The 10-minute abdominal MRI scan: can it become reality?

While MRI is sensitive and specific for liver imaging, the time required for a thorough examination often means that radiologists opt for CT due to quicker results and fewer artefacts. But what if the usual 30-minute slot for MRI could be reduced to 10 minutes? Would that sway doctors to send patients to the MRI suite more often? Experts at today’s session on making the dream of 10-minute MRI exams a reality believe that it would.

Halving the time needed for MRI would not only generate faster results for patients but also would allow for greater daily throughput, and key to cutting MRI exam time is reducing the number of sequences and making the existing sequence acquisition time faster, according to Prof. Dr. Thomas Lauenstein, chair of radiology at Evangelisches Hospital in Düsseldorf, Germany.

He suggests that the 10-minute protocol may be routine in as little as two to five years. His talk will focus on the possibilities for the short protocol in clinical scenarios, if results from ongoing studies on faster MRI support this trend.

Speaking to ECR Today ahead of the congress, he revealed that not all radiologists know that liver sequences could be modified and acquired in less time, or that there were significantly shorter sequences available on some new generation machines.

During his presentation, he plans to provide a brief overview of available hardware, as well as physicist ‘tricks’ for making single sequences faster. He will also cover how to use time more efficiently to maximise the data acquired.

One cornerstone of conventional liver MRI is delayed contrast-enhanced (CE) imaging. In a conventional protocol, acquisition of these sequences takes 15 seconds, which can be reduced to three to five seconds. The extra time gained between delay points should be used to acquire other data, like T2 or diffusion-weighted imaging (DWI), which conventionally is done before or after CE sequences.

DWI is another useful MRI technique for liver imaging. However, 20–30% of radiologists don’t include it because they don’t understand its benefits, Lauenstein noted. "DWI has a two-minute acquisition time and provides similar information to T2-weighted imaging, meaning you can skip some T2 sequences," he said. "Importantly, DWI is an all-in-one sequence which provides different information." He suggested that in a 10-minute protocol, all CE sequences could be avoided. DWI, T2, and T1 sequences should be prioritised instead. He also highlighted some of the pitfalls of the shorter MRI protocol for liver questions: While sensitivity remains high for any clinically relevant data, there will be some loss of specificity. When results from the short protocol are abnormal, the MRI scan will need to be repeated with standard sequences. This begs the question: Who should receive the short protocols and who gets the longer ones?

Short protocols are useful for negative prediction. However, when a pathology is suspected, as is usually the case in oncology, the radiologist will need more information. Leaving a patient in the scanner for a longer repeat scan would disrupt scheduling, and making the patient return for a second visit is not ideal, Lauenstein stated.

Obtained during a short protocol, this DWI shows a patient with conspicuous liver metastasis. The lesions are marked by arrows. Image provided by Prof. Dr. Thomas Lauenstein.

continued on page 2
It’s time for radiologists to welcome the machines, experts say

Use of artificial intelligence (AI) in image transformation and detecting abnormalities is burgeoning. Deep learning and big data analysis from cohort and clinical studies has the potential to boost diagnosis and treatment. Radiologists must get a grip on these technologies that are set to revolutionise their daily practice in a future not so far away, experts argue in a detailed New Horizons session at ECR 2018.

Dr. Camilla Edlund, a radiologist at the Royal National Hospital in London and co-founder of Radiomics, says: “AI is becoming increasingly used in radiology to help with the detection and diagnosis of several diseases, and it has the potential to revolutionise the field.”

Dr. Edlund explained that AI can be used to detect abnormalities in images, such as identifying the presence of cancer in mammograms or detecting fractures in CT scans. However, she noted that the use of AI in radiology is still in its early stages and there are limitations to its current capabilities.

She added: “There is still a lot of research to be done to fully understand how AI works and how it can be used in clinical practice. But the potential benefits are significant, and we need to ensure that we are keeping up with the latest developments in this field.”

Dr. Edlund also highlighted the importance of training and education for radiologists in order to prepare them for the future. She said: “It is crucial that radiologists are aware of the potential benefits and limitations of AI and are able to use it effectively in their practice.”

Dr. Edlund concluded: “The use of AI in radiology is a rapidly developing field, and there is a lot of work to be done to fully understand its potential and limitations. But it is clear that AI has the potential to transform the way we diagnose and treat patients, and we need to ensure that we are ready for this change.”

New Horizons Session
Thursday, March 1, 08:30–10:00, Room B

By Camilla Edlund

**Panel discussion:**

*Chairperson's introduction*

*Deep learning: current performance and future potential*

*Big data in medical imaging*

**Forum discussion:**

*Machine learning: do we still need the radiologist?*

**Panelists:**

Camilla Edlund

Richard Newby

Dimitris Lyberopoulos

Sarah Scales

**Abstract:**

The use of AI in medical imaging is increasing, and it has the potential to revolutionise the way we diagnose and treat patients. However, there are still limitations to its current capabilities and there is a need for further research to fully understand its potential and limitations. We will discuss the current state of AI in radiology and the potential benefits and limitations of its use. We will also debate whether AI can fully replace radiologists in the future.

**Abstract:**

Deep learning is a powerful tool for image analysis and has the potential to revolutionise radiology. However, there are still limitations to its current capabilities and there is a need for further research to fully understand its potential and limitations. We will discuss the current state of deep learning in radiology and the potential benefits and limitations of its use.

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The future is now, Marc Dewey says

The radiological community must understand the potential of value-based radiology and its related challenges, the German radiologist Marc Dewey will argue during the Wilhelm Conrad Röntgen honorary lecture today at ECR 2018.

Marc Dewey is Chairman of the German Research Foundation and Head of the Department of Radiology at Charité – Universitätsmedizin Berlin. "The main research interest is in cardiovascular imaging but he is interested in many other aspects of clinical practice including value-based imaging something he will need to learn at the ECR," Dewey said. "Participants will get to know these things. First, why the time to change clinical practice is now. Second, they will appreciate the potential of value-based imaging in the clinical care process. And third, understand the challenge in implementing value-based radiology, Dewey promised.

"Continuous human image analysis and artificial intelligence has great potential for meaning value for patients at lower costs he believes. 'This is value-based radiology and the time to get involved now is to act as it is not merely a new technical tool of radiologists but will be accompanying the entire diagnostic and treatment pathway in all medical specialties for the benefit of our patients,'" he said. "Dewey is the scientific coordinator of the DISCHARGE trial, an EU-funded multicentre project with more than 1000 patients across Europe that explores the ability of CT scans to help predict clinical outcomes. The DISCHARGE project is a unique and truly impressive effort of several hundred individuals working at 33 European institutions. External advisory board members were often thrilled when first witnessing the DISCHARGE trial and coordinating large-scale projects as imaging in Europe gave them the 'ability to better understand the culture, context, and ideas in different regions of Europe.' Dewey is involved in other research projects not only on perfusion imaging and digital health within the Charité group. The German Research Foundation generously supports his Charité group with grants for instance we are currently exploring functional analysis of perfusion imaging as a new technique to inform and understand the pathophysiology of expansive brain tumors. We are also exploring the role of advanced digital health research supported by the Berlin Bethel Hospital. He explained. "Dewey has driven his research projects but the potential to impact clinical practice has been a motivating factor as well he admitted. "We select topics also based on the potential to influence clinical practice and generally focus on those areas which technological innovations, clinical studies, and outcomes research have not advanced. "The radiology community must understand the potential of value-based imaging, the accuracy of being directly involved in clinical care of patients, communicating with other specialties, and assessing technological innovations. His advice to radiology students would be to focus on very risky projects that may allow them to develop some disruptive innovations for clinical practice." Dewey will posit that the Berlin Konrad Röntgen Society for the coming term and received the second highest scientific award of the German Röntgen Society, the Röntgen research prize, for his work in 2017.

"In 2018, he was awarded by the German Röntgen Society, Dewey has taken on several roles within the European Society of Radiology notably as member of the Programme Planning Committee of the European Congress of Radiology, the Accreditation Council in Imaging of the European Society of Radiology and the ESR Education on Demand – e-learning editorial board. He also has been coordinator of the ‘Clinical Trials in Radiology’ sessions at ECR since 2017. ‘ECR brings together a fresh and vibrant community that I am always looking forward to meeting every year in beautiful Vienna,’ he said.

Don’t miss the Clinical Trials in Radiology Sessions at the SKY HIGH STAGE today and tomorrow

Thursday, March 1, 10:30–12:00, Sky High Stage
CT 4 Clinical Trials in Radiology 2
Moderator: M. Dewey (Berlin)
- Neur0CARE EARLY HEART study: early clinical and biological prediction of radiotherapy-induced cardiac toxicity in breast cancer
  M.O. Bierer, Fomenko-van Roosmalen (Amsterdam) Discussion V. Temple (London/UK)
- Low-dose chest CT vs conventional chest x-ray prior to cardiac surgery, the CRICST study
  B.P. Bulcke, Rotterdam/NL Discussion: J. Reiners, Berlin/DE
- Computed tomography (CT) vs invasive coronary angiography (ICA) in patients with atrial septal defect and suspected coronary artery disease (CAD): gender analysis of a randomized study
  M. Rotondi, Berlin/DE Discussion: S. Hammer, Bremen/DE
- Effect of coronary computed tomography vs invasive coronary angiography on stent adhesion and severe epitrochlearis in patients with atrial septal defect, a randomised controlled trial
  L. Hospital, Berlin/DE Discussion: R. Vliegenhart, Groningen/NL
- The role of anatomic split hepatic resection for reducing infectious complications of transversal ultrasonad-guided biopsy
  F. Schroten, Uithoorn/DE Discussion: A. Onoe-Lowe, Leuven/BE
- The accurate non-invasive staging of liver fibrosis using deep-learning radiomics of shear wave elastography for a multinational study
  H. Zhou, Shenzhen/CH Discussion: G. Reggi, Torino/IT

Friday, March 2, 10:30–12:00, Sky High Stage
CT 1 Clinical Trials in Radiology 3
Moderator: M. Dewey (Berlin)
- Breast cancer screening with tomosynthesis: validated screening performance of the Mammographic Imaging Screening Trial
  R.S. Johnson, Malmö/SE Discussion: J.T. Gilbert, Cambridge/UK
- Digital breast tomosynthesis vs digital mammography: multicentre validation study of reproducibility and diagnostic accuracy
  H. van Besouw, Amersfoort/NL Discussion: L. Elzenbeck, Berlin/DE
- Reduction in infant volumes on CT and functional outcomes after endovascular treatment for acute ischemic stroke: a novel mediation analysis
  K. Conroy, Rotterdam/NL Discussion: J. Smit, Utrecht/NL
- Radiology follow-up of the NO-AGS trial: body composition changes detected by dual-energy x-ray absorptiometry show a correlation with laboratory marker of inflammation
  A. Basirico, Bolzano/IT Discussion: F. Brandt, Tubingen/DE
- An international randomised controlled trial of two novel strategies for reducing dose for computed tomography angiography in thorax and skeletal regions: the IOMER trial
  I. D'hooge, Hasselt/BE Discussion: E. De Smet, Brussels/BE
- Prophylactic hydration in patients with chronic obstructive pulmonary disease
  E. Bhandari, Annapolis, MD/US Discussion: A. Trani, Ulm/DE
- Radiological community must understand the potential of value-based radiology and its related challenges
  M. Dewey, Berlin/DE Discussion: J. Bizzini, Padua/IT
- Choose radiology because it is ‘perfect’ for being directly involved in the clinical care of patients, communicating with other specialties, and assessing technological innovations. His advice to radiology students would be to focus on very risky projects that may allow them to develop some disruptive innovations for clinical practice. Marc Dewey will posit that the Berlin Konrad Röntgen Society for the coming term and received the second highest scientific award of the German Röntgen Society, the Röntgen research prize, for his work in 2017.

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The year 2017 was a year of progress, development and change for the European Society for Hybrid Medical Imaging (ESHII). We started it with a few hundred members and ended it with over 1,100, and as the president of the Society I would like to thank them all. They have made the ESHII into the fastest growing society for hybrid imaging.

Interest in hybrid imaging is increasing rapidly, but there are also challenges. In some countries the division between radiology and nuclear medicine is becoming more pronounced, and this is not good for the development of individual colleagues or patients. The times when CT was used only for organ locating are over, and more and more guidelines state that CT should be performed with a diagnostic purpose. In the case of PET/CT, the position is very clear – NII should be used with diagnostic intentions with an optimized imaging protocol, which would include a focal dose reduction and additional diagnostic images, and not only in radiology or nuclear medicine.

We have seen a huge demand for education on hybrid imaging with focus on PET/CT, PET/MR and PET/EM, and up to now, most of our activities have been educational. In 2018, ESHII’s courses jointly organized with the ESHI were launched and we have also held two hybrid imaging in Oncology ASKLEIPOS courses, two European Diplomas in Radiology (EDIR) preparation courses for hybrid imaging and one course in collaboration with the European Society of Oncologic Imaging (ESO) and the European Society for Hybrid Medical Imaging (ESHI). Both ASKLEIPOS and EDIR preparation courses have been scheduled for 2018 for more information visit www.ESOR.org.

The ASKLEIPOS courses were heavily oversubscribed. We were able to offer up to six a week and organise them over a four-month period. More than 600 grants were awarded to more than 20 young radiologists and nuclear medicine physicians during our programme of monthly webinars, in order to improve patient care.

The webinar naturally continue in 2018. These are free of charge for members and cover technical, educational, and clinical topics. These webinars are held in collaboration with the International Atomic Energy Agency (IAEA). Last summer we started preparations for merging the European Society of Molecular and Functional Imaging in Radiology (EDIR) with the ESHII to create a new society which will broaden the scope of the society within hybrid imaging. This will allow us to expand our hybrid imaging activities and provide European Society of Nuclear Medicine physicians with unique opportunities to develop clinically relevant hybrid imaging technologies and transform them from bench to bedside in order to improve patient care.

The mission of the merged society is to develop clinically relevant hybrid imaging technologies and transform them from bench to bedside in order to improve patient care. This will be achieved through training, education and research. The ESHII® is open to anybody working in these areas of imaging, including physicians, scientists, physicists, technologists, radiographers and other professionals. The ESHII® will foster specific educational and training programmes to extend and disseminate knowledge about these new areas of imaging in the medical community across Europe and the world.

In 2018, ESHII will introduce the first fellowship in hybrid imaging. This will provide unique opportunities for educational visits to hybrid imaging departments lasting a month. For the future it is important that we develop training in imaging which covers hybrid imaging in depth. We have therefore been involved in a revision of the ESR training curricula which now includes more hybrid imaging content. The next step will be to work towards a subspecialty diploma in hybrid imaging. Incorporating physicians in imaging and nurses for cross-over training in radiology and hybrid imaging and the society will continue its activities in education and training.

The growth of the society, the broadening of scope after the merger and the planned increase in activities give us the confidence to also expand the courses, and committees for education, research and professional issues have now been established. The ESHII is open to anybody working in these areas of imaging, including physicians, scientists, physicists, technologists, radiographers and other professionals. The ESHII® will foster specific educational and training programmes to extend and disseminate knowledge about these new areas of imaging in the medical community across Europe and the world.

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Are you ready to take the EDiR?

Would you like to take the examination for free?

Solve the question posted at the EBR blog before 13:30h.

The European Board of Radiology will raffle amongst the winners an examination place for the EDiR that will take place at the ECR 2019. The registration for the ECR 2019 is also included!

Go to the EBR blog at blog.myebr.org in order to look for the EDiR question of the day. You will also find further interesting resources such as Dr. Pepe’s Diploma Casebook, EDiR Mnemotechnics and other useful tips to prepare for the examination.

The correct answer and the winner will be announced today at 14:00h at the EBR blog.
Hybrid imaging can deliver valuable clinical details about structure and function

BY BECKY MCCALL

The beauty of hybrid imaging, such as PET/CT or PET/MR, is its ability to provide information on both structure (CT) and function (MR), noted session co-moderator Prof. Katrine Riklund, professor of diagnostic radiology at Uppsala University Sweden. "PET is a functional imaging method that visualizes different biochemical or molecular functions, and in this way it is possible to quantitatively image biomarkers." She emphasized that PET/CT with fluorodeoxyglucose (FDG) is now part of routine recommendations in many oncological applications, for example, the staging of lung cancer; the staging and follow up of certain lymphomas; and the evaluation of different metastases in colorectal cancer before surgical resection of metastases.

"Imaging with PSMA (prostate specific membrane antigen) is routine in some countries and its usage is rapidly increasing. Ga-DotaTOC/ NOC/TATE is routinely used in neuroimaging to visualize the extent of somatostatin receptor containing tumors, among other diseases where clinical use of hybrid imaging is routine," added Riklund, who is a former ESR President.

At today’s session, Prof. Elina-Maria Larsson from Uppsala University, Sweden, will address how hybrid imaging might help determine the difference between radiation necrosis and tumour recurrence.

She plans to discuss how MRI, with and without intravenous contrast agent, is the primary imaging method for the evaluation of treatment effects on brain tumours, but also the associated difficulties of differentiating tumour progression from reactive, treatment-related changes after surgery, radiotherapy, chemotherapy or immunotherapy. In addition, she will outline how different radiopharmaceuticals are available for the purpose of differentiating tumour from radiation necrosis, and the appearance of typical hybrid imaging findings in both radiation necrosis and tumour recurrence.

Malignant gliomas and cerebral metastases are usually treated by total or partial surgical removal of the tumour followed by radiation therapy and/or chemotherapy, depending on tumour type. For follow-up, MRI with morphological imaging and perfusion scans is usually performed.

"It is often difficult to differentiate treatment effects, such as radiation necrosis, from tumour recurrence/progression with morphological MRI. The addition of perfusion MRI helps, but is not always conclusive," explained Larsson.

Changes to brain tissue due to radiation therapy can vary in nature depending on the time from treatment. Early reactive changes (pseudoprogression) are seen within the first three months after radiation therapy in 30-50% of patients with high-grade gliomas treated with concomitant temozolomide. Later radiation-induced changes, including radiation necrosis, can occur in patients with gliomas from three months to several years after treatment in 3-25% of patients, dependent on the radiation dose, treatment duration and so on, she continued. After treatment of brain metastases with stereotactic radiotherapy, radiation necrosis is seen in up to 68% of cases. Radiation necrosis can take the form of a severe brain tissue reaction to radiation therapy that results in endothelial apoptosis and necroinflammation.

Larsson intends to explain how PET, MRI perfusion or protein MR spectroscopy can improve diagnostic specificity by providing more functional and metabolic information than morphological MRI. "18F-FDG PET shows high uptake in normal brain tissue, but because a malignant tumour also has high glucose metabolism, it is difficult to separate tumour from surrounding brain."

Furthermore, radiolabelled amino acids and tracers such as 11C-MET with a short half-life or 18F-FET with a longer half-life, show a high tumour-to-background contrast, said Larsson. Amino acids accumulate in recurrent tumour, but not in reactive or reparative processes after treatment.

"Several studies have shown an accuracy of 80-90% for amino acid PET to differentiate between recurrent tumour and necrosis, but it can often be made more uncertain in clinical practice due to a combination of tumour recurrence and reactive changes/necrosis in heterogeneous lesions," she commented.

MR perfusion with evaluation of relative cerebral blood volume (rCBV) is also helpful because high rCBV usually indicates tumour recurrence, said Larsson. "Studies on MR perfusion have reported approximately the same accuracy as amino acid PET, but the method is often not used in a standardized way and the methods for post-processing and analysis are variable."

MR spectroscopy shows the relative concentrations of different metabolites and the increase of choline (Cho) supports a suspicion of recurrent malignant tumour with cell proliferation. Despite having a reported accuracy of around 80%, it is time-consuming in terms of scanning and analysis and therefore unpopular in practice, according to Larsson. Also, in patients who have been operated on previously, artefacts can lead to a deterioration of image quality.

Furthermore, PET uptake and increased rCBV and/or high Cho may not coincide because they have a slightly different location within the contrast-enhancing lesion due to slightly different physiologic processes. "This is usually not a big problem for diagnostic purposes, but it is more difficult when the methods are used to aid the selection of surgical biopsy location."

Asked for her own imaging preference for the differentiation of tumour recurrence from necrosis, Larsson said her group performs morphological MRI with and without contrast injection and MR perfusion in the follow-up after all gliad brain tumours.

"When we have difficulties in interpreting the findings with these methods, we add amino acid PET. We do not use hybrid PET/MR in clinical routine, but we co-register the MR and PET images in our PACS, which is easy," she noted. "Of course, it would be better for the patient to get a ‘one-stop-shop’ examination in a hybrid PET/MR scanner, but it is expensive and not needed in all cases, so I think PET should be added when MR and MR perfusion do not suffice."

On conventional imaging, radiation necrosis can look similar to malignant brain tumour recurrence, resulting in a mistaken impression of treatment effects, but often hybrid imaging can help out in such cases.

This topic, alongside prostate cancer imaging and a discussion of targets for new radiopharmaceuticals, forms the backbone of this morning’s session on when to use hybrid imaging, organised by the European Society of Radiology and the European Society of Hybrid Medical Imaging (ESR/ESHI).
Web tools can help determine radiation risk from CT in pregnancy

As demand for imaging and the use of CT in the emergency department grows, the probability of both planned exposures in pregnancy and inadvertent exposures is also increasing. It is likely that both scenarios will be encountered by most imaging departments several times a year, so radiologists must be prepared for this eventuality. Delegates will hear at today’s Special Focus Session on CT in pregnancy and the dilemma it poses for the radiologist and the mother.

BY VIVIENNE RAPER

Whole-body MRI prepares to move into clinical mainstream

Whole-body MRI is gaining acceptance in the global medical imaging community as a powerful tool for early diagnosis and disease monitoring, according to Prof. Frédéric Lecouvet, professor of radiology and head of the MRI Unit at the Department of Radiology at the Saint-Luc University Clinics in Belgium. He is chairing today’s State of the Art session on how developments in hardware and software over the last two decades mean radiologists can now use MRI to image a patient from head to toe in a reasonable time.

BY FRANCES RYLANDS-MONK

Whole-body MRI: tips and traps to watch out for

Whole-body MRI is a technique that allows a comprehensive evaluation of a patient’s body in its entirety. It is widely used in oncology, cardiology, and psychiatry, among other fields. However, there are some important considerations and precautions to keep in mind when using whole-body MRI.

1. **Proper Patient Selection:**
   - Ensure the patient is suitable for the procedure, considering factors such as body size, claustrophobia, and metal implants.
   - Consider alternatives for patients with certain medical conditions that may affect MRI compatibility.

2. **Patient Preparation:**
   - Advise patients to fast and avoid ingestion of contrast agents.
   - Provide instructions regarding grooming and any metallic items, such as jewelry or hairpins.
   - Instruct patients on the correct positioning and immobilization technique.

3. **Technical Considerations:**
   - Optimize scan parameters to enhance image quality and reduce scan times.
   - Ensure appropriate dose management for patients requiring sedation or anesthesia.

4. **Image Post-processing:**
   - Utilize advanced software tools for better visualization and diagnostic capabilities.
   - Review images carefully for misses and false positives.

5. **Technical Limitations:**
   - Be aware of limitations, such as partial volume effects and signal dropout.
   - Ensure adequate coverage of the entire body.

6. **Patient Safety:**
   - Ensure that the MRI environment is free from hazards.
   - Conduct a thorough risk assessment for each patient.

By following these guidelines, radiologists can maximize the benefits of whole-body MRI while minimizing risks and improving diagnostic accuracy.
Breast imaging can be a tricky business. Luckily for ECR 2018 delegates, a slew of experts are awaiting firmer evidence on, ‘What is the utility of DBT in breast cancer?’ Dr. Ritse Mann from the University Hospital of Utrecht, the Netherlands, said, “Better detection of the nodal status and the ability to differentiate between minimal and advanced nodal disease are important topics of future research.”

Also at the session, attendees were introduced to ABUS, a high-frequency ultrasound (US) technique designed to visualize the structures within the breast. The technique ensures that the entire breast is visible in a structured way in images which can be obtained by technicians and read by board members by a radiologist. ABUS also enables comparison with digital mammography. It works well for women with dense breasts and provides an overview of the breast, making it useful for further examination of larger and more differentiating lesions. However, there are also advantages to watch for, such as artefacts which Dr. Sjöholm Mann from the radiology department at Radboud University Nijmegen Medical Centre, the Netherlands, will cover during the session.

MRI of the CNS can support, supplement, but also presents a challenge possibilities provides opportunities for therapies has a clear therapeutic benefit for optimal responders to first-line therapies. An MRI can show the disease activity and proper monitoring the progression of the disease in the brain and spinal cord. Currently, a high effort by the MRI scientific community and public health systems is made to establish evidence-based guidelines on how to use MRI in these purposes and to provide required resources based on a combination of different clinical and radiological resources assessed during the first months after treatment initiation.”

These criteria, which are partially based on the detection of active lesions on chair MRI scans, define the new guidelines for enhancing, worsening or no or slowing To lesion, and important recommendations in how to perform and use MRI in the monitoring process will also be named topics of the presentation by Dr. Myk Davis, Hanover Medical School, Germany.

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For patients with hepatocellular carcinoma (HCC), the most prevalent primary liver cancer, surgical resection is considered to be the definitive treatment and the only one offering long-term survival or cure. However, due to various circumstances, only a small proportion of patients with newly diagnosed HCC or other hepatic malignancies are candidates for curative surgical intervention, thereby warranting exploration into alternative therapies. Many liver tumours do not respond to surgical treatment that provides durable local control in a significant proportion of patients. For patients who may require new oncological treatments, the majority of patients may benefit from an effective and novel minimally invasive therapeutic approach. The use of locoregional therapies, including chemoembolization, or transcatheter arterial chemoembolization therapy, has become a standard of care for patients with HCC. By delivering chemotherapy to the lesions, direct exposure to tumour cells is achieved, allowing for a higher concentration of drugs to be applied within the lesion.

In the last years, great progress has been achieved in the treatment of liver tumours. However, despite advances, the management of patients with primary and secondary hepatic malignancies is still challenging and the improvement of existing methods and the development of new therapeutic modalities are necessary. In today’s personalised medicine, the key is an individualised approach where treatment is based on the specific features of each patient. Many systemic antineoplastic therapies are very effective in inducing a tumour response, but do not have the same success in treating patients with advanced disease or those with drug-resistant tumours. In these cases, the only option is to identify and define new strategies to improve the efficacy of systemic treatments.

Optimising the treatment of liver tumours

In the first session of today’s joint course, ECR delegates will learn about the pivotal role of the UEMS (Union Européenne des MédecinsSpecialistes) within the EU and the importance of its cooperation with the ESR (European Society of Radiology).
The eye: a window to the brain

In the past decade, research investigating the eye-brain connection has increased sharply, and researchers have begun to recognise the potential of using retinal structures as a biomarker for brain diseases. Markers found in Alzheimer patients compared to controls of retinal neurodegeneration include a thinner retinal nerve fibre layer and an altered ganglion cell layer assessed by optical coherence tomography (OCT). This indicates that atrophy in the brain and the retina may occur concomitantly, and that the eye may be used as a ‘window’ to the brain.

Subsequent studies have indeed demonstrated that a thinning of these retinal layers were associated with global brain atrophy, even in non-demented subjects. These observations have led to the hypothesis that the retina and the brain suffer from shared underlying pathologies such as vascular disease or the accumulation of misfolded proteins, leading to concomitant atrophy.

Another hypothesis is that retinal thinning may be directly linked to changes in specific brain areas, most likely those that are anatomically connected and involved in visual processing. Given that previous studies have exclusively focused on global brain changes, my colleagues from Erasmus MC in Rotterdam, the Netherlands, and I aimed to unravel whether retinal thinning in non-diseased individuals reflects changes in specific brain regions, or whether these changes are more widespread in the brain. We used voxel-based analysis to study the relation between retinal layers and brain tissues on the voxel level, within a large population of non-demented aging people. Our main aim was to identify whether the retinal nerve fibre layer and ganglion cell layer are associated with changes in local grey matter density and white matter microstructure.

All participants were derived from the population-based Rotterdam Study and underwent OCT and MRI scanning. Thickness of the peripapillary retinal nerve fibre layer and perimacular ganglion cell layer were measured on OCT images using an automated segmentation algorithm. Voxel-based morphometry protocols were applied to process MRI data. When looking at the associations, we found that thinner retinal nerve fibre layer and ganglion cell layer were both associated with lower grey matter density in the visual cortex, and with lower fractional anisotropy and higher mean diffusivity in white matter tracts of the optic radiation and of the tracts coursing adjacent to the optic radiation (see figure).

Furthermore, thinner ganglion cell layer was associated with lower grey matter density of the thalamus, close to the presumed location of the lateral geniculate nucleus, a relay centre for the visual pathway. These findings may indicate that damage to brain regions involved in visual processing may result in axonal damage along the visual pathways resulting in thinner retinal layers. Conversely, it is also possible that damage to the retinal ganglion cells leads to thinner retinal nerve fibre layer and consequently to changes in specific brain regions. Whether damage occurs first in the retina or brain needs to be determined in further longitudinal research.

In conclusion, this work showed that retinal thinning is associated with grey and white matter brain changes along the visual pathway, including the optic radiation and the visual cortex. These findings suggest that retinal thinning on OCT may reflect areas with lower cell densities in a pathway rather than reflecting lower cell densities throughout the entire brain.

The proposed changes to the International Association for the Study of Lung Cancer (IASLC) classification system represent an extremely useful data set which will aid clinical practice. The question remains, however, whether our current imaging modalities and pathological processing are accurate enough to keep up with even smaller T-stage size margins.

Mark Murphy is a specialist radiologist in radiology in the Mater Misericordiae University Hospital, Dublin, Ireland.

The 8th edition of the lung cancer staging system provide a step beyond current imaging accuracy?

In our study we examined 190 consecutive lung cancers preceding surgical resection. We compared the size of the tumour on pre-operative CT to the size on the post-operative pathology report and also assessed secondary endpoints such as time to surgery. We found that there was a difference of 0.97 cm between the radiological and pathological measurements. Half of the tumours were larger and half were smaller. Time to surgery was not a significant factor. Using the 8th edition we found that the preoperative stage matched the post-operative stage in just 55% of cases (63.1% using 7th edition). There are multiple reasons which may contribute to the size discrepancy which we will discuss during the presentation.

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Axial contrast enhanced CT of the thorax revealing a 2 cm soft tissue density in the right upper lobe of the lung with pleural tethering highly suspicious for a primary lung malignancy.

The Tumour, Node, Metastasis (TNM) staging classification is the gold standard staging system for lung cancer and the new 8th edition has recently been adopted. The new proposals are based on a meta-analysis of 15,420 cases from 85 countries around the world. In the new edition, the T-stage component is divided into ever smaller tumour size ranges, with mostly 1 cm groupings and an increase in the number of T groups from originally 4 to now 6.

The TNM stage is founded on radiological and pathological measurements. The majority of clinical decision making, however, is based on radiology in the pre-operative domain. While T-stage alone rarely dictates management correctly, the setting of vastly improved neoadjuvant treatments as well as sublobar resections it will become more important.

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MRI manufacturers aim to deliver greater speed and automation with product enhancements

For a relatively mature modality, innovation still abounds in MRI, as visitors to this week’s technical exhibition can witness firsthand. Companies exhibiting at ECR 2018 are showcasing a diverse range of systems with higher scan speeds, intraoperative capabilities and improved patient comfort. Their aim is to achieve better results and to increase the cost-effectiveness of MRI for end users.

Siemens Healthineers is showcasing a new MRI application, GoKnee3D, which helps to shorten the time it takes to perform comprehensive diagnostic exams of the knee. With this application, a high-resolution diagnostic 3D knee exam can be acquired in minutes, compared to the current standard of around 20 minutes, according to the company. High-resolutionisco-rapid 3D images allow for evaluation in all planes, including double-oblique and curved planar. The volume acquisition is based on the CaseHist SPACE (stamping perfection with application-optimised contrast with different flip-angle evolution) protocol, which reportedly enables higher scan speeds and optimal image reconstruction with better signal quality.

"With GoKnee3D, we significantly accelerate MR imaging without compromising on diagnostic quality and expand our portfolio with a further highly automated and standardised application of high clinical relevance," said senior vice president and general manager of MRI at Siemens Healthineers Dr. Christoph Zindel. "We not only increase efficiency, but help improve patient care by opening up MR technology to more patients, while surgery is in progress, with no need to move the patient.

At ECR 2018, Samsung is presenting a prototype of Specialty MRI, specifically for extremity imaging. It is designed to maximise not only cost and space but also patient convenience and comfort, because it eliminates the need for the whole body to be in the MRI device, and the helium-free and eco-friendly prototype solves problems helps reduce maintenance costs and installation complications, the manufacturer noted. Visitors to the GE Healthcare booth will get up to speed with the latest refinements in the Signa MR system powered by GE’s digital platform, SignaWorks. The company is presenting the wide-bore 3-T system, Signa Premier, aimed at advancing the detection, diagnosis and speed appropriate treatment of traumatic brain injury.

Signa Premier includes a new radio-frequency (RF) transmit-and-receive architecture and the total digital imaging RF chain, with an independent receiver channel. It also comes with a range of RF coils that enable total freedom in coil positioning and handling during an MRI scan, featuring a 48-channel head coil with a design that can accommodate nearly all patients, a 30-channel anterior array that provides 4cm coverage and a 60-channel posterior array that provides 10cm of coverage, according to GE.

"MR is highly effective at imaging patients, but traditional coils can be bulky, heavy and rigid, causing discomfort to patients and technologists. Across the MR industry, there has been a concerted effort to..."

continued on page 18
MRI 2028: What to expect in the next decade of MRI

The 50th anniversary of MRI for clinical use will occur in the next decade. Over this time, MRI has remained at the pinnacle of diagnostic imaging, with undeniably more influence in many advanced diagnostics. Yet as we enter an increasingly digital era of medicine, what role will MRI play? Below, we explore some of the future developments about their influence on MRI and radiology in general.

MRI 2028

Magnetic Resonance Imaging (MRI) has revolutionized the medical imaging landscape by providing detailed and non-invasive imaging of the body's internal structures. As we approach the 2020s, the future of MRI continues to be shaped by advancements in technology, increasing adoption of digital platforms, and expanding applications. Here’s a glimpse into some of the trends and developments expected to redefine the role of MRI in healthcare.

**Trend** | **Market Impact** | **Technical Challenges**
---|---|---
Advanced Microscopy | Improved disease diagnosis and treatment | Scalability, data management
Biofilm Imaging | Enhanced infection monitoring and management | Sensitivity, specificity
Imaging-guided Therapy | Precision medicine for targeted treatments | Navigation, real-time monitoring
Non-invasive Imaging | Reduced patient discomfort and costs | Signal-to-noise ratio, contrast resolution
Imaging in Oncology | Personalized therapy planning and follow-up | Tumor heterogeneity
Imaging in Cardiology | Early detection and intervention | Motion artifact, heart rate variability
Imaging in Neurology | Diagnosis and monitoring of neurological diseases | High-field MRI, long-term monitoring
Imaging in Pediatric Medicine | Early detection and treatment of pediatric conditions | Imaging parameters, patient comfort
Imaging in Orthopedics | Diagnosis and management of musculoskeletal conditions | High-resolution imaging, patient compliance
Imaging in Gastroenterology | Evaluation of gastrointestinal tract | Image quality, patient position
Imaging in Pulmonology | Assessment of respiratory function | Motion correction, image artifacts
Imaging in Neurosurgery | Pre-operative planning and intraoperative guidance | Image fidelity, surgical planning
Imaging in Plastic Surgery | Planning of cosmetic procedures | Image quality, patient comfort
Imaging in Dermatology | Assessment of skin conditions | Image quality, patient comfort
Imaging in Ophthalmology | Evaluation of ocular diseases | Image quality, patient comfort
Imaging in Dentistry | Diagnostic and treatment planning | Image quality, patient comfort
Imaging in Radiology | Comprehensive imaging for diagnostic and treatment planning | Image quality, patient comfort

The European Institute for Bio- medical Imaging Research (EIBIR) is a network of organizations founded by the European Society of Radiology (ESR) and other research bodies, in order to enhance biomedical imaging research, in Europe and beyond. The Institute is a non-profit research organisation that aims to promote research and education in biomedical imaging.

### MRI 2028: Prospects and Challenges

**Prospective MRI Availability**
- Focus on the most advanced and cutting-edge MRI technology.
- Long-term investment in research and development.
- Collaboration with industry and academia.

**MRI in Oncology**
- Improved detection and characterization of tumors.
- Integration of MRI with other imaging modalities for enhanced diagnostic accuracy.
- Development of targeted therapies based on MRI-guided imaging.

**MRI in Neurology**
- Enhanced characterization of neurological disorders.
- Improvement in neurodegenerative disease staging.
- Development of personalized treatment plans.

**MRI in Cardiology**
- Better understanding of cardiovascular diseases.
- Improved monitoring of treatment response.
- Development of non-invasive imaging techniques.

**MRI in Gastroenterology**
- Enhanced detection of gastrointestinal diseases.
- Improved characterization of lesions.
- Development of targeted therapies.

**MRI in Radiology**
- Improved diagnostic accuracy across various specialties.
- Development of new imaging protocols.
- Integration of MRI with other imaging modalities for enhanced diagnostic accuracy.

**MRI 2028: What to Expect in the Next Decade of MRI**

- Improved detection and characterization of tumors.
- Integration of MRI with other imaging modalities for enhanced diagnostic accuracy.
- Development of targeted therapies based on MRI-guided imaging.

**MRI 2028: The Future of MRI**

- Improved detection and characterization of tumors.
- Integration of MRI with other imaging modalities for enhanced diagnostic accuracy.
- Development of targeted therapies based on MRI-guided imaging.

**MRI 2028: Challenges**

- High costs of MRI equipment.
- Limited availability of trained personnel.
- Patient comfort and motion artifact.
- Long-term patient care and follow-up.

**MRI 2028: Opportunities**

- Improved detection and characterization of tumors.
- Integration of MRI with other imaging modalities for enhanced diagnostic accuracy.
- Development of targeted therapies based on MRI-guided imaging.

**MRI 2028: Final Thoughts**

- Improved detection and characterization of tumors.
- Integration of MRI with other imaging modalities for enhanced diagnostic accuracy.
- Development of targeted therapies based on MRI-guided imaging.

**MRI 2028: Conclusion**

- Improved detection and characterization of tumors.
- Integration of MRI with other imaging modalities for enhanced diagnostic accuracy.
- Development of targeted therapies based on MRI-guided imaging.
German Röntgen Congress 2018 to focus on heart, neuroradiology and digital communication

I would like to invite you to the 99th German Röntgen Congress, which will take place from May 9-12, 2018 in Leipzig, Germany.

The motto for the congress is ‘Radiology connects’. It will focus on the mediating and integrating function of radiology in relation to connected diagnostic and therapeutic knowledge, on bringing specialist disciplines that are part of the respective service processes even closer, as well as offering a platform to the internal and regional service networks. The three thematic fields of the German Röntgen Congress include:

- Heart and vascular: diagnosis and treatment, radiology-diagnosis and intervention
- Digital communication in the field of radiology
- Logical specialist knowledge, and clinical knowledge in line with radiotherapy

The German Röntgen Congress is part of the respective service processes. You can look forward to establishing formats and tools such as RöKo (Röntgen Congress) and the Interactive Learning Platform of the German Röntgen Society.

At the opening event a highlight speech will be made by Carolaus Schmied, MD, Head of Unit Radiation Oncology – Health Research of the European Commission in Brussels on Research policies of the EU, and in the healthcare sector. Jim Bemker, MD, Professor of Radiology, AMC University of Amsterdam, will give a presentation titled ‘Diagnostic footprints in imaging’. The truth about the current situation will be set for free.

Hitachi: Inspire the Next

INNOVATING HEALTHCARE, EMBRACING THE FUTURE

See how we create value through Innovation and Digital Technologies, by equipping today’s Healthcare Professionals with tomorrow’s Innovative Solutions.

Join our Lunch Symposium on Friday, March 2nd, 12:30 – 13:30, room N and ask us about our Live Sessions at our booth K2/21.

#ECR2018 myESR.org

EuroSafe Imaging Session

Thursday, March 1, 10:30 – 12:00, Room K
EU 2: Strategies for dose reduction in computed tomography: from technical concepts to clinical practice
Chairpersons: W. Stiller; Heidelberg/DE

- Chairpersons introduction
- W. Stiller; Heidelberg/DE
- Systems for dose reduction in CT.
- More than automated exposure control
- P. B. Noël; Munich/DE
- Iterative image reconstruction for dose reduction in CT.
- Technical developments and concepts for clinical practice
- S. T. Schindera; Aarau/CH
- Dose reduction strategies in paediatric CT.
- Dose reduction protocols for dose reduction in chest CT.
- Dose reduction and image quality: how low to low dose radiography.

This session is part of the EuroSafe Imaging Campaign.
Macedonian Society of Radiology – challenges and achievements

As the only association in the Republic of Macedonia which unites radiologists both from the private and public sector; the Macedonian Society of Radiology over the past two years has stayed true to its mission, which is keeping its members up-to-date with new developments from the progressive field of radiology. The current number of 70 active members of the society have various duties including the launch of new methods and sharing experiences of their everyday work routine.

Aside from the congress, the society gives constant support to and regularly organises the expert meeting of the Macedonian Association of Radiological Technologies. The event that marked the year was the Symposium for Optimisation of Medical Exposures organized by the society, in cooperation with the Radiation Safety Directorate. This was the same time that was a great opportunity to hold the International Day of Radiology in the capital city of Skopje, and to highlight the importance and the challenges facing the healthcare system, the health workers and the patients. The symposium was part of the new development in the use to introduce the Macedonian radiological directives, which have been developed for the past two years.

Aside from the congress, the society, under the presidency of Prof. Nadejda Mitevska, the Society, in cooperation with the University Clinic of Radiology, together with the Radiation Safety Directorate, is taking part in regular congresses which are organized throughout the country. The symposiums are held at the end of every year. These symposiums are usually held at a time that is very convenient for the majority of doctors and radiologists and therefore, the society organizes collaborative meetings with doctors and other medical facilities from diverse hospitals and institutions from both inside and outside of Macedonia. Our meetings are always watched by the presence of professors and doctors from other fields of medical expertise and the discussions they trigger.

The Macedonian Society of Radiologists is functioning one of the biggest challenges since its formation. Currently, the healthcare system in Macedonia is suffering from constant shortage of radiologists which is currently urging the Ministry of Health to announce the number of specialists in radiology, and in the last couple of years, we have clearly seen how the pace of implementation of these new specialists is very slow and that the society is very worried about the attention of its members.

We are also trying to introduce radiology to the whole public medical public as one of the most progressive fields of medicine and present its challenges and its progress through various channels of communication. One of the channels we have found is by the media and every successful media are now in the media, and now we are taking the initiative to help the radiology to spread the word and interest there among the public.

Anastasija Mitovska is an assisting professor and an assistant in the Macedonian Society of Radiology.

BY ANASTASIA MITEVSKA

ECR launches new ESR iGuide clinical decision support portal at ECR 2018

When the ESR started a European initiative on guidelines and clinical decision support (CDS) more than five years ago, its main aim was clear: making evidence-based guidelines easily accessible to referring physicians. The launch of a public accessible web portal is a major milestone in the pursuit of this aim.

ECR launches new ESR iGuide clinical decision support portal at ECR 2018

When the ESR started a European initiative on guidelines and clinical decision support (CDS) more than five years ago, its main aim was clear: making evidence-based guidelines easily accessible to referring physicians. The launch of a public accessible web portal is a major milestone in the pursuit of this aim.

Understanding that the challenges in Europe are the availability of CDS, its timely and easy access, and the usability of the 3D images for women of ALL breast sizes and densities.

Cutting-edge detector technology and advanced 3D algorithm deliver exceptional 3D images for women of ALL breast sizes and densities.

Designed to clearly see subtle lesions and fine calcifications to help detect cancers early.

The clear choice, from every angle.

III Clarity HD

When the ESR started an initiative in 2014 to create a clinical decision support system (CDS) as part of the European initiative to disseminate evidence-based guidelines throughout Europe, the European Society of Radiology (ESR) set out with a clear mission: to improve patient care and reduce unnecessary radiation exposure.

The ESR iGuide web portal is a simple, user-friendly solution of an integrated decision support system that can be implemented at four hospitals across Europe as well as in other countries. This is a free service for all ESR radiologist members, with a monthly subscription of €7 starting on September 30, 2018. Thereafter, it will continue to be a free service for all ESR radiologist members.

The portal is also designed to help ESR radiologists, referring physicians, radiologists, hospitals and clinics comply with European guidelines, national radiation protection standards, and the EU’s directives. The ESR iGuide system can support radiologists to efficiently compare imaging referrals with expert guidelines, utilize images for more accurate and reduced unnecessary radiation exposure.

Although the new portal offers a user-friendly solution of an integrated decision support system, it is not only the most effective way of improving imaging referrals; it also provides full analysis capability in comparison of referrals, improves performance and optimizes the collaborations between referral and referring physicians.

The ECR iGuide was launched at ECR 2015, and, since 2016, NDSC’s CDS service has been available to all ESR members for free.

The first pilot projects comprised at four hospitals across Europe and the Middle East, to assess the impact of CDS on clinical workflow, increase adherence to expert guidelines, utilize images for more accurate and reduced unnecessary radiation exposure.

In Croatia, ESR iGuide was implemented as part of pilot projects across Europe and the Middle East, to assess the impact of CDS on clinical workflow, increase adherence to expert guidelines, utilize images for more accurate and reduced unnecessary radiation exposure.

In ESR iGuide as part of pilot projects across Europe and the Middle East, to assess the impact of CDS on clinical workflow, increase adherence to expert guidelines, utilize images for more accurate and reduced unnecessary radiation exposure.

The first pilot projects conducted in over 96 hospitals.

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2018: coming of age for emergency radiology

By Elizabeth Dick

2018 is an exciting year for the European Society of Emergency Radiology (ESER). We have rolled out our new European Diploma in Emergency Radiology. You can prepare yourself by attending workshops in Vienna (March), Naples (June) and at the ESER Annual Meeting in Krakow in October, viewing the programme of webinars on the ESER home page and of course, by making use of all the experience you have acquired at your home institution. Oral exams will be held during ECR 2019 (one-on-one).

Our current ESER President, Prof. Stefan Wirth, was the senior author of this significant paper, which you can read at www.venus.org (search for Wirth). Visit www.eser.org to find out more about how to enrol in the course.

Emergency radiology is a growing specialty across the world, both for those who exclusively concentrate on emergency imaging and for those who combine it with other subspecialties. There are a wealth of new courses and learning resources to access. A good way to keep up to date with everything that is available is to follow us (@ESERadiology) on Twitter and Instagram or find our page on Facebook – Emergency Society of Radiology. We would also love to hear from you on these platforms to forge new links and extend the reach of emergency radiology!

The threat of terrorism is one that has dominated Europe, and indeed the world, in recent years. As radiologists, we have to be prepared to deal with mass casualty events to deliver the best possible outcome despite difficult circumstances and horrendous injuries. Munich, Nice, Brussels, London and Manchester have all had different types of attacks in the last two years and radiologists have been an integral part of the response to these attacks.

Although the key challenge is training within a department, recommendations across Europe about how to offer optimal polytrauma or a mass casualty incident services are still lacking. This is exactly why ESER aims to come up with the first European guideline for radiological polytrauma management by 2019.

The International Day of Radiology (November 8, the anniversary of Roentgen’s discovery) celebrated emergency radiology in 2017. Across the globe there were podcasts, public lectures, exhibitions and interviews to mark the occasion. The ESER (as lead organiser), RANZCR and most national radiological societies have supported this effort to forge new links and extend the reach of emergency radiology! The threat of terrorism is one that has dominated Europe, and indeed the world, in recent years. As radiologists, we have to be prepared to deal with mass casualty events to deliver the best possible outcome despite difficult circumstances and horrendous injuries. Munich, Nice, Brussels, London and Manchester have all had different types of attacks in the last two years and radiologists have been an integral part of the response to these attacks. Although the key challenge is training within a department, recommendations across Europe about how to offer optimal polytrauma or a mass casualty incident services are still lacking. This is exactly why ESER aims to come up with the first European guideline for radiological polytrauma management by 2019.

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What we all have in common is that emergency radiology is still being developed and recognised as a specialty. There are so many challenges that we all face providing outstanding quality round-the-clock, the increase in demand for imaging, keeping up with constantly advancing technology and of course budgetary constraints. Meeting colleagues from around the world, either in person or online, is necessary so that we can share and exchange solutions to these challenges. Apart from engaging with ESER on social media, we urge you to take the opportunity at ECR 2018 to come to as many emergency themed sessions as you can. Make sure you talk to the people around you before the session, or come up and talk to the speakers at the end. ESER is a very friendly society and we would love to meet you all so we can learn from each other!
European CME Credits are the currency of knowledge and skills

From the ancient times of Hippocrates, doctors have promised to keep their knowledge and skills up-to-date. The importance of Continuing Medical Education (CME) and Continuing Professional Development (CPD) is self-evident to doctors. As progress in medicine becomes ever faster, the necessity to update one’s knowledge is even greater. It has been estimated that about half of all medical knowledge is out of date within five years. It was the great Greek philosopher Socrates who stated: “If you think that education is expensive, you should consider ignorance”.

Continuing Medical Education (CME) can be defined as educational activities which serve to maintain, develop or increase the knowledge, skills and professional performance and relationships that a physician uses to provide services for patients, the public, or the profession.

Continuing Professional Development (CPD) is the educative means of updating, developing and enhancing how physicians apply the knowledge, skills and attitudes required in their working lives. CPD rather than CME is the preferred term, as physicians may perform many roles that indirectly affect the quality of healthcare, such as teaching, research and management.

CME/CPD actually starts from the first day of medical school. However, the longest time in a doctor’s career is the time following specialisation. The actual importance of CME/CPD is most relevant during this period which may be 30 years long.

The medical directives of the EU followed by the directive on professional qualifications have mainly been concerned with basic medical education and postgraduate training. The EU has not demanded any mandatory system of CME/CPD at the European level in spite of the fact that many individual member states have created obligatory systems (i.e. in Italy and Germany up to 50 CME credits should be collected annually). A major concern of the European Union of Medical Specialists (UEMS) has been the structure and facilitation of accreditation of CME/CPD activities and the awarding of appropriate credits (hours) to individual medical specialists throughout Europe. The UEMS established the European Accreditation Council for CME (EACCME®) in order to give Europe a coordinated system to facilitate such activity without encouraging on the responsibility of national accreditation organisations where they exist.

The UEMS-EACCME sees itself as the central link between the National Accreditation Authorities (NAAs), the UEMS Specialist Sections and Boards (S&BS), the European Specialty Accreditation Boards (ESABs) and the Providers of CME activities.

The added value lies in its central link and bridging role. From the point of view of the providers of events, the accreditation process is less resource-consuming and easier since they do not have to apply to every National Accreditation Authority (NAA) to have an event recognised in every European country that recognises and accepts European CME Credits (ECMECs). The approval from the NAA of the country where the event takes place will be recognised in all the other European countries that participate in the UEMS programme.

CME accreditation granted by the UEMS-EACCME also provides a guarantee to participants from all over the world that the content of the CME provided is of a high quality, unbiased and didactic and, for European doctors, that this quality will be recognised in their home country. The Accreditation Council in Imaging (ACI), which operates under the umbrella of the European Board of Radiology (EBR), offers a one-step guide to CME accreditation, which supports EACME in delivering and harmonising the highest level of CME in imaging. The ACI’s purpose is to make managing CME quick and easy for all applicants and to be the beacon of European and global CME.

Being aware that accreditation systems in Europe have differences and vary from country to country, the Accreditation Council in Imaging (ACI) has recently (July 2017) conducted a survey in an attempt to collect the relevant data on accreditation systems in Europe.

According to the data received, the CME system has been introduced in most European countries (78.9%), and has been indicated as mandatory by 64.7% of survey respondents. It is notable, though, that all representatives from ESR institutional member societies (100%) and 78.2% of individual ESR members from Europe would support mandatory CME.

By analysing the survey responses, the ACI has both learned and confirmed that there are vast differences in accreditation systems Europe-wide, with specificities varying notably from country to country, but also within the same country, such as in Germany where each Federal State has a medical chamber.

Respondents had marked inconsistencies, demonstrated by very inhomogeneous data provided on several specific issues, as for example on identifying their national accreditation authorities and EACME's 'exchange' course. There are also inconsistencies in general knowledge on accreditation, which leaves behind the impression of uncertainty regarding the comprehension of information about CME/CPD systems among the broad European radiological community. This raises the question of whether there is a need for systematic and more detailed clarification of the CME/CPD systems in Europe and its equivalence to the UEMS accreditation system at the European level.

To conclude, it is important to highlight one relevant tendency that emerged from the survey and it is that the unification of CME/CPD systems within Europe would be supported by the vast majority of respondents (92.6% of ESR Institutional Member Societies, and 90.5% of ESR individual members), which we shall consider the ‘voice of European radiology’ for the future.
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Your online open access journal for Education and Strategies in European Radiology.

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We proudly present the scholars and fellows of 2017

Insights into Imaging: one-on-one with the new Editor-in-Chief

ECR Today spoke to Prof. Luis Martí-Bonmatí, the new Editor-in-Chief of Insights into Imaging, about his first weeks in office and his strategies for the future of the journal.

Luis Martí-Bonmatí: I comple- mented Prof. Robert Hermans, the pre- ceding Editor-in-Chief, and I am really excited to be part of this team and to contribute to the journal. Insights into Imaging is a very well established journal that has a high impact on the research community. It is well respected and appreciated by many researchers in the field.

ECR Today: Professor Martí- Bonmatí, you started taking over as Editor-in-Chief of the journal Insights into Imaging from Dr. Robert Hermans. Can you tell me a bit about your predecessor and how you would describe the journal?

Luis Martí-Bonmatí: Dr. Robert Hermans was an outstanding editor. He was very keen on the quality of the journal, and he focused on the research community. He was very passionate about the journal and the impact it has on the field.

ECR Today: Can you tell me more about your vision for Insights into Imaging in the future?

Luis Martí-Bonmatí: I want to continue the work of my predecessor. I want to maintain the high quality of the journal, and I want to make it more relevant and accessible to the research community.

ECR Today: What are some of the challenges you see in the field of radiology, and how do you think the journal can help address these challenges?

Luis Martí-Bonmatí: One of the challenges in the field of radiology is the need for standardisation in the research community. Insights into Imaging can help by providing a platform for the exchange of knowledge and ideas. Additionally, the journal can help highlight the work of leading researchers and groups in the field.

ECR Today: What is your vision for the future of the journal?

Luis Martí-Bonmatí: I want Insights into Imaging to continue to be a high-quality educational source for the radiology community. It should provide relevant and exciting content, and it should be accessible to everyone who is interested in the field of radiology.

ECR Today: What is your message to the readership? As a high-quality medical journal, how does Insights into Imaging contribute to the healthcare cycle?

Luis Martí-Bonmatí: Insights into Imaging publishes high-quality research, which is of great interest to the radiology community. It contributes to the healthcare cycle by providing evidence-based knowledge and ideas that can be used by radiologists to improve patient care.

ECR Today: How do you plan to promote relevant papers in Insights into Imaging?

Luis Martí-Bonmatí: Insights into Imaging can promote relevant papers by featuring them in the journal, by promoting them on social media, and by highlighting them in the journal’s content.

ECR Today: What is your message to authors? What is the best way for them to present their work?

Luis Martí-Bonmatí: I encourage authors to focus on the research and the main thrust of their work. They should avoid introducing too much jargon or technical language. They should present their work in a clear and concise manner.

ECR Today: As we are entering a new era, I would like to ask you what challenges and opportunities do you think the future will bring to radiology?

Luis Martí-Bonmatí: I think the future of radiology will be driven by technology and innovation. It will be an era of transformation and change. Radiology will continue to evolve as a discipline, and it will become more interdisciplinary.

ECR Today: As a high-quality medical journal, how does Insights into Imaging contribute to the radiology community and to the future of radiology?

Luis Martí-Bonmatí: Insights into Imaging plays a crucial role in the radiology community. It is a platform for the exchange of knowledge and ideas, and it provides a source of high-quality research. It helps to promote relevant papers, and it encourages researchers to improve the quality of their work.

ECR Today: As the new Editor-in-Chief, what are your expectations for Insights into Imaging in the future?

Luis Martí-Bonmatí: I expect Insights into Imaging to continue to be a high-quality journal that contributes to the radiology community. It should remain relevant and accessible to everyone who is interested in the field.

Twelve years of continuous investment in radiological education: the ESOR success story

Since beginning operations in 2007, the European School of Radiology (ESOR) has invested more than €12 million in training programs, clinical fellowships, and scholarly and educational activities. The school has awarded fellowships and grants to more than 1,000 scholars and has received more than 14,000 applications for clinical fellowships, representing more than 5,140 different applications from 103 countries. The school has also received more than 5,000 applications for its annual grants and scholarships.

The importance of ESOR’s continuous investment in radiological education is clear. The future for journals like Insights into Imaging is secure, and the journal surely looks very bright.

The greatest challenge of all is to continue the work of the previous Editor-in-Chief, Prof. Robert Hermans, and to further promote relevant research in the field of radiology.

We encourage all of you to join the ESOR community and to be part of the future of radiology.

Twelve years of continuous investment in radiological education: the ESOR success story

We proudly present the scholars and fellows of 2017

COMMUNITY NEWS

ECKER2018

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ECKER2018
Promotion of cardiovascular imaging through education and research remains in the spotlight for the European Society of Cardiovascular Radiology (ESCR). In Europe the ESCR is the platform of choice for standardisation, quality-control, networking advocacy and certification of radiologists in cardiovascular imaging.

For the ESCR, promotion of academic activities and education has always been one of the pillars of its support for cardiovascular imaging. A goal that is set to continue under the new executive committee led by President Jose Almeida from Iceland, Sweden.

To improve its service for members, in 2013 the ESCR introduced a documents database containing a variety of topics, delivered and moderated by experts in their fields (Table 1). These valuable resources reflect a new move to share information in the digital age, and are accessible from ESCR members through the website. In addition to the new media initiatives, the ESCR continues to provide workshops on a variety of topics, often organized to link in directly with the annual ESCR event. More specifically, the ESCR also supports the ESCR Visitor Scholarship Programme, offering young qualified radiologists the opportunity for further education and collaboration in cardiovascular imaging in Europe (Table 2).

The ESCR focuses on expanding and promoting cardiovascular imaging in Europe.

Webinar topics 2018: the myoccardial season

ESC MR/CT Registry Data (11/12/2017)

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<th>Participating institutions</th>
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<td>Takács-ECR (2017)</td>
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</tbody>
</table>

ESCR TODAY | THURSDAY, MARCH 1, 2018

COMMUNITY NEWS

FOR RODRIGO SALGADO

on May 24–26, 2018, in Geneva, Switzerland. The ESCR also continues to develop in partnership with other European societies, such as the North American Society for Cardiovascular Imaging (NASCI).

The annual meeting of the European Society of Cardiovascular Radiology (ESCR) will take place on May 24–26, 2018, in Geneva, Switzerland. This event is the perfect meeting point with the annual ESCR event. After a successful meeting in 2017, the ESCR will continue to develop in the platform of choice for standardisation, quality-control, networking advocacy and certification of radiologists in cardiovascular imaging.

The ESCR also continues to develop in partnership with other European societies, such as the North American Society for Cardiovascular Imaging (NASCI). By supporting the ESCR, radiologists have the opportunity to share expertise.

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community news

By Rodrigo Salgado

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Radiological Society of Kazakhstan celebrated 40th anniversary

The Radiological Society of Kazakhstan was founded in 1977 and celebrated its 40th anniversary last year.

In October 2017, the 1st Eurasian Radiological Forum was held in Astana, Kazakhstan, and included joint meeting with the IAEA on radiation protection and quality assurance.

The statutes of the Radiological Society of Kazakhstan were adopted in 1999, the Radiological Society of Kazakhstan, the Radiological Society of Kazakhstan, and the education and training of its members and young radiologists in close collaboration with other radiological societies. In 1999, the KRSSR, together with the ESR, introduced a two-week course on nuclear medicine for specialists from Central and West Asia. In 2004, the KRSSR was reorganized into the Association of Radiologists of Kazakhstan, and became a full member of the European Society of Radiology (ESR).

In August 2007, the Association of Radiologists of Kazakhstan was renamed the Radiological Society of Kazakhstan and became a full member of the European Society of Radiology (ESR). Since 2004, an annual one-week European School of Radiology – ESR Astana Tutorial has been held on the initiative of the European Society of Radiology in Astana. This has given its young radiologists from Kazakhstan, Uzbekistan, Kyrgyzstan, Tadjikistan and Taimuristan the opportunity to refresh their knowledge. The programme has been taught by leading professors from Europe (Nicholas Court, Paulo Bertani, Matthias Fronky and Matthias Scheltema) and Russia (Maxim S. Zaitsev, Igor Tyutin and Igor Pronin).

Since 2014, members of the Radiological Society of Kazakhstan have actively participated in the International Day of Radiology by publishing an interview for the ESR community. In 2016, the first Eurasian School of Radiology – EURAS was held in the initiative of the European Society of Radiology in Astana. This year’s 7th Eurasian Radiological Forum from 10–12 October 2017 marked the 40th anniversary of the Radiological Society of Kazakhstan. The programme consisted of the Training Symposium between the Korean Society of Radiologists of Kazakhstan, which focused on cardiovascular imaging and included a joint meeting on radiation protection and quality assurance with the USA.

The congress and members of the medical society also conduct educational seminars and themed master classes over the years. In conclusion, the president of the Radiological Society of Kazakhstan, I. Tyurin, would like to stress that during the years of collaboration with the European Society of Radiology, our society has become a strong training platform for young radiologists. Every year, we see getting increased frequency of burnout and an increased frequency of errors made in the subsequent period, thus creating a vicious cycle whereby errors are made, more patients are injured, and the practice is exposed to more liability actions.

Further reading


Gustav Klimt, Ancient Greece I, painting between the columns on the north wall of the Main Staircase of the Kunsthistorisches Museum Vienna, 1890/91 © KHM – Museum der Stadt Wien.

BY RAUSHAN I. RAKHIMZHANOVA

COMMUNITY NEWS

BY ANTONIO PINTO, PALMENO SACCO AND CORRADO BIBBOLDI

New law on patient safety and health professionals’ responsibilities in Italy

To err is human, yet society demands that medical professionals be faultless. For radiologists, being held to such standards is particularly challenging due to the rapidly advancing science of image diagnosis. Error in medicine has become headline news in recent years.

Over the last two decades, the number of claims made against medical doctors has been increasing dramatically. The cost of such negligence actions is destroying good doctor–patient relationships and driving prominent young doctors away from specialties which have become high risk with respect to negligence claims.

In addition to the social and economic effects, malpractice lawsuits have severe implications for patient safety. The rising tide of medical malpractice litigation and payouts is rapidly becoming prohibitive. Consequent liability actions are destroying the medical doctors have been increasing in numbers of claims made against professionals in terms of liability and patient safety, as well as on professional responsibility and patient safety. BMJ 2017;357:j2277.

In Italy, a new law on patient safety was enacted on March 8, 2017. The new law instituted a comprehensive law on patient safety. The law was enacted to protect patients, physicians and other healthcare professionals from the effects of mass media trials and to protect patients and other healthcare professionals from the effects of mass media trials.

Prevention on healthcare safety and patient safety as well as on professional responsibility is of paramount importance as it helps to protect professionals. The Italian College of Italian and French Radiology, a section of SIRM, together with the Italian College of Italian and French Radiology, has promoted educational programmes in order to help radiologists learn about the new law. A good understanding of the law and its ramifications is of paramount importance as it helps to protect professionals.

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Further reading


Gustav Klimt, Ancient Greece I, painting between the columns on the north wall of the Main Staircase of the Kunsthistorisches Museum Vienna, 1890/91 © KHM – Museum der Stadt Wien.

ECR TODAY | THURSDAY, MARCH 1, 2018

Special Exhibition: Stairway to Klimt

Eye to eye with Gustav Klimt

#ECR2018

myESR.org

KUNSTHISTORISCHES MUSEUM WIEN
1010 Vienna, Burgring 5
www.khm.at
WHAT’S ON TODAY IN VIENNA?

THURSDAY, MARCH 1, 2018

THEATRE & DANCE

Die Glasmännerei
by Tennessee Williams

AKADEMIETHEATER | 19:30
1030 Vienna, Lisztstraße 1
Phone: +43 1 51444 4145
www.burgtheater.at

Jedermann (stirbt)
by Ferdinand Schmalz

BURGTHEATER | 19:30
1010 Vienna, Universitätsring 2
Phone: +43 1 51444 4145
www.burgtheater.at

All About Eve
by Christopher Hampton

KAMMERSPIELE DER JOSEFSTADT | 19:30
1010 Vienna, Rotenturmstraße 20
Phone: +43 1 42 700 300
www.josefstadt.org

Ein Körper für jetzt und heute
by Mehdi Moradpour

SCHAUSPIELHAUS | 20:00
1090 Vienna, Porzellangasse 19
Phone: +43 1 317 01 01
www.schauspielhaus.at

Weiße Neger sagt man nicht
by Esther Muschol

TAG – THEATER AN DER GUMPENDORFER STRASSE | 20:00
1060 Vienna, Gumpendorfer Straße 67
Phone: +43 1 5860222
www.dastag.at

Fremdenzimmer
by Peter Turrin

THEATER IN DER JOSEFSTADT | 19:30
1080 Vienna, Josefštádter Straße 26
Phone: +43 1 42 700 300
www.josefstadt.org

Wien ohne Wiener
An evening with songs by Georg Kreisler

VOLKSTHEATER | 19:30
1070 Vienna, Arthur-Schnitzler-Platz 1
Phone: +43 1 5211-0
www.volkstheater.at

Please note that all theatre performances are in German.

CONCERTS & SOUNDS

ORF Radio-Symphonieorchester Wien
Conductor Gustavo Gimeno
Wiener Singakademie, choir
Eleonora Buratto, soprano; Sara Mingardo, alto;
Kenneth Tarver, tenor; Luca Pisaroni, bass-baritone
G. Rossini: Petite messe solennelle

KONZERTHAUS | 19:30
1030 Vienna, Lothringerstraße 20
www.konzerthaus.at

Wiener Symphoniker
Conductor Alain Altinoglu
Renaud Capucon, violin
M. Ravel: Pavane pour une infante défunte; E. Lalo: Symphonie espagnole d minor op.21; J. Brahms: Symphonie No. 2 d major op. 73

MUSIKVEREIN | 19:30
1010 Vienna, Bösendorferstraße 12
www.musikverein.at

Chris Potter Underground (US)

PORGY & BESS (JAZZ) | 20:30
1010 Vienna, Riemergasse 11
www.porgy.at

Son Lux (US) + Hanna Benn (US)

ARENA (POP & ALTERNATIVE) | 20:00
1030 Vienna, Baumgasse 80
www.arena.co.at

Please note that all concerts are in German.

OPERA & MUSICAL

Vivaldi – Die fünfte Jahreszeit
Musical by Christian Kolonovits

VOLKSOPER | 19:00
1090 Vienna, Währingerstraße 78
www.volksoper.at

Ariodante
by Georg Friedrich Händel
Conductor William Christie
With Sarah Connolly, Chen Reiss, Hila Fahima, Christophe Dumaux, Rainer Trost, Wilhelm Schwinghammer

WIENER STAATSOPER | 18:30
1010 Vienna, Opernring 2
www.wiener-staatsoper.at

I Am From Austria
Musical with songs by Rainhard Fendrich

RAIMUNDTHEATER | 19:30
1060 Vienna, Wallgasse 18–20
www.raimundtheater.at

Tanz der Vampire
Musical by Michael Kunze and Jim Steinman

RONACHER | 19:30
1010 Vienna, Seilerstätte 9
www.musicalvienna.at

Please note that all opera performances are in German.
People & Places

DIVERSE & UNITED
ECR faces

ECR baby turned hotshot medicine student invited to ECR 2018

By Mélisande Rouger

Thomas Sartoretti, a first-year medicine student from Zürich, Switzerland, is one of the youngest speakers at ECR 2018. He is only 18 but has probably attended more ECR meetings than delegates twice his age, as he explained in an interview with ECR Today.

"I am an ECR native: I already attended the meeting in my first year of life. In my toddler years, the big poster with the annual ECR logo in the entrance hall of the congress building really fascinated me, and so did the thousands of well-dressed radiologists and technicians going up and down the escalators," he remembered vividly.

The son of Dr. Sabine Sartoretti, chief of the neuroradiology department at Kantonsspital Winterthur, Switzerland, this determined young man got the ECR bug from his mother. "She really introduced me to the meeting. Now that I am studying medicine, I find the ECR to be a great opportunity to learn about novel imaging technologies being introduced into the clinical setting," he said.

A college freshman, he is interested in imaging technologies, biology, pharmacology and neuroscience, but he has a special curiosity for radiology. "It is really the only medical specialty utilizing the full spectrum of imaging technologies currently available. The necessity of using data analysis, statistics, programming and physics to develop new imaging technologies really motivates me to want to participate in radiological research," he said.

Sartoretti’s interest for scientific work was aroused early on, and he gained his first opportunity during ECR 2016. "I met with Prof. Andreas Gutzeit from Paracelsus University of Salzburg, a former colleague of my mother’s. While we were all comfortably enjoying our Schnitzel at Figlmüller, the idea of a common radiological research project was born. In mathematics, it is an accepted fact that young people up to the age of 30 years are at the top of their intellectual abilities and are extremely valuable to have on research teams; Prof. Gutzeit wanted to prove his conviction that young medical students are the same. He invited me and my sister Elisabeth to participate in a project on bacterial contamination of ultrasound probes. This was really the first scientific project I participated in, and it resulted in a publication in European Radiology," he said.

Other work has followed including in radiological technology, for instance on optic nerve segments on 3D double inversion recovery (DIE) sequences in visually asymptomatic patients with multiple sclerosis. At ECR 2018, Sartoretti will present a poster on Zoom Diffusion for pathologies in brain stem and hippocampus. Sartoretti also plans to attend scientific sessions on new imaging sequences in MR in the field of neuroscience and techniques that faster MR sequences, as he has been involved in the clinical application of a new compressed sense technique.

"I would like to attend more general lectures, for example regarding the future perspectives of medical imaging in the context of deep learning. Last year, I attended Prof. Mauricio Castillo’s lecture entitled ‘Dissatisfaction, burnout and inequality: three major challenges in radiology’, which I found very interesting," he added.

He is very keen on again visiting the ECR’s technical exhibition, something that left him deeply impressed last time. "I was given lots of explanations by software developers, together with practical demonstrations, about new MR sequences and new reconstruction algorithms. The scientific presentations showed me the enormous diversity of radiological research topics currently being investigated in the industry and at research institutions."

With its extensive scientific programme, ECR 2018 will certainly not disappoint him.
On Tuesday, February 27, the exams for the European Diploma in Radiology (EDiR) took place at ECR. 258 candidates sat the exam, making it the largest EDiR examination so far.

The participation of such a large number of candidates was possible thanks to special examination software recently developed by the European Board of Radiology (EBR). The EBR welcomed candidates from 43 different countries in Europe, Asia, Africa and America. The ESR funded 20 people to participate in the exam through their Invest in the Youth support programme grants.

The non-profit organisation ‘Junge Radiologen – Young Radiologists’ invites all interested participants of the ECR to the Coffee and Talk Session ‘Young radiologists in Europe’ on Friday, March 2 at 16:45, where they will present themselves and future plans for ‘Young radiologists’ in Europe, followed by an open discussion and brainstorming with ESR President Prof. Bernd Hamm. The organisation aims to establish an international platform for job-related networking, advanced vocational training as well as scientific exchange and cooperation for radiology residents. For further information visit www.junge-radiologen.de

Right from the start, the new format Coffee & Talk proves to be a huge success! Prof. Yves Menu from Paris moderated one of the first discussion rounds. These informal sessions take place in the stylish EuroSafe Imaging Lounge, Room Coffee & Talk (1st level). Topics vary from radiation protection and value-based imaging to EuroSafe Imaging, imaging biobanks and management tips. Stop by and contribute to the lively discussions while sipping your coffee or tea.

At the ECR 2018 Opening Press Conference, experts presented the scientific highlights they will focus on at the congress. Left to right: Prof. Pedro Vilela from Almada, Portugal, Prof. Wiro Niessen from Rotterdam, ESR President Prof. Bernd Hamm, Prof. Vicky Goh from London, Prof. Marc Dewey from Berlin and Assoc. Prof. Marius Mayerhöfer from Vienna.

For the first time, ECR presents ‘the Cube’, our dedicated interventional radiology (IR) workshop.

The Cube, intended to attract young physicians with limited or no experience in IR, provides insight into the facets and faces of this fascinating field. On the first day of the workshops, rooms were packed all day long!