Federation of Radiographer Societies (EFRS) and the European Federation of Organisations for Medical Physics (EOMP) – decided to ensure the sustainability of the Network, and signed a Letter of Intent in September 2012, forming the new EMAN Steering Committee. This paved the way for the post-project activities of the Network and further outreach to other relevant stakeholders.

The EMAN Network structure includes a Steering Committee (ESR, EFRS and EOMP), a Management Office (ESR), stakeholders, and observers. To date the following organisations have joined EMAN: Nuclear Protection Evaluation Center, France (CEPN) as a stakeholder; European Radiation Dosimetry Group (e.V./URADOS), Federal Office for Radiation Protection in Germany (BS), Swedish Radiation Safety Authority (SSM) and the European Commission (EC) as observers.

The Steering Committee has reached out to a number of additional medical professional organisations, international organisations and regulatory bodies inviting them to join the Network and is hoping to further enlarge the Network in the near future.

The objectives of the EMAN network are:
• To collaborate among professional partners in medical radiation protection in order to improve optimisation and to expand the network established under the EC Tender project
• To specifically update and expand optimisation in CT, interventional procedures and the use of x-rays outside the departments of radiology
• To increase the visibility of EMAN among all groups of stakeholders in order to bring awareness, knowledge, skills and competences to individual members of the medical workforce
• To disseminate up-to-date information about literature, studies, research and good practices relating to the ALARA principle in the medical sector
• To provide a platform for multi-stakeholder exchange and discussion in the fields of medical radiation protection
• To identify and communicate challenges faced by hospitals in regard to radiological protection and to provide tools for the assessment of optimisation of radiological protection

To potentially expand the scope to other clinical areas of optimisation

The long-term vision of the EMAN Network is to contribute to optimising radiation protection for healthcare workers and patients throughout Europe and to ultimately contribute to an effective safety culture in the medical sector.

The main aims the Network builds on are the radiation protection strategies developed during the EC-funded phase in the areas of computed tomography, interventional radiology, cardiology and radiological practices performed outside the radiology department. Three working groups with representatives of the professionals involved, medical radiologists, cardiologists, radiographers, medical physicists and regulators, worked for two years to identify the needs and priorities for the implementation of elements to increase the level of radiation protection both for patients and, when relevant, staff.

The results achieved by the three multidisciplinary groups provide the methodology for other fields of diagnosis and therapy. It is recommended that the same methodology be applied at the hospital level, establishing multidisciplinary core teams to implement exposure optimisation in different areas. The role of the core team is to develop optimised procedure protocols, train staff and supervise practice. The knowledge, competence and skills of the members of the core team have to be defined together with training initiatives, supported by EMAN and scientific societies.

Each working group developed synthesis documents and recommendations addressed to the European Commission, standardisation and regulatory bodies, manufacturers and, users. The documents are available on the EMAN website for consultation and dissemination.

The first annual EMAN meeting to contact the EMAN Secretariat, who welcome to contribute to the activities of the post-project activities of the EC-funded project. To that end, the three working groups are encouraged to resume their activities, update their documents and build upon the achievements of the project.

Experts, who are interested in the Network and share our interest in improving this safety culture, are welcome to contribute to the activities of the working groups. Please contact the EMAN Secretariat to be kept up to date and informed.

BY GRACIANO PAULO, ON BEHALF OF THE EMAN STEERING COMMITTEE

It’s time for a new kind of Poster.

Professor Graciano Paulo from Coimbra, Portugal, is President of the European Federation of Radiographer Societies (EFRS) and member of the EMAN Steering Committee.
Radiation safety in medical imaging and European Union law

The European Union (EU) has more than fifty years of experience in enacting laws on health protection of workers and the general public against the dangers of ionising radiation. This legislation has been adopted under the Euratom Treaty, which entrusts the European Commission (EC, ‘the Commission') with the task of proposing ‘basic safety standards’ (EU BSS) after having received the opinion of the group of scientific experts referred to in Article 31 of the Treaty.

After consulting the European Parliament, the Council of Ministers adopted the Euratom BSS Directive (Figure A), which has to be enacted in the national law of the 28 EU member states. The Commission has the power to review enactment measures, issue recommendations and take infringement action against member states.

The EU's legal framework for radiation protection has expanded over the last few decades, and currently consists of several legal instruments covering different issues. EU legislation on radiation protection of patients was first issued in the 1980s and revised in the 1990s. The current Medical Exposure Directive (MED) is an elaborate piece of EU legislation that deals with a number of matters, including the justification and optimisation of radiological procedures, the distribution of responsibilities, the training of medical staff, procedural aspects and equipment use.

The EU BSS were recently revised with two main objectives: a) to consolidate the existing legal basis for protection of workers, patients and the general public; and b) to update the legislation in line with recent scientific, technical and societal developments. The revision and negotiation process took more than five years. Having been adopted in December 2013 (Figure B), the revised EU BSS will repeal and replace five current Directives, including MED, as of February 2018.

The revised EU BSS bring several important changes to radiation safety in medical imaging. The Article 31 group Working Party on Medical Exposure (OPMED) was deeply involved in the EU BSS revision, and many of the proposed changes were presented at European and international meetings. The most important amendments – as agreed by the national governments – are as follows:

- The occupational dose limit for the lens of the eye has been reduced from 150 to 20 mSv. This is particularly relevant to interventional radiologists and cardiologists, for whom eye protection and dose monitoring should become a standard practice.
- Medico-legal procedures – now called ‘non-medical imaging exposure’ – have been taken out of the medical chapter and should be treated according to specific new requirements. This includes a more rigorous justification and development of national guidelines, specific protocols and diagnostic reference levels (DRL).
- Justification has been reinforced. The term ‘prescribe’ has been replaced by ‘referee’ in order to emphasise the right of the radiological practitioner to select the appropriate procedure. Patients have to be informed about the benefits and risks of the examination, and the radiation dose should be indicated in the examination report. New requirements have been introduced for the exposure of asymptomatic individuals.
- Optimisation has been strengthened. DRLs have to be regularly reviewed and will cover also interventional procedures. Written protocols are required for relevant categories of patients, e.g. children. The involvement of a medical physicist is obligatory in interventional procedures and CT, and his availability for consultation and advice is required in all other imaging.
- Equipment installed after the EU BSS enactment deadline should meet several new requirements for the display reporting and recording of radiation doses.
- Accidental and unintended exposures are subject to recording, analysis and, in some cases, reporting to national authorities. The referee and the patient should receive information about clinically significant accidents.

The revised EU BSS Directive has to be implemented in 28 EU member states no later than four years following its publication. This is a major task, requiring leadership from national authorities and the involvement of scientific bodies, professional societies, manufacturers and other stakeholders.

European cooperation will facilitate the efficient and transparent implementation of regulatory changes and should bring similar benefits to patients all over Europe and better coordinate action among the different stakeholders. Cooperations on all levels – locally, nationally, regionally and internationally – is the key to success in maintaining and, where necessary, improving radiation protection of patients and health professionals without putting an undue burden on regulators, clinicians and the industry.

BY GEORGI SIMEONOVA

The European Commission is experienced in taking action to support the implementation of EU legislation, and new initiatives on radiation safety in imaging will soon follow. In 2007 the European national authorities for radiation protection established the HERCA network (www.herca.org) and the protection of patients is high on their agenda. The European societies and federations of key medical professionals are cooperating on radiation protection issues (www.eman-network.eu). Equipment manufacturers are engaged in a dialogue with radiation protection regulators (www.coci.org) on a European level.

The revision of the EU BSS and their implementation in the next four years should be taken as an opportunity to enhance cooperation and European cooperation will facilitate the efficient and transparent implementation of regulatory changes and should bring similar benefits to patients all over Europe.

Legislation development process

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Radiologists prepare for change in Irish healthcare

The Faculty of Radiologists, the Royal College of Surgeons in Ireland, is the body responsible for the provision of postgraduate training in diagnostic radiology and radiation oncology in Ireland. At present, there are 82 specialist registrars in diagnostic radiology and 13 specialist registrars in radiation oncology in full-time training in their specialties. These trainees are spread across 11 centres in diagnostic radiology and three in radiation oncology in Ireland. Both programmes have a five-year training programme. Following satisfactory completion of the fellowship examination, candidates are eligible for inclusion on the specialist register of the Medical Council of Ireland, and are eligible to apply for permanent consultant posts in their specialty. Nonetheless, most of our trainees pursue further training abroad after completion of training in Ireland, principally the United States, Canada and the UK but increasingly in other European countries and Australia.

There are approximately 320 consultant radiologists in full-time practice in the Republic of Ireland (300 diagnostic and 20 radiation oncology). The number of consultant trainee posts in the public sector is controlled by the Health Service Executive (HSE). The ratio of consultants to population is low in comparison to most EU countries, and the number of studies performed by individual consultants is quite high under international standards. Understandably, this places great pressure on practising radiologists and radiation therapists, but despite this, the research output of our trainees and consultants is consistently very high, as evidenced by the high level of participation in international meetings such as the ECR. The development of our specialist training on best practice international lines will, I hope, help the strategic evolution of imaging research.

The standard of equipment in diagnostic and therapeutic departments in the country is relatively high, but variable. Equipment purchase and replacement is not based upon a deprivation model. Therefore, the replacement of old equipment is haphazard and not planned in advance. The high level of demand in the service issues facing our specialties are the need to increase consultant numbers (and to achieve a commensurate increase in trainee numbers to keep pace in order to ensure safe delivery of timely service to patients, and a need to budget for the development of departments and replacement of equipment in a more planned fashion.

Current government policy in Ireland is to centralise cancer care in regional cancer centres. The implications for delivery of first-class diagnostic services are significant. At present, many forms of cancer are managed to a high standard in hospitals that have evolved very experienced teams in specific niche areas. The movement of staff and expertise has been and will continue to be required to achieve the political goal of centralisation with limited resources to implement these changes in continuing times of austerity. A major issue for the Faculty of Radiologists is to inform the development of uniform, best practice, quality assurance programmes across the country. This must obviously be done with patient safety at its core. There is, however, a parallel process of educating and informing society so as to set realistic expectations. The National Quality Assurance Programme is currently under tender for provision of the programme’s technical aspects but is expected to be rolled out in 2014. Despite these difficulties, the specialties of radiation therapy and diagnostic radiology are robust and well-respected in Ireland. Our specialties attract the brightest graduates every year, and competition for places on our training schemes is very intense. We work closely with possible, with employing and regulatory authorities to maintain our high standards and we look forward to the future with our fellows and trainees remaining at the centre of high-quality medical care delivery.

More information about the Faculty of Radiologists, the Royal College of Surgeons in Ireland, can be found at www.radiology.ie

BY MICHAEL FUCHSJÄGER

Breast imaging society’s membership growing steadily

First and foremost, EUSOBI is growing. The annual meeting last year in Rome, held in conjunction with the Breast Study Group of the Italian Society of Medical Radiology (SIMR) was attended by a record 217 radiologists from 50 different countries, compared to 91 in 2012 and 64 in 2011. Among these were 202 attendees from non-EU countries, so not only are the numbers increasing, but our area of influence is expanding. Furthermore, within the last two years the number of EUSOBI members has increased from 300 to 391.

Last year, EUSOBI established some new subcommittees, including educational, scientific and international relations committees. These committees have been highly active: Julia Camps-Hernes, chairman of the International Relations Committee, organised a Breast MRI course in Graz, Austria, is a member of the EUSOBI International Relations Committee.

Other initiatives included two fully booked first courses, one high-end, state-of-the-art Breast MRI Courses in Vienna and Rome. The next one of these highly sought after courses will take place in Dubrovnik in June. The first EUSOBI Digital Breast Tomosynthesis Course, held in Vienna a few days ago (March 4–5, 2014), was also fully booked. During this course not only was there an overview of the currently available tomosynthesis systems, but results from different ongoing clinical trials will be presented and hands-on expert training in tomosynthesis interpretation was offered. Another EUSOBI initiative is the focus on publication of recommendations for women’s information. The article on mammography ‘Mammography: EUSOBI recommendations for women’s information’ in Insights into imaging 2013; 7:3-20, will be followed by a similar publication dedicated to breast MRI in 2014.

From June 2–6 the first International EUSOBI Breast Cancer Screening Course in cooperation with the Dutch National Expert and Training Centre for Breast Cancer Screening (LBCR) will take place in Nijmegen, the Netherlands. This course is specifically designed for radiologists who perform breast cancer screening or are interested in breast cancer screening. Each participant will be able to read 500 screening examinations individually. The programme will incorporate a series of lectures by several experts in the field of radiology, pathology, breast cancer screening, epidemiology, physics and technical aspects of digital breast cancer screening, according to the organiser, Ruud Pijnappel.

Ruud Pijnappel is also the local organiser of the 2014 EUSOBI Annual Meeting, which will take place in Amsterdam from 26–27 September, and will be held jointly with the Dutch College of Breast Imaging (DCBI). This congress will continue the focus on radiology-pathology correlation which began at the Barcelona meeting in 2012, and will include what a radiologist needs to know about modern molecular breast pathology. After the highly acclaimed EUSOBI meets Egypt and Chile sessions in Rome, EUSOBI will meet India in Amsterdam. Highlight sessions will focus on the specific populations left out of organised/population-based screening programmes: the age groups below 50 years of age and above 70 years of age, and the important question of whether or not we really need high-field or ultra-high field breast MRI will be answered.

During ECR 2014, the European Board of Breast Imaging (EABI) examination will take place for the fourth time. Since its implementation at the annual meeting in Barcelona in 2012, 10 radiologists have taken the exam, ten of these passed the exam and obtained the European Diploma of Breast Imaging (EABI). The European Diploma in Breast Imaging, endorsed by the ECR and the European Society of Radiology, is a common European qualification for breast imagers and will help standardise training and expertise in breast imaging across Europe. Notably, this diploma has gained the interest of many non-European radiologists, especially from the Middle East. The next EABI examination will be held in September in Amsterdam at the EUSOBI Annual Meeting.

More about the EUSOBI can be found at www.eusobi.org

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Belgian hospital enhances optimisation and monitoring in paediatric CT

Over the last decade, there has been growing concern regarding the potential risk of cancer induction from CT due to its exponentially increased use in medicine. Although there is no doubt about the clinical benefit of CT in appropriate clinical settings, keeping radiation doses as low as reasonably achievable remains fundamental to decreasing radiation-related risks and increasing patient protection.

At the University Hospitals Leuven, Belgium, there is a strong commitment to minimizing radiation doses of all patients and children in particular. This can be achieved with high-end scanners and in several ways. More specifically, the appropriateness of the CT exams should be validated and the radiation dose tailored to the size of the child.

**APPROPRIATENESS**

The most effective way to reduce radiation exposure is to avoid radiation when it is not needed. This is independent of the CT scanner and its technical parameters and relates only to the concept of justification (the net benefit must be positive). Justification is implemented in clinical practice by applying Belgian referral criteria for medical imaging, a concept of good practice against which the need for the individual patient is balanced against the risks (http://www.health.belgium.be/richtlijnen- medische-beeldvorming).

At present, the number of paediatric CT examinations that lack appropriateness is not systematically assessed. In cases of equivocal indications, the radiologist contacts the referring clinician and suggests an alternative examination (or rejects the exam if needed). Empirical data based on communication with paediatric radiologists suggest that around 20-40% of CT referrals could be declined, mainly trauma and oncologists suggesting that around 15-20% of CT referrals could be declined, especially trauma and oncologists. However, this is mainly composed of the latest technical innovations. The goal is the harm of harmonising and optimising CT procedures for all scanners. In collaboration with a university spin-off, Qaelum (www.qaelum.com) and a protocol being developed to create a web repository of all CT examination procedures, track voluntary and involuntary changes, and to register patient specific dose. This allows CT patient dose and protocols in a clinical workflow to be tracked and doses to be collected in a register. Diagnostic reference levels (DRLs) can then be determined.

As a result of the CT examinations performed at our institution, there has been a low level below the reference levels proposed by the Federal Agency for Nuclear Control (FANC) (see Table 1-IV).

**USE OF HIGH-END CT SCANNERS**

Additional opportunities to further reduce dose come from technical innovations as provided by the manufacturers. The CT equipment is mainly composed of the latest technology to obtain the highest diagnostic image quality with the lowest possible radiation dose. These technical innovations include automatic tube current modulation (ATCM), automatic selection of tube potential, adaptive collimation, and reconstruction algorithms like iterative reconstruction techniques and protocols tailored to patient size and age.

In particular, a scanner is available that allows the tube potential to be set as low as 10 kV. This is extremely useful for dose reduction when performing CT of babies.

The department of radiology also takes advantage of improving technology, by performing continuous research (medical physicists and physicians) to assess these latest technologies and to ultimately improve patient care. For these aspects, a close and mutual collaboration with the vendors has been set up, resulting in scientific presentations and papers.

**REFERENCES**


**Tables**

| Table I: CTDIvol and DLP as extracted from 426 paediatric head CT examinations, grouped by age. Protocols used for these examinations were spiral, single phase and without intravenous contrast medium injection. KV varied between 80 and 120, depending on patient size. Automatic tube current modulation was active. DLP are reported for a 1 cm phantom.
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| Table II: CTDIvol and DLP as extracted from 109 paediatric thorax CT examinations, grouped by age. Protocols used for these examinations were spiral, single phase and without intravenous contrast administration. KV varied between 80 and 120, depending on patient size. Automatic tube current modulation was active. CTDIvol as reported on the scanner is for a 2 cm phantom. The conversion factor for converting the CTDIvol to a 1 cm phantom size is a 1 cm phantom size for paediatric body protocols is 2.2. So for example the CTDIvol for a child of 1 year for a CT thorax is 0.782×2.2=1.714 mGy.
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| Table III: CTDIvol and DLP as extracted from 45 paediatric abdomen CT examinations, grouped by age. Protocols used for these examinations were spiral, single phase and without intravenous contrast. KV varied between 80 and 120, depending on patient size. Automatic tube current modulation was active. CTDI vol as reported on the scanner is for a 2 cm phantom. Conversion factors for converting CTDIvol to a 1 cm phantom size to a 1 cm phantom size for paediatric body protocols is 2.2. So for example the CTDIvol for a child of 1 year for a CT abdomen is 0.825×2.2=1.806 mGy.
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| Table IV: National dose reference levels (DRLs) (5th and 95th percentile) for CTDIvol and DLP of paediatric head, thorax and abdomen CT.
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ESCR boosts educational activities in 2014

The European Society of Cardiac Radiology (ESCR) membership exceeded 1,000 members in 2013. This has helped it further strengthen its role as the leading professional organisation in cardiac imaging in Europe and one of the largest subspecialty societies within the ESR.

Prof. Morton A. Meyers is distinguished professor of radiology and medicine, as well as chairman emeritus of the department of radiology at the State University of New York at Stony Brook (SUNY). He is author of the history of science and medicine, Prof. Morton A. Meyers from East Setauket, NY, United States.

Award-winning author delivers honorary lecture at ECR 2014

In recognition of his great contributions to abdominal radiology and his insightful publications on the history of science and medicine, Prof. Morton A. Meyers from East Setauket, NY, United States, will deliver the Samuil A. Reinberg Honorary Lecture entitled, "The Tempestuous Genesis of MRI: Credit and Discredit at ECR 2014.

In addition to teaching at SUNY, Prof. Meyers has served as visiting professor at more than 70 medical schools around the United States. He has also been an invited lecturer having received invitations to lecture in Japan, South Africa, China, Israel, Canada, Mexico and throughout Europe to name but a few places. He has also received a number of awards from national and international societies; as well as the Walter B. Cannon Medal of the Society of Abdominal Radiology. Notably, he delivered the Opening Lecture at ECR 2012, since which he is proud to serve as an Honorary Member of the ESR.

Research, science and, first and foremost, education are the major fields of the society’s activities. The field of non-invasive cardiovascular imaging has dramatically expanded during the last decade, which demands that subspecialty societies also offer additional services to their members to keep up with developments. Starting at ECR 2014, aspiring cardiac radiologists have the opportunity to take part in the European Board of Cardiac Radiology (EBCR) educational sessions.

The current vice-president of the ESCR, Matthias Gutberlet from Leipzig, Germany is vice-president of the ESCR.

"With great delight, I have witnessed the rapid growth of the ECR, now clearly established as a renowned international forum. The inspired leadership of the ESR serves as a model for all professional societies in our specialty and I am very pleased to count among its members many colleagues and friends.”

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ESCR members received a highly educational year in 2014, with a highly educational meeting in Paris on October 2–4, 2014, with a highly educational combination of the latest research results, workshops and educational courses, as well as case presentations. There are three parallel sessions for beginners, advanced cardiac imagers and experts in the field. The Society hopes that with the additional educational offers some of the existing gaps can be closed in the curriculum, from beginners to experienced cardiac radiologist and members of the EBCR.

One of the Society’s recent achievements was the creation of a combined registry for cardiac MR and CT (www.mrct-registry.org) to document and certify cardiac examinations by ESCR members and institutions. The documentation in the cardiac MR CT Registry will be a prerequisite for Cardiac Database applications. It will help the society to identify high-volume centres as training centres for fellows in cardiac CT and MR, establish multicentre trials in cardiac imaging and create a platform to document the promising impact of cardiac imaging procedures (MR and CT) on patient outcome in the near future. The registry has been a success from the very beginning and, as of February 1, 2014, contains approximately 30,000 documented cardiac CT and cardiac MRI cases from 338 contributing users from 103 institutes in 16 European countries. ‘The growth is very impressive and the number has increased around 50% over the last 6 months,” says Prof. Matthias Gutberlet from Leipzig, Germany.

The current vice-president Prof. Gutberlet, on behalf of the ESCR, would like to encourage all ESCR members to document their anonymised cardiac cases in the ESCR’s MR CT Registry and use the ESCR website or Facebook page to share ideas and problems with the European cardiac imaging community, which may help to further improve the society for their members.

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Two new modules will be offered this spring, one on cardiac CT from April 30 to May 3, and one on cardiac MRI on May 2–3, 2014. These courses are organised by Prof. Christian Lowe from Vienna, Austria, and Dr. Marco Francesc from Rome, Italy. The venue of the workshops will be the brand-new ESR Learning Centre, ideally located on the famous Paseig de Gracia in Barcelona, and will be organised and lectured by members of the ESCR. A limit of 30 attendees will ensure all participants get the most out of the workshops and enjoy the friendly atmosphere.

Furthermore, different educational activities will be provided as joint activities with the Asian Society of Cardiovascular Imaging (ASC), the International Congress on Cardiovascular Magnetic Resonance (EuroCMR), the European Society of Thoracic Imaging (ESTI), ESCR, the International Society of Radiology (ISR) and the Society for Cardiovascular Magnetic Resonance (SCMR). There will also be an ASKLEPIOS multimodality course in Vienna, May 23–26, 2014, a joint workshop with ASCI at Jeju Island in Korea on June 14–15, 2014, and another joint workshop with the ISR in Dubai on September 9–12, 2014. The ESCR educational year will end with the 12th Annual ESCR Meeting in Paris on October 2–4, 2014, with a highly educational combination of the latest research results, workshops and educational courses, as well as case presentations.

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Italian society steams on

The Italian Society of Medical Radiology (Società Italiana di Radiologia Medica – SIRM), which I am honoured to preside over, has achieved a significant position in the field of Italian health over the last few years.

This is not only thanks to the constant attention paid to how radiology specialists must be established and run in order to achieve the specific goals set by the sector, but also thanks to the role of the radiologist. This role, owing to innovative technology and professional commitment, is now recognized as a milestone in the diagnostic and therapeutic steps involved in various fields of application. All this has enabled us to identify the position radiology has in the emergency setting, whether it be in the position radiology has in the field of Italian health over the last few years.

The Royal College of Radiologists (RCR) has had some success in persuading the UK planning authorities of the need to increase training places that is yet to be backed up by the requisite funding. We also have a constant struggle to ensure that the need to expand interventional radiology services is not achieved at the expense of diagnostic services. Thus, while we have secured an additional training places for England and four for Wales, whether those places will be funded and filled remains uncertain. Despite that, it was a massive achievement to have the 38 places allocated in England – apart from general practice and psychiatry, ours was the only medical specialty to be recognised for growth.

On a positive note, a recent English health service document planning for seven-day-week working has recognised the crucial role that imaging and interventional radiology can play. Another recent document has pointed out the variation in services across the country and the consequent need for investment.

The College continues to make the case for growth in the workforce with the commissioners of services, service providers, workplace planning groups and those responsible for planning and financing. We are also advocating networking solutions to help meet the demand for seven-day-week services. Despite the advanced development of the skill mix in the UK with radiographer reporting, we know that simply will not fulfill what is required.

PATIENT SAFETY, QUALITY AND RADIATION PROTECTION

There is a growing focus on patient safety across the UK. This has been especially stimulated by the findings of a major public inquiry into the failings at a hospital in the English Midlands. The Francis report issued in February 2013, contains some 200 recommendations and there was action for the College to take. As part of our response we have appointed a patient safety adviser (a Fellow of the College) to work with us for a year, ending this summer; to help embed patient safety into our programmes of work and in particular into our standards and guidance documents.

Patient interest in safety and discrepancy is obviously heightened by documents such as the Francis report and we are working with our newly re-formed lay member network to discuss the human factors in imaging, the limitations in accuracy despitehuge advances in technology, the multiple safeguards in place, and what happens when discrepancy occurs. This will draw on the growing volume of literature and is part of the College’s important role in education as far as the public and patients are concerned.

In the UK, we have a long tradition of managing radiation protection carefully, focusing on radiography and has served us well. Nevertheless we are all due to the need to ensure that the protocols and reporting structures are working effectively and will be contributing to any review of the regulations.

Quality improvement is also a watchword of the College, and the quality of care was one of the major themes of the Francis report. The RCR has delivered active and successful programmes of national clinical audit for many years, and we are now looking to develop that expertise into quality improvement so as to ensure that the learning from audit is seen through, and that systems and processes change as a result. We have changed a new Quality Improvement Working Party with just that.

LEADERSHIP EDUCATION AND SUPPORT

THE THREE PILLARS OF THE RCR

Support for, and engagement, with the College’s membership is a key pillar of what we at the College aim to achieve, and that of management and leadership roles. These three pillars come together at our Annual Scientific Meeting. Now a vibrant and growing three-day event, which has doubled in size over the last few years, it takes place at the Barbican in the City of London and has a developing international profile.

The 2014 meeting takes place on September 8-10. Full details of the programme, with early bird registration before the end of May can be found at www.esr.ac.uk

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Professor Carlo Faletti from Torino is the SIRM President.

BY CARLO FALETTI

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Euror promotes role of imaging in personalised medicine

The ESR has been a member of European Alliance for Personalised Medicine (EAPM) since 2013, which is a multi-stakeholder coalition acting on a European level to improve patient care by accelerating the development, delivery and uptake of personalised medicine and diagnostics.

In October 2013, the ESR together with the EAPM organised a round-table discussion on ‘the role of radiology/imaging in personalised medicine – How to provide the right patient at the right time?’ which took place at the European Parliament in Brüssel.

The event was hosted by Croatian MEP Dr. Biljana Borzan (S&D) and focused on the necessity for cooperation between policymakers, medical professionals, patients and the industry in order to raise awareness of the crucial role imaging plays in driving forward the development of personalised medicine.

The discussion concluded that the key issues requiring action include the development of imaging biomarkers and biobanks, improved framework conditions for research, and greater efficiency in translating scientific research into practical outcomes.

Two weeks later, the European Commission published its staff working paper on the use of ‘omics’ technologies in the development of personalised medicine, which – contrary to the expectation of ESR – paid very little attention to imaging in this field. The ESR submitted a statement on the report to the EC requesting a clearer reference to the role of imaging in order to ensure better visibility.

The ESR will continue its efforts in enhancing the visibility and importance of imaging in the development of personalised medicine.

EUROPEAN MEDICAL DEVICES LEGISLATION

Another dossier the ESR is closely following is the European medical devices legislation.

In the wake of the PIP breast implant scandal back in 2013, the European Commission published a proposal revising the existing legislative framework, taking into account new technologies, enhancing the quality standards, introducing stronger market surveillance and providing greater transparency.

In October, a European Parliament plenary session discussed the proposed medical devices regulation. Among the main amendments adopted were a new committee for case-by-case assessments of high-risk devices and the creation of special notified bodies to be designated by the European Medicines Agency (EMA).

The ESR welcomes the creation of special notified bodies but is concerned about creating a centralised role for the EMA.

The discussions between the EP and Council have started. The member states have voiced disagreements regarding the pre-market approval mechanism of high-risk devices, reprocessing, post-market surveillance, as well as the timeframe for adoption, and seem to favour the Commission proposal over the EP report. It is unlikely that an agreement will be reached before the European Parliament holds its elections in May 2014.

DATA PROTECTION REGULATION

In January 2012, the European Commission adopted a proposal for a Regulation on the protection of the privacy of natural persons with regard to the processing of personal data and on the free movement of such data. Since the last Directive, 95/46/EC, the processing of personal data and on the free movement of such data, was adopted to the processing of data and free movement of such data, was adopted.

In May, a proposal revising the existing Directive, 95/46/EC, on the processing of personal data and on the protection of individuals with regard to the processing of personal data and on the free movement of such data, was adopted. The ESR submitt ed a statement on the report to the EC requesting a clearer reference to the role of imaging in order to ensure better visibility. The ESR will continue its efforts in enhancing the visibility and importance of imaging in the development of personalised medicine.

For more information please contact eu-affairs@myESR.org.
Rising Stars exposes students to the charms of radiology,” says former ECR President

ECR Today spoke with Professor Małgorzata Szczerbo-Trojanowska, from Lublin, Poland, patron of the Rising Stars programme.

ECR Today: The Rising Stars programme is under your patronage this year. What motivated you to take on this role?

Professor Małgorzata Szczerbo-Trojanowska: As head of the Department of Interventional Radiology and Neuroradiology at the Medical University in Lublin, Poland, I have served as ECR Congress President in 2010. My main priority then was to encourage the best, brightest and most enthusiastic students to choose diagnostic imaging as their professional career.

I am very pleased to be involved in the preparation of the Rising Stars programme, which aims to create an interesting educational agenda for students and to encourage them to actively participate in the congress sessions specifically designed for them.

I think this programme is a very important initiative of the European Society of Radiology and the ECR. Having been an academic teacher for many years, I am aware of the great significance of undergraduate education. It has always been my aim as chairperson of the radiology department at my university to offer attractive forms of radiology teaching and to expose students to the charms of radiology from the early years of their education. This is the way to raise their interest in this specialty and get them involved in radiology research. It is the best interest of the future of radiology. So when I was offered to take patronage of the Rising Stars programme, I didn’t hesitate for even a second.

ECRT: Why should a medical student or radiology trainee take part in this programme?

MST: The European Congress of Radiology, one of the world’s leading radiological meeting, offers medical students and residents a unique opportunity to see the greatest scientists, practitioners, lecturers and teachers present some fascinating achievements of modern radiology. There are also many chances to learn the state of the art in a wide variety of imaging methods for a plethora of diseases, and to find answers to complex problems of contemporary medicine provided by world-renowned experts. Participation in the ECR offers the important possibility of having an opportunity to give a presentation on the results of their own research work and opinions or ideas, related to medical studies. Visting the ECR technical exhibition is always an exciting and stimulating experience, providing a unique opportunity to become acquainted with cutting-edge technologies and new solutions. The congress is also an excellent platform for young people to meet peers and colleagues from various continents and countries, and establish friendships that last a lifetime.

The special dedicated lounge and the wonderful Rising Stars party will allow the participants to meet new friends.

ECRT: What do you think of the topics of the sessions?

MST: As always the topics were very carefully selected. This year four new topics for student scientific sessions were chosen: awareness of the role of radiology in medicine among medical students and radiographers-in-training, multiple-choice questions (MCQ), oral exams, ‘My first medical scientific work’ and ‘My own research work and opinions, or ideas, related to medical studies’. Visting the ECR technical exhibition is always an exciting and stimulating experience, providing a unique opportunity to become acquainted with cutting-edge technologies and new solutions.

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ECRT: What do you think of the quality of the students’ presentations?

MST: Judging from the very well prepared abstracts, I assume that the presentations will also be excellent. Last year I chaired two sessions and I remember the very high quality of the presentations’ contents, structure and slides, and the excellent language, timing and performance. It was really a difficult task to select the best paper of the session. It is worth mentioning that the discussions following each presentation were educational and mature, and proved the author’s profound knowledge of the topic.

ECRT: How relevant is it to offer peer-teaching workshops for students?

MST: Many student congress participants showed interest in ultrasound in the past. For those who have already had training in ultrasound workshops are an excellent chance to learn and benefit from contact with experts in this field. For those who have never used this imaging modality yet, it is an exciting experience showing the power of this most popular diagnostic tool. I am sure, based on many examples, that a lifetime interest in a particular area of radiology can be initiated by a single meeting with a brilliant educator.

ECRT: Do you have any advice for residents and medical students in general? Why should students choose radiology as a specialty?

MST: I would encourage medical students to choose radiology because it is the most dynamically evolving discipline in the whole area of medicine. Accurate and early diagnosis is vital to successful treatment. Radiologists are, nowadays, the key players in the management of patients. Imaging departments are the fastest growing sector in medicine and will remain so in the future. I would advise students and radiology residents to expand their knowledge beyond imaging modalities to understand the clinical background and relevance of radiological diagnosis and treatment. This can be achieved by close cooperation with medical specialists from other specialties. Those who would like to be involved not only in the diagnostic part, but also actively participate in treatment can specialize in interventional radiology, which offers a wide and rapidly expanding range of minimally invasive treatment methods.

I would personally encourage students and residents to engage in academic careers and research. Scientific work is demanding, but it stimulates personal development and, at the same time, gives tremendous satisfaction. Actively participating in research in the discipline you have chosen has this exciting feeling of contributing to its further development.
Top tips for trainees and teachers: Part 4: Research

Inspired to start research by the excellent speakers you have heard at this year’s ECR? Not sure where to start? Get some top tips from Prof. Hans-Ulrich Kauczor, the ESR’s Research Committee chairperson and professor at the prestigious University of Heidelberg, Germany. Even if you work in a smaller hospital, there may still be opportunities. Prepare your study well, don’t be afraid of statistics and don’t be disheartened by early failures – experience will help you achieve your goals.

ECR Today: Not all trainees are fortunate enough to work in a university hospital. What kind of research do you think is feasible in an average-sized general hospital or a smaller hospital?

Hans-Ulrich Kauczor: Unfortunately, the opportunities are limited in non-university and especially in non-academic hospitals. The two best ways will be to participate in multi-centre clinical trials and to affiliate with a university hospital. In addition, evaluations of the standard-of-care provided to the general public with regard to standardized procedures and quality, as well as cost effectiveness entering the field of health technology assessment (HTA) are becoming more and more important.

ECR: What do you think are the most important things for a trainee to remember when planning a research project?

HUK: Think before you start the project. Define the hypothesis of your research and define a clear and sound study plan and design your study accordingly.

ECR: Many trainees and teachers are overwhelmed by statistics. What do you think they should do to overcome this?

HUK: Be strong and acquire some basic knowledge yourself. Partner with biostatisticians. Always include some funds for biostatistical analysis if you write grant applications. This is money well spent as it will enhance the quality of your research tremendously.

ECR: Do you have any advice on how and where to get funding?

HUK: Nothing specific. It is always about the well-known players. Remember: most of the funding agencies are politically-driven, and their programmes have to be or at least sound, different every time and serve a general need, such as to fight unemployment, increase chances for kids, provide a better environment, save energy, support the ageing population, etc. Be creative and think about novel applications of radiology to serve those needs.

ECR: What should trainees know before embarking on publishing their research?

HUK: A good command of the language of the journal, mainly English. Know how to structure a scientific paper and remain strictly within the topic of your study.

ECR: Do have any other advice for trainees embarking on a research project?

HUK: Be prepared for failure and learn from it. This is the best way to improve your skills, and you will perform better next time.

COMMUNITY NEWS

Spanish Society helps bring European and Latin American radiologists together

We, at the Spanish Society of Medical Radiology (SERAM), feel proud of our sustained growth in affiliates, visibility, influence and scientific activities.

SCIENTIFIC WORK

SERAM has increased its scientific work in the form of research grants, collaborative projects with the industry, courses and publications. Last year saw the formation of a highly positive partnership with the industry. We organise our highly popular special training courses with them, called the Areas of Special Interest. Other courses last year included: Advanced MS beyond morphological imaging, Cardiac Imaging: Imaging 5th Edition, Vascular Imaging: 2nd Edition, Imaging in Oncology: 14th Edition and the SERAM Master Class, a new area, specially devoted to discussions pharmacokinetics, as well as the properties and clinical indications of contrast media in radiology.

These courses were really received well; people show how positive cooperation with the industry in areas of common interest can be achieved.

INTERNATIONAL PRESENCE & AFFILIATES

We would like to highlight our increased visibility and cooperation with international societies like the European Society of Radiology (ESR), American Roentgen Ray Society, Radiological Society of North America and those of Latin America, like the Inter-American College of Radiology. Our International Affairs Meeting celebrated its 6th edition at the last RSNA with ‘Virtual Radiology: a world of opportunities’ as the main topic of discussion. Our international presence has been reinforced with our Visiting Professor Programme, in which SERAM sends faculty members to scientific meetings abroad. We also participated in CIRG&ESNA 2013, a session of the Inter-American College of Radiology in Spain on imaging of infection and inflammation.

SERAM and its sections have also hosted several international congresses in Spain, not to mention the meetings of ESGAR (Barcelona), ESR (Milan) and CIRSE (Barcelona).

SERAM has expanded the number of its international affiliates and has cooperation agreements with several European societies and 21 from Latin America. We have recently signed an agreement with the SPR, the Portuguese-speaking society. SERAM is the natural bridge between European and Latin American radiology.

PUBLICATIONS

Our peer-reviewed journal, Radiology: a gainig visibility and is now the radiological magazine of reference in Spanish. SERAM introduced its editorial grant in 2012, and has now increased the number of grants awarded, due to the wide demand and interest.

The Society continues the publication of its Monographic on an annual basis. This publication gathers state-of-the-art information about relevant topics. The edition in 2013 was entitled, Diffusion MRI: basics, concepts, techniques and clinical applications.

EDUCATION AND TRAINING

We have a programme of established educational courses for residents during their full stay as trainees. Introduction to Radiology, Instrumentation and Techniques, Scientific Publications and Management are consolidated activities, recommended and addressed to the different years of residency.

We would also like to mention the activities of the Spanish Foundation of Radiology, with its commitment to education in the form of annual grants, the special grant in cooperation with the European School of Radiology (ESOR), and the International Course on Radiopathological Correlation. In 2014, the 25th edition, or silver anniversary, of this classic course in cooperation with AIRP will take place. SERAM keeps close contact with most of the technicians’ associations, as there are many in Spain, and is preparing a teaching publication aimed as informative material for use in most of their schools.

SCIENTIFIC SOCIETIES

We participate in collaborative projects and agreements with Spanish societies in the areas of cardiology, nuclear medicine, and radiological protection. We participate in working groups with the Spanish Society of Oncology, Spanish Association for the Study of the Liver and the Spanish Group of Sarcoma, among others.

SERAM WITH PATIENTS AND PROACTIVE COMMUNICATION

One of our objectives is to foster the visibility of radiology and show what radiology and the radiologist can do for the patients. In that sense, we are improving InfoRadiologia, our web section for the public, and we have established a press office with a substantial increase in our presence on most media channels, specialized and general. The number of visits to our website has doubled, and we are more and more present in social networks.

It is clear that radiology practices should establish a strong presence on social media.

We supported the second International Day of Radiology with a big impact in both local and national newspapers. Again, celebrations took place at the headquarters of the Asociación Española contra el Cáncer with speakers from different patient associations.

SERAM’S 32ND NATIONAL CONGRESS

These days we are busy preparing our 32nd National Congress, which will take place in Oviedo, May 22–25.

The main topic of the congress will be ‘Thoracic radiology: from inception to nowadays’. There will be four pre-congress monographic sessions: research in radiation scientific publications, radiophysics, and a technologist’s course.

We expect more than 2,000 attendants from all over Spain and abroad. Our congress is a real international event.

Find out more at www.seram.es

Dr. Christiane Nyhsen is consultant radiologist at Sunderland Royal Hospital, UK, and former chairperson of the ESR Radiology Trainees Forum.

Hans-Ulrich Kauczor is professor and chairman of radiology at University Hospital Heidelberg in Germany. He chairs the ESR’s Research Committee.
SIEGFRIED ANZINGER

AT THE BANK AUSTRIA KUNSTFORUM WIEN

Siegfried Anzinger, Bar Scene 1, 2013
© Siegfried Anzinger
The Bank Austria Kunstforum Wien is holding a major exhibition of works by the Austrian artist Siegfried Anzinger. The focus of the show, including around 80 works, is on new paintings specially created by the artist for the exhibition. The painted works will be supplemented by drawings, watercolours and pastels produced at intervals alternating with the distemper pictures. Part of the exhibition is devoted as well to selected pictures in the context of Anzinger’s participation in the 1988 Biennale di Venezia. These works manifest the artist’s progressive rejection of the label of ‘Wilde Malerei’ (Wild Painting) and testify to a multi-layered painterly subtlety in graphic structure and tension – qualities that had a sustained formative influence on the subsequent decades in Anzinger’s artistic œuvre.

In recent years, popular culture in the form of a motif repertoire taken from comics and trash literature has entered Anzinger’s panel pictures – particularly Cowboy and Indian scenes – which he combines among others with traditional iconographic motifs from the Bible. The decisive aspects here are the breaks with form and content associated with traditionally established canons, classical elements, and perfected skills. The artist continually breaks expectations, skillfully sidesteps and surprises us with new work blocks. In its matte quality the thinly applied distemper paint makes a noble retreat and imparts the effect of a ceiling fresco to the painting: a thoroughly contemporary interpretation of Baroque mural painting is combined with an iconography of the profanely popular and religiously sublime.

The subject of his bright, colourful palette is the figure. From vaguely abstract suggestions of bodies and soft lines to detailed scenes bordering on the cartoon and the humorous, the viewer discovers a cornucopia of expressive, painterly forms and motifs. Madonnas with oversized noses, grotesque portrayals of saints, naked women in trees, or episodes from the world of cowboys and Indians. Despite the narrative content, they also always refer to something beyond what is depicted – to painting as painting.

Siegfried Anzinger was born in Weyer, Upper Austria, in 1953. After studying with Maximilian Melcher at the Akademie der Bildenden Künste in Vienna in the 1970s, he moved to Cologne, Germany, in 1981. In 1998 he became professor of fine arts at the Kunstakademie Düsseldorf.

**Bank Austria Kunstforum**

The Kunstforum is a top address for art lovers, especially for classical modern painting of the post-war years. Every year, 300,000 people visit the temporary exhibitions held in this private institution, shows that are unique across the globe. Leading museums present their works here as well as private collectors. Whether van Gogh or Mark Kandinsky or Chagall, Warhol or Lichtenstein, the great names of art are united here. Since 2000, there have also been exhibitions devoted to contemporary artists.

Bank Austria Kunstforum
Freyung 8
1010 Vienna
Opening hours:
Daily 10 am–7 pm
Friday 10 am–9 pm
www.bankaustria-kunstforum.at

**Siegfried Anzinger, Orange Rubber Raft, 2013**
© Siegfried Anzinger
### Theatre & Dance

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<tr>
<th>Location</th>
<th>Event Details</th>
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<tr>
<td>Akademietheater</td>
<td>19:00 <em>Begin the Beguine</em> by John Cassavetes</td>
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<tr>
<td>Burgtheater</td>
<td>16:00 <em>Hamlet</em> by William Shakespeare</td>
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<tr>
<td>Museumsquartier – Halle E+G</td>
<td>20:00 <em>Red Bull – Flying Bach</em> Unique performance combining Johann Sebastian Bach and Breakdance, interpreted by the Breakdance world champions Flying Steps and opera director Christoph Hagel</td>
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<tr>
<td>Schauspielhaus</td>
<td>20:00 <em>Princip (Dieses Grab ist mir zu klein)</em> by Biljana Srbljanović</td>
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<td>stadtTheater walfischgasse</td>
<td>20:00 <em>Halbe Wahrheiten</em> by Alan Ayckbourn</td>
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<tr>
<td>Theater in der Josefstadt</td>
<td>19:30 <em>Joseph und seine Brüder – Die Berührte</em> by Thomas Mann</td>
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<tr>
<td>Volkstheater</td>
<td>20:00 <em>Woyzeck</em> by Georg Büchner with songs by Tom Waits</td>
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### Concerts & Sounds

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<th>Location</th>
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<tr>
<td>Konzerthaus (Classical Music)</td>
<td>19:30 <em>Wiener KammerOrchester</em>, conductor: Balázs Bánfi, Botakoz Mukasheva, violin, Sivan Magen, harp D. Collati, P. Vasks, C. Debussy, W.A. Mozart</td>
</tr>
<tr>
<td>Musikverein (Classical Music)</td>
<td>12:30 <em>Wiener Symphoniker</em>, conductor: Osmo Vänskä, Lise de la Salle, piano W.A. Mozart, J. Sibelius</td>
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<tr>
<td>Porgy &amp; Bess (Jazz)</td>
<td>20:30 <em>Thomas Faulhammer Quartet</em> (Austria)</td>
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### Opera & Musical Theatre

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<th>Location</th>
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<tr>
<td>Volksoper</td>
<td>18:00 <em>Albert Herring</em> by Benjamin Britten</td>
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<tr>
<td>Wiener Staatsoper – Vienna State Opera</td>
<td>18:30 <em>L’Elisir d’Amore</em> by Gaetano Donizetti, conducted by Guillermo Garcia Calvo With Nina Marinacci, Charles Castronovo, Assia Arutiunian, Erwin Schrott</td>
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<tr>
<td>Ronacher</td>
<td>19:30 <em>Der Besuch der alten Dame</em> by Michael Reed, Moritz Schneider</td>
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