Under stress: radiologists embrace novel ways to tackle burnout

When Dr. Markus Berger set off to work on a Monday morning, he had no idea that his drive would eventually lead him to Buddhist teachings and to become a more thoughtful and complete radiologist. He plans to describe his experiences during today’s session on burnout.

“I was driving out of the garage towards the motorway when suddenly I felt I couldn’t control the car anymore,” he told ECR Today in a pre-congress interview. “I was sweating, I couldn’t carry on. I drove back about a kilometre and put the car back in the garage, but – being a faithful employee – took the train to the hospital. I arrived an hour or two late.”

Berger, who is chief of radiology at the Swiss Paraplegic Centre in Nottwil, Switzerland, talked to his supervisor and team. They agreed he could work half time for three to six weeks while he identified the problem.

“The first thing I did was to scan myself to look for anything organic. Of course, everything was normal. I went to see an ophthalmologist, a general internist … They prescribed me therapies, medications. They even prescribed me a pacemaker, which is hard for a radiologist who works with MRI machines,” he said. “But the only thing I got was new glasses.”

Berger turned to the internet where he read about people having panic attacks while driving a car. After some thought, he realised he felt stressed and overworked for a couple of years and had found it difficult to sleep through the night. Insomnia is among the first symptoms of burnout, according to Prof. Myriam Hunink, professor of radiology and clinical epidemiology at the Erasmus University Medical Centre in Rotterdam, the Netherlands.

Other physical symptoms include headache, stiff neck, lower back pain, and gastrointestinal upsets. Hunink came up with the idea for today’s session after realising – from colleagues and the media – that burnout was becoming more prevalent. She estimates that 50% of radiologists have at least one symptom of burnout, of which the most important for diagnosis are emotional, such as feeling overwhelmed, detached, or disillusioned.

“It’s important on two levels: at the level of the individual, and at the level of the department. It has a huge effect on people and the quality of care they can give,” she noted.

Berger attributes his burnout to – among other things – a hospital reorganisation and 12-hour work days. According to Hunink, increasing workloads are among the factors leading to a rise in burnout. Radiologists are tackling more cases, interpreting more images, and under increased pressure not to make mistakes.

“Previously everything was done by interacting with the patient and referring physician, and there was time to talk. Now there’s a long workload to take care of, which seems to grow each day and – if you don’t do it – all hell breaks loose,” she said.

Moreover, there’s an expectation that everything is done digitally, which makes radiologists feel they spend most of their day looking at pixels and clicking on their mouse. This potential problem is worse in radiology than other clinical specialties where there is naturally more patient-clinician interaction.
Distinguished breast radiologist to present honorary lecture today

In recognition of her contribution to cancer imaging and passionate work in education and research, Professor Fiona J. Gilbert from Cambridge, UK, has been invited to deliver the Arthur de Schepper Honorary Lecture ‘From features to function: breakthroughs in breast imaging’ at ECR 2017.

Professor Fiona J. Gilbert from Cambridge, UK, will speak about breakthroughs in breast imaging in today’s honorary lecture.

By Mélanide Rouger

Radiology first piqued her interest while doing a residency in oncology in Glasgow. “CT scanning had just been introduced and I found it much easier to manage patients with cancer when I could see the amount of disease that was there. I then undertook my training in medicine and went into radiology as it allowed me to keep my interests in general medicine and surgery. I love being able to influence management of our patients through imaging and I find the level of certainty that we can bring to a diagnostic dilemma rewarding. I find it much easier to understand the pathophysiology when I can see the image, so my absolute delight is CT and MRI images, which reveal the answers. I particularly like taking multidisciplinary team meetings where we can get our expert opinion and discuss patient management,” she said.

Over the last ten years, Prof. Gilbert has also been awarded grants in excess of £30,000 from the Medical Research Council, the Engineering & Physics Research Council, the British National Institute for Health Research (NIHR) Health Technology Assessment Board, and Cancer Research UK.

She is responsible for radiology research and radiological under- graduate teaching at Cambridge University.

“I am very involved in research. My particular interests here are in assessing new imaging technology and finding out whether it is improving diagnostic confidence, improving decision making, and whether or not it impacts on patient care and is cost effective. I love taking a multidisciplinary approach to better understand tumour physiology and am thrilled as we have just acquired a PET/CT machine to do just that,” she said.

Prof. Gilbert has authored more than 100 peer-reviewed publications, six book chapters and many conference abstracts.

She has worked to advance the discipline at the national level and is the immediate past chair of the academic council of the Royal College of Radiologists. She has also served in leadership roles for various organisations, including the UK National Cancer Research Institute Breast Cancer Advisory Group.

In the future, she expects more IT support to help radiologists avoid mistakes, find errors and improve their diagnostic acumen. “I think we are seeing a dramatic reduction in the amount of radiation we use to image patients and more judicious use of contrast agents. I hope that there will be tools that will allow us to provide images with computer aided detection algorithms, to allow us to report greater volumes of images and free us to do more multidisciplinary team meetings to allow us to influence patient management,” she said.

She also foresees an increase in using imaging for screening patients and patient stratification for more optimal treatment and earlier diagnosis. “But I hope this will be guided by a more thoughtful approach, using all available technology such as blood tests and genetic analysis. Cost containment is critical and imaging needs to be undertaken only when this impacts positively on patient management,” she added.

Prof. Gilbert is also concerned about the current shortage of radiologists in Europe, as the profession is ageing and the demand for imaging studies is rising sharply.

“In the UK there is a critical shortage of trained radiologists – the problem is exacerbated by the inexorable increase in the demand for cross sectional imaging. The situation is similar in other countries in Europe. We need to ensure we train more radiologists in order to maintain the quality of breast imaging provided to cost-effective patient care,” she said.

Prof. Gilbert has tackled all these issues in various talks around the world. She is a regular speaker at international radiology conferences including the European Congress of Radiology, the annual meeting of the European Society of Breast Imaging and the Radiological Society of North America meeting.

She has regularly attended the ECR after a first presentation on CT and MRI in the management of low back pain, years ago.

“The meeting was much smaller then but still had a wonderful European feel to it. The size of the meeting meant it was much easier to navigate compared to RSNA and easier to meet colleagues from other departments and countries. The meeting was very high quality with superb presentations and lectures and I am thrilled to see it growing. I loved being in Vienna and took the opportunity to go to the zoo where I tried to do every year,” she said.

Arthur de Schepper Honorary Lecture

Saturday, March 4, 12:15–12:45, Room A

From features to function: breakthroughs in breast imaging

Fiona J. Gilbert, Cambridge/UK
Refocusing radiologists’ practice around patients’ needs

The traditional view of the radiologist as a physician who adds value to the healthcare system solely by interpreting diagnostic images and generating reports is obsolete—the role has drastically expanded, today encompassing a broad spectrum of different competences. In today’s ‘ESR meets’ session, experts from the United States will discuss how radiologists can stay in control and keep pace with changes that healthcare delivery models are currently facing.

Over the last decades, radiologists have not only been critical to the technological developments in imaging, but they have more recently developed guidelines for the appropriate imaging algorithms to maximise clinical effectiveness. These appropriate use criteria are now being implemented into clinical workflows. The radiologists’ role now includes public health delivery, quality of care improvement, information technology, cost effectiveness and most importantly, patient safety among various other facets and competences. Radiology’s realm of technical possibilities is continuously expanding and its place in healthcare continues to evolve.

However, it has also become more vulnerable to financial pressures and subject to the profound ongoing changes that seek to transition healthcare delivery to a value-based system. Radiologists need to develop new strategies to claim a central role in healthcare reform. It is not an exaggeration to say that the future of the profession will depend on how radiologists decide to act and how they manage external disruptions and trends.

To ensure radiology’s future, greater emphasis should be placed on meeting the patients’ needs and transitioning from a focus on the volume of scans read to the value of the patient experience. With this in mind, professional radiology organisations in the United States have created campaigns to promote patient-centred practice and a thoughtful understanding of the radiologist’s role in shaping care delivery and improving the health of the patients they serve.

Two of them, the Radiology Cares campaign, developed by the Radiological Society of North America (RSNA), and the Imaging 3.0 campaign of the American College of Radiology (ACR), and in particular their principles, will be discussed today by Prof. Richard L. Ehman, from the Department of Radiology at the Mayo Clinic, Rochester, Minnesota, and Prof. Geraldine McGinty, from the Department of Radiology at Weill Cornell Medicine in New York.

“Radiology societies in the US are supporting radiologists as they reengineer and put patients at the centre of care delivery. Practice and reimbursement policies are aligning to incentivise this change. Tools are being developed that will help radiologists to succeed under these new models by delivering high quality high value patient-centred care,” said Ehman.

Launched at RSNA 2012, the Radiology Cares campaign attempts to promote the alignment of radiology practice with patients’ needs and best interests; the meaningful engagement of radiologists in their patients’ experiences throughout the continuum of their radiological care; effective communication between radiologists, patients and other healthcare providers; and, last but not least, patients’ ability to make informed decisions regarding their medical care.

“The Radiology Cares campaign focuses on optimising the experience of patients during their radiological care. Through online resources and educational materials the initiative helps radiologists to take patient-centred radiology from concept to practice,” explained Ehman.

A similar approach is followed by the Imaging 3.0 initiative, a multi-phase programme consisting of services, processes and technology tools that enable radiologists to adapt how they manage their practices, patient care and their own futures.

The initiative aims to position the radiologist as an integral member of the care delivery team, requiring radiologists to go beyond image interpretation and to make themselves available as expert consultants to referring physicians and healthcare systems.

“Imaging 3.0 makes the clear statement that radiologists are the stewards of appropriate imaging. It calls for culture change to connect more effectively with the patient and the care team and it establishes a focus on developing tools and advocating for alignment of incentives to support that change,” McGinty noted.

Today’s session will be chaired by Ehman, Prof. James Brink, from the Department of Radiology at the Massachusetts General Hospital, Boston, and the ESR President, Prof. Paul Parizel, from the Department of Radiology at the Antwerp University Hospital, Belgium.

They will be joined by Prof. Keith Dreyer, from the Department of Radiology at Harvard Medical School, Boston, who, among others, plans to discuss the role of decision support systems in improving the appropriate utilisation of medical imaging, and Prof. Edward Jackson, from the Department of Medical Physics at the University of Wisconsin School of Medicine and Public Health, Jackson intends to explain the need for quantitative imaging biomarkers in clinical trials and practice and to address the key challenges and some current approaches in regard to the implementation of standardised quantitative imaging techniques.

Radiology Cares campaign: patient-centred radiology model (Provided by Prof. Richard L. Ehman, with permission of the RSNA)
HOT SHOTS
FROM DAY 3

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Cardiovascular and Interventional Radiological Society of Europe
How radiology can find new roles in post-PACS, networked world

An unexpected consequence of PACS is that radiologists are increasingly sidelined by referring physicians to the extent that if a patient comes into the emergency room with a suspected fracture, the physician can look at the images to make a diagnosis and may not even read the radiologist’s report, according to Prof. Johan Van Goethem from the Department of Neuroradiology at Antwerp University Hospital in Belgium.

This problem is confounded as physicians grow more specialised. In their areas of special interest, they can increasingly read images with equivalent skills to a radiologist.

“Many radiologists don’t see it coming yet, but our profession is in real danger if we don’t act swiftly in the coming years to change the way we work,” he said.

Moreover, although radiologists have an active role in many multidisciplinary teams, some referring physicians don’t appreciate the work they do. Also, the public and media are often unaware of the work of radiologists, believing that radiologists are mere technicians needed to work with patients rather than sitting in a darkened room, and must also place themselves inside the clinical loop by discussing more cases with referring physicians and becoming more active members of multidisciplinary teams, he continued.

An important future role of radiologists might be as a gatekeeper. This may include screening referrals for the appropriateness of the technique and limiting access to examinations. Here the benefit is financial, and Van Goethem explains that if the same physician diagnoses and prescribes, therapy costs rise exponentially. In spine imaging, for example, radiologists recommend no imaging for acute lower back pain without leg pain for the first eight weeks because it doesn’t aid therapy and this reduces both costs and patient exposure to ionising radiation.

Additionally, he recommends that radiologists focus on examinations, such as MRI today and spectral imaging in CT in the future; that referring physicians find too complex to report or interpret.

Radiologists should also super-specialise in order to gain the respect of referring physicians. Van Goethem believes. They should be aware, for example, of the techniques used by orthopaedic surgeons, the complications that are possible, and what both normal and abnormal post-operative imaging look like. “Otherwise you’re placing yourself out of the game and radiologists aren’t necessary anymore,” he warned.

During today’s session, ECR delegates will hear about other challenges to the profession and how they can respond.

Prof. Gabriel Krestit, chairman of radiology and nuclear medicine at the Erasmus Medical Centre, Rotterdam, the Netherlands, thinks the training of radiologists needs to adapt to prepare the next generation for future changes in the profession.

“The radiologists who will be practising in 20 to 30 years time will need to understand more about the molecular basis of diseases, understand the power of computers and artificial intelligence, and deal with big data, and data analytics,” he said. “This is something we need to introduce as fast as possible into our education.”

Deep machine learning will make some aspects of the job easier, but also raise some philosophical questions. For example, if computers can analyse the raw data underlying MRI and CT images, do radiologists need images at all?

Krestin suggests that the future role of radiologists will be more about consulting with clinicians in a multidisciplinary team, handling data, and answering their questions. To perform this role, radiologists would need to change their daily practice, moving from describing images to interpreting and integrating information from blood tests, imaging, and genetic sequencing.

Other speakers in the session will talk about turf battles resulting from more cardiologists, neurologists, and other physicians reporting CT or MRI examinations. Who should report examinations presents a different type of challenge to the profession.

There will also be a talk about how SWOT (strengths, weaknesses, opportunities, and threats) analysis can help radiologists understand their strengths as a profession and how to focus on these.
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Pitfalls in PET/CT and FDG indications in focus

Hybrid imaging provides unique insight into tumours but the potential pitfalls make it a challenging tool only to be used after appropriate training. However, many strategies exist to read PET/CT scans properly and research is increasingly pushing the new modality further into areas other than oncology, as a panel of experts will highlight at ECR 2017.

CT and PET already come with their own pitfalls before they are combined into PET/CT, according to Prof. Gerald Antoch, chairman of the department of diagnostic and interventional radiology at Düsseldorf University Hospital, Germany. “You have to deal with already known pitfalls and now that these modalities have been brought together there are additional pit- falls that PET/CT imaging may come along with,” he said.

Misinterpreting CT contrast material uptake is one of the most common difficulties encountered by radiologists and nuclear physicists in charge of reading PET/CT. “In PET/CT one uses the CT images for attenuation correction of the PET data if you use CT contrast material, this CT-based PET attenuation correction may cause artefacts in the PET image. These artefacts may show up as areas of apparently increased tracer uptake on PET where there is actually no tracer uptake. So if you don’t look closely enough and if you’re not aware of this artefact, you may misinterpret these areas of tracer uptake as real areas of tracer uptake caused, for example, by a tumour,” said Antoch.

One strategy to reduce the number of contrast material associated artefacts is to adapt the scanning protocols to the examination. Typically, physicists inject CT contrast material through a vein in the arm in the order to adapt to as many potential artefacts arising from bringing together PET and CT. Otherwise you are at risk of misin- terpreting the images,” said Antoch. Appropriate training remains a cornerstone to use hybrid imaging, he added.

Also taking part in the session is Prof. Ingela Riklund, who is a radiologist and nuclear medici- cine specialist at Umeå University Hospital, Sweden. She will explain to neurology, cardiology and infecti-ous diseases especially in patients with fever of unknown origin. “Not only tumours but also infe-ctions present with an increased glu- cose metabolism, so if you use FDG radiomarkers for PET glucose, it will also work in this context,” Prof. Antoch explained.

As for cardiology and neurology, these two indications will further evolve with PET/MRI scanners becoming more popular, he belie- ves: “MRI is very good for the heart and brain, so it may be well sui- ted. These are two major fields on the move.”

ESHI Session (European Society for Hybrid Medical Imaging)
Saturday, March 4, 08:30–10:00, Room M 2
Hybrid imaging: case-based diagnosis in PET/CT
Moderator: K. Nikolova, Tubingen/DE
• FDG indications in oncology: case-based
  K. Riklund, Umeå/SE
• Non-FDG indications in oncology: case-based
  O. Ratib, Geneva/CH
• Pitfalls in PET/CT: case-based
  G. Antoch, Düsseldorf/DE

FDG indications in focus
in the area of the subclavian vein, identifying this as an artefact. Images provided by Prof. Antoch.

A. FDG indications in oncology: case-based
B. FDG indications in oncology: case-based
C. FDG indications in oncology: case-based
D. FDG indications in oncology: case-based

Images demonstrating a contrast-associated PET-artefact. CT (A) demonstrates highly concentrated contrast material in the subclavian vein.
One bolus is the contrast material as soon as it has flushed into the vein a saline flush help to flush the contrast material to the heart very quickly. “It’s really important to know all potential artefacts arising from bringing together PET and CT. Otherwise you are at risk of misinterpreting the images,” said Antoch. Appropriate training remains a cornerstone to use hybrid imaging, he added.

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The time is now: breast cancer screening with tomosynthesis edges closer to implementation

Digital breast tomosynthesis (DBT) has taken its first tentative steps into the clinical arena. It’s already in use in some places, but adoption is not yet widespread for a variety of reasons. DBT advocates are convinced its time has come, but others are not so sure. In a Special Focus session today, the big names of DBT cover all the bases of the modality and discuss its future.

A 63-year-old woman with bilateral breast pain for two months. Both breasts were normal on clinical evaluation. In the outer quadrant of the left breast, there is a subtle spiculated mass, measuring 16mm, seen on craniocaudal view. This is not well visualised on the mediolateral oblique view, but is better demonstrated on tomosynthesis edges closer to implementation.

Prof. Fiona Gilbert, head of the radiology department at the University of Cambridge in the UK, is keen for ECR 2017 attendees to appreciate the state-of-play of DBT and why they might wish to wait in their practice. One reason to adopt DBT is it’s been shown to increase the number of screen-detected cancers, and this is likely because the technique tends to find cancers earlier and also diagnose cancers that would have otherwise presented in the interval between screens. She plans to discuss not only the potential influence of DBT screening on the interval cancer rate and next-round cancers but also the increase in review time and some potential complications in image transfer and some increase in review time and some potential harms including overdiagnosis.

"This is because the technology is more expensive, potentially has a higher radiation dose (therefore potential cost to the woman), and also takes longer to read, so is more costly in terms of the radiologist’s time," she said. “The policymakers will also want to ensure there is a sustained increase in cancer detection before adoption of DBT. They wish to see a reduction in interval cancers and a sustained increase in cancer detection in subsequent screening rounds. Also, they need to be sure the additional cancers found are cancers that might have caused death if not found at the time DBT detected them, which is more difficult to prove, Gilbert added.

Another speaker who studied this topic closely is Dr. Giacela Genaro, a medical physicist at the Department of Radiology and Management Review, Veneto Institu- te of Oncology (IOV) – Istituto di Ricostruzione e Cura a Carattere Scientifico (IRCIS) in Padua, Italy. In her talk, she intends to discuss radiation dose, number of DBT projections, and the need for conventional or synthetic 2D images in combination with DBT. During the session, attendees will also learn about hanging protocols, reading time, and potential solutions for reducing the interpretation time, in addition to IT issues.

Anyone familiar with DBT recognises it produces a lot more data than standard mammography. In standard mammography screening, there are four images (between 10 and 50 MB each) plus four prior mammograms of the same size. In DBT screening, the number of images can be between 20 (for 2cm compressed-breast thickness) and more than 60 (for 6cm or more-compressed-breast thickness), assuming 3mm slice thickness.

‘Those numbers double for some manufacturers using 5mm slice thickness,’ she said. And tomosynthesis is not only about slices: there are slab and synthetic images, making twice the data amount if you consider the prior examination.

Mammography screening review is a relatively fast process, but the huge amount of data implies an increase in review time and some complications in image transfer and image handling, making DBT more challenging, according to Genaro.

You need to think about your infrastructure (network specifications), about your review hardware about your storage capability (when adopting DBT), she continued.

Also, there is no standard for DBT images that is accepted and applied by all manufacturers. The lack of a standard for DBT images is not the only issue because there is also the question of synthetic images. Gilbert foresees developments in synthetic images, leading to the replacement of conventional 2D images that are used when reading DBT.

“These are of higher quality than the original versions and they also have certain enhancement characteristics, which makes it easier to spot the microcalcifications and subtle lesions,” she said. “The synthetic image means that the radiation dose used in DBT can be held at just the same level as a conventional 2D mammogram.”

Also, it’s likely that computer-aided detection (CAD) will improve reading sensitivity and specificity and shorten the reading time.

So how soon will DBT be ready to run? Only time will tell.

Special Focus Session

Saturday, March 4, 14:00–15:30, Room E1
SF 15b Breast cancer screening with tomosynthesis: the time is now

- Chairman’s introduction
- P. Skanne, Oslo/NO
- Screening with digital breast tomosynthesis in Europe: tumour characteristics and potential harms including overdiagnosis
- F. Gilbert, Cambridge/UK
- Which challenges should we consider prior to tomosynthesis screening implementation?
- G. Genaro, Padua/IT
- Panel discussion: Is tomosynthesis ready for replacing 2D mammography in organised breast cancer screening?
Unforgettable cases come under close scrutiny in special focus on chest radiology

When histology is known for the left side in bilateral chest lesions then, depending on the risk and whether a local treatment is considered, radiologists should clarify the other side, not wait, recommends Dr. Claus Peter Heussel, diagnostic and interventional radiologist at the Thorax clinic, University Hospital of Heidelberg, Germany.

In a 62-year-old female who underwent a CT-guided biopsy for suspected bronchial carcinoma that in fact turned out to be COP.

His third tip, therefore, is always to check the benign differential and then prove the histology in the week-long window before therapy starts. This means scheduling a bronchoscopy and confirming diagnosis with histological proof. The same strategy should be applied for other types of suspicious lesions, particularly given the increase in TB cases in Europe.

Fourth, radiologists should consider a longitudinal assessment, whenever possible.

“Benign lesions such as tuberculosis (TB) and cryptogenic organising pneumonia (COP) may appear as malignancy but in reality aren’t, and these lesions require different treatment,” he added, pointing to a case of a 45-year-old patient with COP.

Heussel will also reveal tips for improving mass or consolidation interpretation.

“Benign lesions such as tuberculosis and polyangiitis may be the key to a diagnosis. However, she warns that some findings may point to a disease that later turns out to be a different pathology. For example, in patients with haemoptysis, blood on the tracheal walls that will eventually be spontaneously absorbed might be mistaken for tracheal wall thickening wrongly pointing to achaete disease. Specific knowledge of the anatomical and pathological basis of airway abnormalities and also the typical diagnoses and differentials is crucial when interpreting trachea images, she noted.

Due to its composition of cartilage and membranous areas, the trachea can be affected by a range of diseases like relapsing polychondritis and osteochondroplastic tracheopathy that affect only the cartilaginous part. Others

continued on page 12
Prof. Werner Jaschke from Innsbruck, Austria, will focus on the pros and cons of teleradiology in his talk.

Communicating imaging findings has never been easier than now. However, radiologists must do so in new and sometimes challenging settings.

A prime example of such a complex scenario is teleradiology, which does not allow face-to-face communication and may lead to loopholes in the information being transferred, according to Prof. Werner Jaschke, Head of the Radiology Department at Innsbruck Medical University, Austria.

“Communication, approximately 30% of what we perceive is based on sentiments. If you communicate with somebody, interaction beyond language has terrific importance. But in teleradiology we are only focusing on images and a written report, there is no room for unspoken communication,” he said.

“The only way radiologists can communicate their findings appropriately in teleradiology is in a clear, unambiguous manner. ‘Fluid collection’ can be an abscess or pleural effusion. So in such a situation, the person asking the question must be patient and the radiologist must be patient and other physicians to communicate complex conditions of patients and ignores the fact that radiologists are clinicians interacting with patients and other physicians to analyse complex conditions of patients. Direct communication improves patient care because new ideas and information can contribute significantly to establishing a correct diagnosis. We pretend we can supplement this communication process with smartphones and tablets. I think this assumption is wrong,” he explained.

“Teleradiology should therefore only be used when no specialist is available in-house, he believes. Without communication, you turn radiology into a commodity. Physicians need communication with radiologists, just like patients.”

Patients have a lot of different needs when they arrive at the radiology department, according to Dr. Erik Briers, a volunteer at Europa Image, the European Prostate Cancer Coalition of patient support groups for prostate cancer across Europe.

Briers has a PhD in chemistry and a career in laboratory medicine and as a science writer. He is also a cancer survivor and a member of the ESR Patient Advisory Group (ESR-PAG). He will speak of his experience with radiology during the session.

“Patients first need to know why they are being referred for an examination, so clinicians should really...
explain their decisions. Patients need to know what type of imaging test they will undergo and why,” he said.

Patients should also receive practical details, for instance how they should prepare for the examination. “Will the examination last four hours, and if so, is there a parking lot nearby? Should patients eat or not eat before the test? This is the kind of practical information patients should know before entering the room,” he said.

It is the responsibility of the radiology department to explain everything, the procedure to the patient and information should be given as the examination progresses. Common information elements should be available in the department, for example, a brochure or on-screen information on a PET, CT or MRI scan.

A very important aspect is that information must be communicated in broad terms so that everyone can understand it differently but both patients deserve the same quality answers and information. “Layperson is an important aspect to take into account.” Knowing this is crucial to improving patient prognosis, as studies have shown that literacy is linked with life expectancy. “The less intelligent and less educated rarely present themselves. They miss out on a lot of information and the difference in life expectancy between high and low literacy is twelve years. Treatment adherence is not different. Some people don’t understand that they need to take their pills in the morning and evening. You can also see that those who are highly trained smoke less,” Briers said.

Patients rarely have direct contact with their radiologist but this could sometimes help, especially when patients have doubts about their examination, he concluded.

Gastrointestinal specialists provide top tips for common problems in abdominal imaging

There is a lot to consider when imaging the abdomen. Luckily, in a session today, ECR 2017 delegates will get practical and timely advice from a myriad of speakers, including former ECR President Prof. Yves Menu.

Menu, from the Department of Radiology at Saint Antoine Hospital in Paris, will address patients with liver metastases, for whom follow-up is ‘dramatically’ important with systemic chemotherapy. “Follow-up of metastases to the liver is an extremely common clinical problem and every general radiologist has to face this situation daily,” he said.

His first tip is to identify if the treatment is adjuvant, neoadjuvant or palliative because the grades and evaluation methods will be completely different. For adjuvant therapy, the goal is to detect new lesions. For neoadjuvant therapy you must select the optimal schedule for curative treatment if relevant. For palliative treatment, it’s essential to evaluate treatment efficacy.

Menu’s second tip is to understand if the treatment is cytotoxic, targeted, or immune, because again a variety of criteria and complications are different for each category. For cytotoxic CT, only size matters. For targeted therapies, focus on the treatment structure, and vascularisation matters. For immune therapy, the radiologist should be aware of the possibility of pseudoprogression.

His third tip is to apply the relevant evaluation standard for the tumour and for the treatment. Looking to the future, development of standards, and therefore new guidelines for radiological reports, will be crafted to increase the personalization of management, he said.

Menu is not the only person providing guidance. Other radiologists will share their suggestions, including Dr. Franco Iafrate, director of the CT Colonography Unit, Department of Radiological, Oncological and Pathological Sciences at Sapienza University of Rome in Rome.

He will discuss colonic polyps. Colorectal cancer is the second deadliest tumour in both men and women, and it has been constantly increasing for the last 20 years, even though it is preventable, he said.

“Conventional colonoscopy is not well accepted by the patient and it seems that CT colonography has approximately the same accuracy for detecting lesions > 5mm,” Iafrate said. “We hope for a dramatic increase of CT colonography examinations because colorectal cancer is deflatable and we must try to defeat as much as we can.”

Colon cancer has a slow progression (an average of ten years) and usually originates from a benign lesion, a polyp. Consequently, early detection and identification of a polyp can turn into cancer, he said. It is important to keep track of them.

“Radiologists are now playing a crucial role in colorectal cancer screening,” Iafrate continued. “All radiologists, even if they are not well trained in gastrointestinal imaging, need to be aware that next to a more invasive exam for colorectal cancer prevention, such as conventional colonoscopy, there is nowadays virtual colonoscopy. This is a minimally invasive, safe, well-accepted, and efficient method for detecting polyps that has been endorsed by scientific societies and associations for colorectal cancer screening.”

CT colonography software is effective and the technique is standardised so much will change there, according to Iafrate. “The accuracy of colonoscopy has increased,” he said.

“Radiologists must play the first role in this fight,” he said. “We just need to train more radiologists dedicated to colorectal cancer screening.”

During the session delegates will also pick up tips on imaging appendicitis, bile duct stones, bowel ischaemia, acute pancreatitis, and more.
Experts to look into quality of care in clinical radiology

In recent years, the need for quality assessment and quality assurance in radiology has moved to the forefront. In today’s ESR Patient Advisory Group session, experts and representatives of patient organisations will assess the situation and discuss different strategies to improve patient safety and quality of care in clinical radiology.

BY KATHARINA MIEDZINSKA

Medical imaging saves lives every day and is indispensable in patient-centred care. During the past two decades, the use of medical imaging to visualise and help diagnose illness and injuries and to guide complex therapeutic interventions has expanded greatly, so that nowadays, patients with a wide spectrum of physical complaints benefit from different imaging procedures.

Radiology is very much seen as a service provider, and as such, its practitioners need to understand quality and delivery of service, including knowledge of customer service and satisfaction, quality assurance and improvement issues.

In this context, radiologists should bear in mind that they do not sell images, but essential diagnostic information and advice, and that by getting involved with the patient and by providing an interpretation of their images within the context of the situation, they can have a positive influence on the patient’s experience in various ways.

Considering a patient’s journey through different medical departments is going to be one of the main focuses of today’s ESR-PAG session, which will be chaired by Ms. Nicola Bedlington, Executive Director of the European Patients’ Forum, and Dr. Barry Kelly, Consultant Radiologist at the Royal Victoria Hospital, Belfast, UK.

“Many of us as doctors suddenly become aware when we are patients that the once familiar territory of our hospitals can suddenly seem forbidding, stressful, efficacious or even uncaring,” noted Kelly. “If this is how it can seem to professionals who find themselves on the other side of the white coats, how much more profound and intimidating must it be for our fellow citizens, who have no experience of such technological, sterile and busy environments?”

In particular, three tools, which have been designed to promote a compassionate, comprehensible and personal experience for patients will be discussed, including the patient satisfaction questionnaire, a driver diagram, which is being used to conceptualise an issue and determine its system components, thus creating a pathway to achieving the goal of patient-centred care, and audit, which, according to Kelly, measures something against an agreed standard.

“As radiological healthcare professionals, we tend to think of this as being process-driven. This is an important component, but audit and should also be used to measure our interaction with each other and with our patients. By doing this, we ensure that a patient-centred approach leads to a safe, professional and harmonious institution,” he said.

In this session, Kelly will be joined by Dr. Dominique-Gérard Carné, from the department of radiology and medical imaging at Polyclinique du Parc, Toulouse, France, who will specifically discuss implementing the driver diagram in a department, and as such, the way that implementing the driver diagram will improve our sense of work well done and help us to assure higher quality service,” he concluded.

To illuminate the topic from every perspective, Europa Unite Ex Officio Board Member Erik Briërs, PhD, and Executive Director of the European Federation of Neurological Associations, Ms. Donna Walsh, will discuss patient safety and quality of care from the patient’s perspective by using examples of good and bad radiology practice from relevant disease areas, and more importantly, by dealing with the issue of information transfer.

ESR delegates will learn that a fair knowledge of an upcoming procedure is an important part of feeling safe for the patient and that an overload of information is equally detrimental to a safe feeling as no information. In their presentations, Briërs and Walsh plan to illustrate that implementing the driver diagram in a department is a step-by-step process that can be monitored by patients, and analyse the potential phases of patient involvement, including ways to identify the most relevant patient-expressed measures and possibilities to collect and analyse patient-generated evidence.

This session will close with a panel discussion on the central question: “Does your department perform well in patient-centred care?”

ESOR Courses for EDIR 2017

ESOR is continuing to organise preparatory courses for residents and board-certified radiologists, wishing to take the exams of the European Diploma in Radiology (EDIR). A series of courses is organised at the ESR Learning Centre in Vienna/Austria at the end of the year. It is possible to attend either one course only, or several courses of the series.

For further information on the detailed programmes and registration, please visit myESR.org/esor

#ECR2017

ECR TODAY | SATURDAY, MARCH 4, 2017
How low can iterative reconstruction really help us go?

Recent years have seen dramatic improvements in CT technology, and this has brought with it a steady improvement in clinical utility, in turn resulting in an increased number of scans conducted worldwide.

Unfortunately, an unwanted consequence of the increased use of CT is an overall increase in radiation dose to the patient population. Therefore, major efforts have gone into promoting methods to reduce patient dose while maintaining image quality.

Probably the most dramatic effect on dose reduction has come from the use of Iterative Reconstruction (IR), which is now available on most latest-generation CT scanners. Today’s Refresher Course on CT dose reduction using IR will provide attendees with vital information about the background, methods, pitfalls, and practical use of IR; it is essential viewing for all ECR attendees who have an interest in state-of-the-art CT and dose reduction.

For many years, Filtered Back Projection (FBP) was the primary method used for reconstructing CT images. FBP takes the raw CT data (0000–9000 projections) and projects it back into the image space, to determine an attenuation value for each voxel. Despite its robustness and generally acceptable performance, CT images reconstructed by FBP can suffer from image noise, poor low-contrast detectability and image artifacts, and these problems (especially noise) are amplified when the radiation dose is lowered.

There is a need for an improved reconstruction method to allow a reduction of radiation dose while improving the spatial and temporal resolution, without sacrificing image quality. IR goes a long way towards satisfying these goals. Instead of the ‘brute-force’ reconstruction used in FBP, which uses only the raw data, IR methods involve modelling the physical processes involved in the generation of projection data. The resulting simulated projections are compared with the raw data, and reconstruction proceeds in a cyclical manner until there is a good match (according to a pre-defined criterion) between the measured and simulated data.

In fact, IR was proposed as long ago as the 1970s and has already found extensive use in methods such as SPECT. However, the much larger data sets (higher spatial resolution) in CT have precluded the use of IR with CT until relatively recently, when it has become feasible due to improvements in computing hardware.

The power of IR algorithms is that they can model many of the physical parameters that FBP does not (and cannot) take account of, such as the x-ray spectrum and the blurring of the focal spot. A number of approaches and algorithms exist for IR, with their own strengths and weaknesses. The most basic IR algorithm goes through a series of iterations applied on a first-pass FBP raw dataset. Recently, more complex IR, termed fully-model-based algorithms, have become available, which use both backward and forward projection datasets. By combining many more iterations, image noise can be reduced even further, potentially enabling 80–90% patient dose reduction compared to FBP.

The noise reduction afforded by IR can be exploited as improved image quality at constant dose, as a reduction of dose with no loss in image quality (see Figure), or as a combination of these.

Despite the real benefits of IR in CT, the method has to be used with care since it can introduce its own effects on images. Some studies have found over-smoothing in cases when higher strengths of IR were applied. This has been associated with aggressive noise reduction and is reported as a distinctive image texture of ‘smearedness’ or ‘pixelation’. Hence, it is vital that the appropriate radiation dose level as well as the strength of the IR technique is selected. CT dose reduction with IR techniques should be achieved in a gradual stepwise approach.

Finally, it is important to note that images reconstructed by IR techniques can have a different appearance compared to FBP, mainly due to a decrease in overall noise and different depiction of tissues. Therefore, radiologists need a period of adaptation to the new image appearance. Over time, as they become accustomed to the look of the images, the iterative strength level may be altered, in order to reduce the patient dose even further.

There is no doubt that iterative reconstruction has an enormous amount to offer in clinical CT and it has already been taken up by the major manufacturers, each of which offers their own variant of the technology. IR most certainly leads to substantial reductions in patient dose from CT, which can only be a good thing. Nevertheless, optimum use of IR requires further discussion among the community, and international guidance about the implementation of IR in clinical practice would be very beneficial.

Vesna Gershan is Associate Professor of Physics of Medical Imaging Techniques at the St. Cyril and Methodius University in Skopje, Macedonia. David Lurie is Professor of Biomedical Physics at the University of Aberdeen, UK; he is Chair of the Physics in Radiology Subcommittee of ECR 2017.

References

Abdominopelvic 2mm-slice CT images from a 26-year-old patient (follow-up of post-traumatic hepatic fracture). (A) Full-dose CT with FBP reconstruction (529 mGy.cm); (B) Half-dose CT with iterative reconstruction (267 mGy.cm). Note the comparable image noise. From reference 2.

Vesna Gershan from Skopje, Macedonia, will chair today’s refresher course on iterative reconstruction in CT.

David Lurie from Aberdeen, UK, is Chair of the Physics in Radiology Subcommittee of ECR 2017.

Refresher Course
Saturday, March 4, 14:00–15:30, Room G
RC 1513 Dose reduction using iterative image reconstruction in CT
• Chairman’s introduction
  V. Gershan; Skopje/MK
  A. Basics of iterative image reconstruction in CT
    M. Kortesniemi; Helsinki/IT
  B. Iterative image reconstruction in clinical practice
    (dos and don’ts)
    H. Alkadi; Zurich/CH
  C. Image quality assessment of iterative reconstruction: pitfalls and future directions
    C. Ghetti; Parma/IT
  • Panel discussion: How low can we go?
This session is part of the EuroSafe Imaging campaign.
Feasibility of high-resolution MR lymphangiography in planning lymphaticovenous anastomosis treatment

Lymphoedema is a prevalent disease that affects 90 million people all over the world, primarily due to parasitic infections but due to malignancy or its therapy (lymph node removal during cancer surgery or radiotherapy). Though there are many conservative treatment options, their efficacy is highly variable and they are not curative.

Recently, operative approaches, such as lymphaticovenous anastomosis (LVA) treatment, have proved their worth as a radical cure for lymphedema, bypassing lymphatic obstruction by shunting lymph flow into the venous system. This procedure, where collecting lymphatics are anastomosed to subcutaneous veins, requires microsurgical techniques and high-resolution imaging to depict these vessels because of their small size (2–3mm).

Imaging lymphatic vessels has always been a challenge for diagnostics. While lymphoscintigraphy is still considered the main technique in diagnosing lymphedema, it lacks spatial resolution. Similarly, indocyanine green (ICG) fluorescence lymphography, which is used intraoperatively, has several disadvantages, such as limited anatomical coverage, lack of spatial information, limited penetration depth (>2 cm to the skin) and inability to characterise subcutaneous soft tissues.

In our study, we propose the use of magnetic resonance lymphangiography (MR lymphangiography) in patients with lymphedema for imaging lymphatic vessels and distinguishing them from veins in planning LVA treatment. All MR examinations were performed with a 1.5T MR unit with the following sequences: a 3D steady-state free precession (SSFP) balanced ECG-triggered sequence with SPECtral inversion gradient-recalled echo T1-weighted sequences after five (B) and 35 (C) minutes show a progressive delineation and enhancement of lymphatic vessels (white solid arrows); it is clear the beaded appearance of lymphatics comparing to veins (open arrows). Furthermore, pre-contrast venogram makes the subsequent distinction of the different lymphatic vessels and their different enhancement kinetics; furthermore pre-contrast venogram makes the subsequent distinction of the different structures easier. Provided by Dr. Francesco Gentili.

From this study, despite the reduced sample size, MR lymphangiography seems to be a promising imaging technique that combines morphological and functional information into a single exam. It is easy to perform and can be useful in planning LVA in patients with lymphedema and in evaluating possible LVA treatment complications.

Francesco Gentili, MD, is a resident fellow in diagnostic imaging at the department of medical, surgical and neuro sciences at the University of Siena, Italy.

Scientific Session

Saturday, March 4, 10:30-12:00, Room X
SS 1415 Assessing venous and lymphatic diseases

Moderators: M.A. Aschauer; Graz/AT
C. Floridi; Varese/IT

Feasibility of high-resolution MR lymphangiography in planning lymphaticovenous anastomosis treatment: a single-centre experience
F. Gentili, F.G. Mazzei, P. Gennari, D. Notaro, A. Fausto, M.A. Mazzei, L.Volturo, Siena/IT
In post-PACS world, ECR 2017 exhibitors demonstrate how to realise full potential of healthcare IT

Since the first murmurings of the term ‘picture archiving and communications system’ were heard in the late 1970s, PACS has become mainstream in the practice of radiology.

In the early days of digitalisation, European hospitals and healthcare suppliers played a central role in the development of the technology. Today, many of the world’s leading manufacturers are at ECR 2017 to display their latest PACS and healthcare IT offerings. The emphasis is on faster network connections, increased storage, 3D capabilities and monitors with higher resolution.

Siemens Healthineers is demonstrating enhanced PACS capabilities designed for high-production environments with usability and availability in focus. Highlights include functions to speed up oncology workflows, such as lesion tracking and anatomical linking. Additionally, Siemens Breast Imaging PACS can support fully integrated breast tomosynthesis reading as well as MRI integrated within the mammography workflow. It also features strong workflow management tools, allowing efficient hosting of tumour boards and workflows being based on breast density. New enhancements include breast implant masking, further streamlined hanging protocols, and an integrated peer review package.

The Clinical Collaboration Platform from Carestream assists with the acquisition, management, and consolidation of islands of systems and presents a single point of access to patients’ clinical records.

GE Healthcare is announcing several innovations in the enterprise imaging and cloud radiology sector. The company is revealing the availability of the Centricity 360 Suite, which is designed to help distributed care teams collaborate efficiently on patient cases in a secure on-premise platform to optimise and simplify patient information exchange with primary care to improve care management.

Change in paradigm – why medical radiation protection has become a fundamental clinical challenge

Since the first murmurings of the term ‘picture archiving and communications system’ were heard in the late 1970s, PACS has become mainstream in the practice of radiology.
Decision support tools just entering the market, while CADx remains some way from being implemented. Current maturity of image analysis solutions; AI is already penetrating CADe and quantitative tools; and now we start to see the first products enter the market.

The great enabler: artificial intelligence in radiology

Much has already been debated over the impact of artificial intelligence (AI) for radiology, and now we start to see the first products enter the market.

Cloud-based 3D reconstruction using TeraRecon’s 3D Print Packs.

BY STEPHEN HOLLOWAY

Current maturity of image analysis solutions: AI is already penetrating CADe and quantitative tools; decision support tools just entering the market, while CADx remains some way from being implemented.

Most discussion has targeted the role of ‘holy grail’, automated differential diagnosis (or CADx), prompting a mix of scepticism, division and uncertainty from the radiologist community. Yet when we dig into the investment and development being made in AI for radiology, it becomes clear that AI will not replace radiologists, but enable them.

Efficiency

There is no getting away from it, radiologist physician numbers are dwindling and scan volumes rising, driving focus on efficiency. Digital technology has helped speed the imaging process, but this has not been enough to counter the ramp in demand and the complexity of imaging studies. Furthermore, complicated protocol management and changing structured reporting are putting radiologists under even greater pressure.

This is where AI can help. Work is already underway utilizing AI to improve the back-end workflow issues that slow radiologist reading and reporting. It will over time individualise the working platform for each radiologist, by learning and continuing to learn from how they work. This means soon imaging software will allow automatic, customised hanging protocols, smart reporting preferences, prior study recall and tool selection, based on the unique working practices of each individual user.

Radiologists will be more autonomous, with fewer clicks and far fewer workflow headaches.

What’s more, with systems based on deep learning algorithms (rather than manually writing algorithms), vendors can make improvements and upgrades more quickly. Sound like science-fiction? It will happen sooner than you think. Our recent research with an extensive field of medical imaging AI companies predicts that close to one-third of image analysis software will be built on deep-learning algorithms by 2022.

Evidence

Quantification tools have been part of imaging IT software for some time, from coronary calcium scoring to lung density analysis. In offering quantification of imaging biomarkers, more accurate measurement of disease characteristics can be made. However, often these tools are manual, a time-consuming and inaccurate process. What’s more, the development of the algorithms supporting these tools is manual.

By using deep-learning, the process can increasingly be automated, while the development of algorithms can be developed faster. The accuracy of this development process has yet to be tested in large scale clinical trials compared to today’s manual solutions admitted, but the range of quantitative tools is rapidly increasing. Therefore, expect to see a growing number of more automated, more accurate quantitative imaging tools coming to the market in the next five years.

Excellence

Quality of diagnosis is a continuing challenge for the modern radiology professional. While pain is taken to safeguard against adverse reporting, the volume of images to be read and limited radiologist capacity makes upholding quality standards a challenge. Due to digitalisation of health information over the last two decades, a raft of new clinical evidence is now available to the reading radiologist. However, there can be far too much information to review, leaving this potentially critical information unused. Here is where AI can aid the radiologist: decision support tools.

These advanced machine learning tools can source, collate and pool all relevant clinical information together in combination with quantitative imaging markers, to offer a more complete diagnostic picture to the reader. Furthermore, these systems will also be able to quickly pool evidence from similar cases, presenting past studies and outcome data, thereby providing guidance on likely outcomes of each diagnostic scenario based on prior outcome reporting. It is still early in market adoption for decision support tools, but some products are already approved for use in very specific study types, while a multitude of others are in development.

Of course, there are many barriers to overcome for widespread AI adoption in radiology. How to regulate continually learning systems? What are the legal and ethical implications? How will AI systems access patient data that is disparate and unstructured?

Despite these, the signs are clear that AI will have a transformative role in radiology. But rather than replacing the radiologist, it’s more likely AI will be an enabler to more efficient, quality and evidence-based diagnosis. And sooner than you think.

Stephen Holloway is principal analyst and company director at Signify Research.

Cloud-based 3D reconstruction using TeraRecon’s 3D Print Packs.

Source: Signify Research 2017

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Stephen Holloway is principal analyst and company director at Signify Research.
Innovative solutions for diagnosis and treatment for GIST patients

A multidisciplinary consortium has made significant steps towards an improved diagnosis of metastatic gastrointestinal stromal tumours (GIST) and has further developed therapy concepts for patients that are resistant to the current types of medication.

Gastrointestinal stromal tumour (GIST) is a rare disease frequently affecting young patients. Its high potential for metastasizing often leaves patients with a life expectancy of less than three years. Currently, there is only one class of effective medication – tyrosine-kinase inhibitors – but tumours frequently develop drug resistance after a few years.

The objective of the four-year EU-funded project MITIGATE is to develop and validate a targeted, personalised treatment concept for metastatic GIST resistant to current treatment. The innovative treatment concept combines new strategies for biopsy, in vivo tissue analysis, molecular tumour characterisation, therapeutics with imaging technologies (PET and MRI) and companion radiopharmaceuticals. This is followed by assessment of biodistribution, dose calculation and measurement of therapeutic effectiveness. In addition, synergistic concepts of minimally invasive treatment will be applied.

The project consortium, which is coordinated by the Ruprecht Karl University of Heidelberg and the European Institute for Biomedical Imaging Research (EIBIR), comprises three European universities, three research organisations and four SMEs.

In the third year of the project, a number of radiopharmaceuticals, all with a potential for GIST-specific imaging, were tested with respect to specificity and patient safety. NeoBOMB1 is a new generation bombesin analogue that binds with high affinity/specificity to the gastrin-releasing peptide receptor expressed in GIST. MITIGATE in vitro studies confirmed this in specifically developed tumour models, and NeoBOMB1 was chosen for the first-in-human application in a clinical trial at the Medical University Innsbruck, Austria.

This phase I/IIa study started in December 2016 and will evaluate safety, biodistribution, anisotropy and preliminary diagnostic performance of 68Ga-NeoBOMB1 in patients with advanced TKI-refractory GIST using PET/CT. Based on the results of the trial, GIST patients may derive real benefits from the imaging procedure, such as improved tumour volume definition and better detection of disease in the near future.

In its final year, the project will focus on the following:

- Evaluation of the results of the clinical trial
- Further development of new GIST-specific radiotracers
- Minimally-invasive percutaneous thermal ablation and irrigation, guided by molecular PET imaging and a robotic assistance system
- Assessment of new functional and metabolic MR imaging methods for GIST tumours

The MITIGATE consortium is looking to continue its success and ultimately ensure an accelerated decision-making process and improved treatment concepts for the individual patient. Together this will result in a personalised and combined multimodal treatment approach in patients with advanced disease.

Today at ECR 2017, EIBIR will host a special session presenting an overview of the MITIGATE project’s innovative results. Members of the project consortium will introduce current therapy methods and the advances made by the MITIGATE partners. The clinical trial for patients with metastatic GIST who are experiencing tumour progression while under treatment with Linifanib (Glivec, Gleevec™) will be presented. Minimally invasive treatment options that were further developed by the project will be introduced. Finally, a representative from GIST Support Austria will report on the impact of the MITIGATE project on European GIST patients. MITIGATE is an EU (FP7) co-funded project that aims at developing new protocols and guidelines to effectively diagnose and treat patients with metastatic GIST resistant to current treatment.

Learn more about MITIGATE and visit the project website: www.mitigate-project.eu...
The non-invasive determination of ‘pressure recovery’ using MRI for the correction of aortic stenosis severity classification

BY FLORIAN SAGMEISTER, HORST BRUNNER AND MEINRAD BEER

In patients with severe aortic stenosis, the moment for surgical intervention depends on the severity of aortic stenosis (AS) and the symptoms of the patient. In the last decades, several new parameters for stenosis severity have been developed in order to improve the correlation of parameters with the haemodynamic physiology across and behind the valve and with clinical symptoms and outcome of the patient (e.g. left ventricular stroke work loss, valvular-arterial impedance, aortic valve resistance). 

In every systole, the intracardiac blood is ejected through the left ventricular outflow tract and crosses the more or less stenotic aortic valve. After a short distance from the ascending aorta, the blood stream converges to the narrowest diameter and achieves its maximal kinetic energy, which is called ‘vena contracta’.

At this position, the blood stream expands again and kinetic energy is converted into potential energy in the ascending aorta – a phenomenon called ‘pressure recovery’ (Figure 1). Invasive studies suggest that this haemodynamic phenomenon probably takes place along a longer distance of the ascending aorta. Unfortunately, the extent of pressure recovery is diminished by loss and dissipation of energy in the form of heat and flow turbulence. In order to evaluate the ‘real’ energy reduction across the valve, these ‘energy losses’ should be quantified. Based on the fluid mechanical principles first described by Clark et al. in 1976, formulas for the non-invasive determination of the extent of pressure recovery have been developed and have been applied in several echocardiographic studies. The relevant parameters are called pressure recovery (mmHg), indexed pressure recovery (pressure recovery related to maximal valve gradient across the stenosis, %), energy loss coefficient (ELCO, cm²/m²) and energy loss index (EL LI, indexed to body surface area, cm²/m²).

Echocardiography is the first and most prevalent imaging modality in patients with severe AS. However, in several studies discrepancies have been found between non-invasive estimated echocardiographic gradients using the Bernoulli equation and invasively measured gradients across the aortic valve before and after surgical valve replacement. The phenomenon of pressure recovery has been applied to explain the often observed overestimation of echocardiographic pressure gradients compared to invasively determined pressure gradients.

Until now, there has been no study using MRI-based aortic measurements for the non-invasive estimation of pressure recovery. In the oral presentation ‘Pressure recovery determination by cine MRI is feasible and leads to significant re-classification of aortic stenosis severity’, initial results in the non-invasive determination of pressure recovery by MRI will be presented. In this session, you can learn more about the following issues: how large is the absolute extent of pressure recovery in a patient cohort with moderate and severe calcific degenerative aortic stenosis? Do MRI results correlate with echocardiographic results? What impact does the measurement position (Figure 2) in the ascending aorta have on calculated pressure recovery? How clinically important is pressure recovery?

The neural substrate of cognition

BY HAZEL I. ZONNEVELD

Cognitive ability varies between individuals and throughout life. It is determined by both genetic and environmental factors, which are partly reflected in the structure of the brain. Over the past few decades, brain imaging has enabled us to study the relation between brain structure and cognition. For example, the hippocampus has been studied extensively in relation to memory. Many of the investigated links between brain structure and cognition have arisen from clinical observations of patients with localised brain lesions or following surgical interventions.

Neuromaging studies have used these observations in hypothesis-driven approaches to study the neural substrate of human cognition. These studies have primarily focused on aggregate measures over entire brain regions (e.g. the prefrontal cortex), even though considerable functional specialisation typically exists within such regions. Hypothesis-free approaches that study brain structure at the highest resolution, i.e. the voxel on brain scans, in relation to cognitive ability have been typically lacking or underpowered. These analyses could yield crucial new insight into the exact neural substrate for cognition. Therefore, we investigated the neural substrate of cognition in a large population-based sample of nearly 5000 middle-aged and elderly subjects who were free of dementia and without clinical stroke. All participants underwent brain MRI, including high-resolution 3D T1-weighting imaging. Cognitive function was assessed using an extensive neuropsychological test battery, including the Mini-Mental State Examination.
Chance in paradigm with medical radiation protection has become a real challenge

An interview with EuroSafe Imaging Chair, Professor Guy Frija

State Examination, Stroop test, a 3D word learning task (WLT), the verbal fluency task and the Purdue Pegboard task. Voxel-based morphometry was performed to investigate the association between local grey matter density and cognitive function. When looking into the verbal fluency test, we found that higher grey matter density in the left parietal lobe and posterior temporal lobe was associated with better performance. Lower grey matter density in the right motor cortex was associated with better performance on the verbal fluency test. Better performance on WLT, a task used to examine memory was associated with higher grey matter density in the left hippocampus. Better performance on the Stroop test, a reading/colour naming interference task to test executive function was related to higher grey matter density in both hippocampi, and lower grey matter density in the left and right thalamus (Figure). Furthermore, we observed that lower grey matter density in the left insula was associated with worse performance on the LDST.

In conclusion, in this study we showed that the detection of more localised differences in brain structure provides relevant information in addition to aggregate measures. Subsequently, this study may provide insight into the pathways of cognitive decline.

Dr. Hazel J. Zorevani works at the department of epidemiology, DRB, the department of radiology and nuclear medicine at Erasum MC University Medical Center, Rotterdam, the Netherlands.

ECR TODAY | SATURDAY, MARCH 4, 2017

ECRT: Do you have a remedy?
GF: Radiation protection can be viewed, as a process of several interconnected steps. Modern CT technology has enabled a significant decrease in patient exposure. However, CDHCR market surveys show a strong heterogeneity of CT scanners across Europe, which is a huge concern. It is the radiologists’ responsibility to highlight this critical aspect to national governments and the European Commission and to encourage the development of equipment upgrade plans.

ECRT: Another big buzzword surrounded by numerous question marks is clinical audit, which was already mandatory in the previous Directive but badly implemented...
GF: The audit process should be a regulatory constraint, but a hindrance to your plans?
ECRT: It is the radiologists’ responsibility to highlight this critical aspect to national governments and the European Commission and to encourage the development of equipment upgrade plans.

ECRT: Another big buzzword surrounded by numerous question marks is clinical audit, which was already mandatory in the previous Directive but badly implemented...
GF: The audit process should focus primarily on the four clinical steps of clinically oriented radiation protection: justification, clinically-guided protocols, clinically-evaluated image quality, and dose evaluation. Fluoroscopy-guided interventions were not considered in this legal requirement, but the clinical approach to patient radiation protection for such procedures is already under way. Paediatric imaging is by definition excluded in the concept, automatically set at the potential impact of this proposed change in paradigm towards clinically oriented radiation protection?
GF: It is implemented properly and in a collaborative teamwork setting with all stakeholders involved, aiging radiation protection with clinical concerns could have a significant impact on the quality of daily clinical practice and hence patient outcomes. In summary, radiation protection would become much more appealing if it were clinically based, focused on a patient-centric approach, especially in those to involve the use of modern equipment.

ECRT: Radiation protection, however, is not considered a ‘sexy’ topic by the vast majority of radiologists. EuroSafe Imaging has seemingly improved the visibility and attention radiation protection requires both within the clinical environment and at political level. How are you going to ‘sell’ the topic to the younger generation of radiologists?
GF: Through EuroSafe Imaging, we will continue to think different first, by propagating that radiologists are the ones behind the pillars of their daily clinical practice, even though the delivered dose per examination has significantly decreased in the past years. Making it mandatory that an examination is clinically warranted and that the prescribed protocol is appropriately set up, as well as that the image quality assessment is a part of the report, will certainly improve the patient outcomes thanks to a clinically driven process optimization. Radiation protection should no longer be a regulatory constraint, but a way to decrease the total quality of daily clinical practice. In addition, modern tools allow us to establish our own practice profiles and to compare it to equivalent settings. This benchmarking endeavour should be very stimulating. Finally, belonging to a community strongly involved in the development of radiation protection should facilitate a new era of networking between European institutions in order to bring big data to our specialty.

ECRT: EuroSafe Imaging has served as role model for radiation protection campaigns across the globe. You have recently been appointed Chair of the new International Society of Radiology Quality and Safety Alliance. What is your motivation and mission for this new challenging role?
GF: The aim will be to ‘profile’ each regional organisation in order to better know and understand local and regional priorities. We will pool experiences and resources into a single website, which will allow us to share experiences, knowledge and relevant material. Also we plan to launch a call for action, which will reflect the regional priorities. In other words, the Alliance’s activities will be entirely bottom-up.

The contribution of EuroSafe Imaging to this ambitious and innovative effort will be very important, as we have a lot of material to provide from the European side. We could also propose educational workshops, which would cover the whole spectrum of radiation protection. It is clear that an active cooperation with IAEA activities will be sought.

ECRT: Congratulations to EuroSafe Imaging and thank you for your dedication and support to the interview.

The neural substrate of cognition: the Rotterdam study
M.A. Ikram, M.W. Vernooij; Rotterdam/NL

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ESMOFIR: research and education on the latest translational imaging modalities and applications

The European Society for Molecular and Functional Imaging in Radiology (ESMOFIR) started its activities in 2013, and since then has pursued a variety of educational and strategic activities in translational research in radiology. The primary purpose of ESMOFIR is to promote molecular and functional imaging in radiology, as well as educating young radiologists in this field. The broader scope of ESMOFIR's activities focuses on education and training in various advanced fields of research, including the integration of multimodal and multiparametric image information, as well as advances in data analysis for molecular and functional imaging datasets. In these areas, there is an obvious and very close relationship between radiology and nuclear medicine, between basic and clinical research, and between medical doctors and scientific researchers involved in the field. This aspect of interdisciplinary translational research is emphasized strongly in all ESMOFIR endeavours.

In the era of personalized medicine, a precise, structured and quantitative evaluation of diseases and their therapies is needed. To assist with this, a close collaboration is being fostered between the ESR Research Committee, ESMOFIR and EIBALL, the European Imaging Biomarker Alliance, to create a clear structure of aims and goals between these groups. There are several major challenges in trying to develop and introduce specific imaging tracers and validated imaging biomarkers into clinical routine. First, most functional and molecular imaging techniques are evolving constantly and standardization and harmonization of acquisition is extremely challenging, e.g., in diffusion-weighted MR or perfusion MR. Second, the number and diversity of functional and quantitative imaging techniques in radiology are increasing rapidly and may overlap, e.g., volume-perfusion CT and Dual-Energy CT/spectral CT techniques. Third, clinical molecular imaging also includes nuclear medicine techniques and therefore, a close and constructive strategy between radiology and nuclear medicine is mandatory not only in the field of hybrid imaging, but also in advanced post-processing methods such as texture analysis. Finally, physiological models and mathematical modelling of developing imaging biomarkers have to be repeatable and reproducible, introducing dedicated and specific post-processing tools to clinical routine, independent of specific imaging equipment.

As for educational and coordinating activities, in June 2016, ESMOFIR held a workshop on Breast Imaging in Vienna (Multimodality hands-on workshop in breast imaging: from morphology to function and molecules), with a broad educational spectrum from fundamental lectures to practical case sessions. Acquisition techniques along with image reading and processing were covered by a selection of European radiologists who are opinion leaders in this field. Furthermore, in March 2018, ESMOFIR joined again with ESMI (European Society of Molecular Imaging) to organize a workshop on 'Imaging of Tumour Heterogeneity', which was held on March 11, 2018, in Utrecht, and was a major success. It featured excellent talks on various aspects of tumour genetics, radiomics, tumour metabolism, texture analysis and imaging biomarkers, and was attended by more than 60 participants. In 2016, ESMOFIR also started a series of ‘webinars’ on the ESR Education on Demand platform, launching topics such as ‘Therapy monitoring in oncology – RECIST and beyond and Functional Radioligand Imaging’. This webinar series will continue in 2017.

In 2017, ESMOFIR will continue its successful collaboration with ESMI, organizing a workshop as a satellite workshop to the annual meeting in Cologne, on Saturday, April 8. This workshop is a joint initiative of ESMOFIR and ESHI (European Society for Hybrid Medical Imaging) and is titled ‘Evolving ‘hybrid imaging into clinical practice’. This will allow radiologists, nuclear medicine physicians and basic researchers interested in translating these new techniques into clinical practice an opportunity to learn more about this area and to attend both meetings.

Overall, there is a clear need for systematic and structured education in the complex and rapidly developing field of translational research in radiology to understand the unmet clinical needs, the underlying physiological basis of the models used, the value and benefits of competing modalities and techniques, and the limits and limitations of the parameters obtained. ESMOFIR will continue its educational and strategic activities in close collaboration with the ESR and the ESR subspecialty societies, as well as with the ESR Research Committee and EIBALL.

Prof. Konstantin Nikolaou is medical director of the department of diagnostic and interventional radiology at the University Clinic Tübingen, Germany. ESMOFIR President

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Is your imaging service ready for the digital age?

Digital Imaging Adoption Model helps to assess imaging capabilities within your organisation

Background

What is DIAM?

DIAM stands for Digital Imaging Adoption Model. It is a model developed for organisations, clinical and managerial users of medical imaging technology with the aim of identifying potential gaps in their imaging IT strategy. DIAM is a sequential and evidence-based approach for assessing imaging IT capabilities and mature imaging networks. The model is designed to help organisations identify those organisations that have already made sophisticated and valuable use of imaging technology in their organisation to highlight them as best practices. The DIAM survey can be taken up to three times and should be completed by a radiologist and other subject matter experts. The survey requires a minimum of 200 service users.

The DIAM was officially launched during ECR 2016 and has since been piloted with more than 20 organisations in countries across Europe. DIAM Stage 6 at 6/7 organisations also demonstrates overall quality of clinical care. Stage 6/7 organisations also demonstrate externally that they have a commitment to use the results for benchmarking and allow for different approaches to achieve at least one of the three possible options: 1) Advanced analytics and personalised medicine capabilities, 2) clinical decision support and medical imaging, or 3) advanced healthcare information exchange and patient engagement. Stage 6 requires two out of the three options to be fulfilled, while all three must be achieved to reach Stage 7.

How it works

The DIAM assessment is a three-step process:

1. Organisations who participate must first fill in an online assessment form, called the DIAM survey. This process can take up to three hours and should be completed by a radiologist and other subject matter experts.

2. Once completed, the online DIAM survey undergoes a thorough quality assurance process. A radiologist and other subject matter experts review the data submitted by the organisation who provided the data.

3. The DIAM score is calculated and a report is produced. Public recognition of organisations at Stage 6 or 7, and an additional validation process is required. This is because those organisations with this consent will be publicly recognised. At DIAM Stage 6, subject matter experts from HIMSS and the ESR seek assurance that participating organisations are actually able to demonstrate the collective capabilities described in the survey. This would normally be achieved during a phone or web conference. For DIAM Stage 7, an onsite visit is required.

Benefits of DIAM participation

There are a number of benefits that participating organisations will receive from a DIAM assessment. All participants will receive their individual DIAM score, as well as a report highlighting current gaps, future investment opportunities and a way to share benchmarking results. These insights can be used for internal and external purposes. Within an organisation, the results of the DIAM assessment can be used for initiating or updating an imaging IT strategy. If a strategy already exists, DIAM results will be useful to adapt and improve on the strategy. A DIAM assessment, such as a report highlighting current gaps, future investment opportunities and a way to share benchmarking results. Within an organisation, the results of the DIAM assessment can be used for initiating or updating an imaging IT strategy.

For organisations who want to receive more in-depth support, subject matter experts from HIMSS Analytics and the ESR will be available to help organisations with their imaging IT strategy development or educational matters related to imaging IT maturity.

Experience so far

The DIAM was officially launched during ECR 2016 and has since been piloted with more than 20 organisations in countries across Europe. The feedback so far from participants is extremely positive. The assessment form is easy to complete and contains relevant compliance goals. The gap report has been used in discussions and negotiations with hospital management teams to support technology development, focus on key objectives and to prioritise next steps. Some respondents have already requested a second score following the introduction of a new PACS or EMR system.

At the time of writing, several organisations had been scored between DIAM Stages 3 and 5, with the DIAM Score being 3. A few organisations are on the edge of DIAM Stage 6 and are likely to achieve this standard in 2017. How to take part

The DIAM is now ready for full roll-out and can be fully supported by the joint efforts of HIMSS and the ESR. If you are interested in participating please send an email to research@himssanalytics.eu and you will receive access to the online DIAM survey form. The standard assessment, including DIAM score and gap report, is completely free of charge.

Jörg Studzinski is director for Research and Advisory Services at HIMSS Analytics in Europe. He is responsible for product development, the creation of market reports, and the consultation around HIMSS IT Maturity Models, such as the Digital Imaging Adoption Model, the EMR Adoption Model, and the Continuity of Care Maturity Model.
ESSR 2017: Emergency and trauma

The European Society of Musculoskeletal Radiology (ESSR) is the main organisation in Europe dedicated to promoting the development of musculoskeletal radiology and, consequently, to advancing the knowledge, diagnosis and treatment of musculoskeletal diseases by means of imaging.

from June 15–17.

The ESSR Scientific Meeting 2017 will be held in Bari, Italy, from June 15–17.

The ESSR aims to produce solutions for current and imminent issues by supporting research, as well as education and training.

The Society, based in Vienna, relies on medical and non-medical professionals who are actively working with the specific aim of benefiting their patients. It also works in cooperation with other European radiological societies, the European Commission and other European authorities with the common purpose of promoting the interests of musculoskeletal radiology. In particular, the ESSR cooperates with international bodies such as the Australasian Musculoskeletal Imaging Group (AMSIG), the Chinese MSK society and the Russian Radiological Society.

The ESSR coordinates research activities, develops educational and multidisciplinary research activities and encourages the presentation of the results of these endeavours at its annual meeting. These meetings represent the major European forum for sharing advances in musculoskeletal radiology and offers excellence in education. The annual meeting is regulated by internal guidelines. Every year since 1994, the meetings have taken place in a different European city.

The ESSR Scientific Meeting 2017 will be held in Bari, Italy from June 15–17.

The meeting is open to both ESSR members and non-members. Radiologists, clinicians and members of associated professions such as physiotherapists and radiographers with an interest in musculoskeletal and sports radiology are invited.

The main topic of ESSR 2017 is emergency & trauma. However, other important themes will be discussed, such as sport imaging, osteoporosis, rheumatology, tumours and interventional procedures covered by internationally acclaimed specialists in their respective fields.

The scientific programme includes oral presentations, scientific and educational poster’s exhibitions, lectures, video presentations and ultrasound demonstrations.

On June 15, there will be the ultrasound workshop, focused on the upper and lower limbs. In the afternoon, in addition to lectures and video presentation, there is the session ‘Hands-on teaching’. On June 16, the meeting gets to the heart of the topic, when we will talk about musculoskeletal trauma. The important features for this year are the plenary sessions ESSR meets Russia and ‘ESSR meets China’ with the aim of deepening understanding and fostering cooperation with our new partners.

Finally on the last day, the main topics will be trauma of the spine and pelvis, sport, spine diagnostics and interventional and tumour.

In addition to these, there will be two new sessions. The first is a Medico-legal and forensic issue, which focuses on bone age assessment by MRI, spectrum of missed fractures in the ER and imaging analysis. The other one is Publish or perish in which we will talk about how to write scientific manuscripts, ethics in publishing, the peer-review process and how to get published.

More information can be found at www.essr.org.

Giuseppe Guglielmi, MD is professor of radiology at the University of Foggia, Italy, head of the department of radiology of the Scientific Institute Hospital ‘Casa Sollievo delle Sofferenze’ in San Giovanni Rotondo, Italy and Past President of the ESSR.

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Editor looks back on seven years of Insights into Imaging

ECR Today spoke with Insights into Imaging’s Editor-in-Chief, Professor Robert Hermans from Leuven, about the challenges he has faced in his seven years as head of the ESR’s open access educational journal.

ECRT: You have been the editor of Insights into Imaging since the journal’s launch in 2010. During this time, have you noticed any major developments?

RH: The most important development so far was the change to an open access journal. This boosted the visibility of the journal and led to a substantial increase in the number of article downloads. Over the years, the number of spontaneous submissions to the journal has increased, and in my opinion the overall quality of the submitted manuscripts has also improved. I also noted more submissions coming from outside Europe. Insights into Imaging is read worldwide.

ECRT: The Impact Factor (IF) is still a major force in the publishing world, and still very important to authors. Insights into Imaging is set to receive an Impact Factor, hopefully this year. How do you think this will impact the journal? Do you think this will increase submissions?

RH: The impact factor reflects how many times articles published in a journal over the last two years were cited, relative to the number of articles published in that journal. Although there is criticism of the actual value of the Impact Factor, it is believed by many to reflect the diffusion and scientific level of a journal. It is important to realise that it represents a journal metric and should not be used to judge the quality of individual articles.

The journal has been under evaluation since 2015, and indeed we will hopefully receive an Impact Factor this year. As calculated by our publisher, Springer, the theoretical Impact Factor for 2015 was nearly 1.5, virtually ranking the journal in the upper two thirds of radiological journals.

I anticipate, once an IF is acquired, the journal will become even more attractive to authors, and the number of submissions will likely increase significantly.

ECRT: Do you have any advice for aspiring authors? What is the best way for them to present their work?

RH: Case reports are a good way to start scientific writing for young radiologists. The ESR has been publishing peer-reviewed case reports for several years on its online platform EURORAD.

A more labour-intensive alternative is to write a review article. Such a review article should provide a synthesis of the best published research on an important topic or question. It may, for example, discuss the use of imaging in a specific pathological condition. Insights into Imaging is the ideal platform for such articles.

An article on original research should be structured according to the acronym ‘IMRaD’, which stands for Introduction, Material and methods, Results and Discussion; each of these sections has specific content. A common problem observed in manuscripts from novice authors is mixing up the different sections. Incomplete information is also a common problem.

When preparing a manuscript for submission, it is important that the manuscript is formatted in the correct way. It is equally important to also read the additional important documents that have to be signed, such as the copyright transfer agreement and the disclosure of conflict of interests.

Also, I would like to stress that citation rules should be rigorously followed. Ask permission from the copyright holder to use images or text passages that have already been published elsewhere, provide evidence that permission was granted, and include proper references in your manuscript. Material freely distributed in the public domain (e.g., from websites) is also often protected by copyright and cannot be used without prior permission.

ECRT: This year will be your last as editor of Insights into Imaging. How do you feel about leaving this position? Do you feel relieved or will you miss it?

RH: I am still very grateful for the opportunity I got from the ESR to help start up this journal. I am confident it will continue to grow and settle among the important journals in the field of radiology. The time has come for a new editor-in-chief, bringing in new ideas to further nourish our journal. During the past seven years, I have got to know many enthusiastic colleagues, whom I otherwise would never have met. I will certainly miss the regular and friendly contacts with the crew in the Vienna Editorial Office, all of them very devoted to their work, and always ready to help and solve problems.

ECRT: What are your plans for the future?

RH: As a head and neck radiologist, most of my time goes toward caring for patients, teaching our residents and teaching medical students. Implementing new techniques, and trying to develop new approaches in head and neck imaging, together with the team in Leuven, will continue to be part of my job. Obviously, I will stay available for the ESR, to help further education and science in radiology.

Robert Hermans is professor of radiology at UZ Leuven, specialising in head and neck radiology. He has served as Editor-in-Chief of Insights into Imaging since 2010.
The Accreditation Council in Imaging (ACI), operating under the umbrella of the European Board of Radiology (EBR), was launched successfully in January 2016, in cooperation with the European Board of Radiology (EBR), the European Society of Urology (ESU), and the European Society of Pathology (ESP). The first set of requirements for accreditation in imaging have been confirmed how important CME accreditation is to be achieved through the international accreditation of CME events, and the establishment of a system for the international recognition of CME points. The UEMS-EACME® sets itself as the central link between the National Accreditation Authorities (NAAs), the UEMS Specialty Sections and Boards (SSBs), the European Specialty Accreditation Boards (ESABs) and the Providers of CME. Accreditation of CME events is duly reviewed by the National Accreditation Authority (NAA) of each country. The EBR/ACI wants to be part of the work with the EACCME®, is the Accreditation Council in Imaging (ACI). The ACI is operating under the umbrella of the European Board of Radiology (EBR). Within the framework of this collaboration, during the Content Review Process of Application, the EBR will assume the role of reviewer and EACCME® is the ACI. The ACI is conducting the application process and assist the European Accreditation Council (EACCME®) in delivering and harmonising the highest level of CME in imaging. The ACI’s primary purpose is to make managing CME quick and easy for all applicants and to work together with providers to offer imaging specialists the Continuing Medical Education (CME) crediting system. CME is widely practiced in Europe and, in most EU Member States it has even become mandatory (e.g. in Italy and Germany). Many UEMS Sections of Radiology and member of the ACI Policy Committee.

Next, ECR Today spoke with Prof. Paolo Ricci from Rome, President of the UEMS Section of Radiology and member of the ACI.

ECRT: Is CME practiced widely in Europe and what is the current CME landscape in Europe?

Paolo Ricci: CME is now widely practiced in Europe and, in most EU Member States it has even become mandatory (e.g. in Italy and Germany). Many UEMS Sections of Radiology and member of the ACI.

ECRT: How does the collaboration between the EBR and UEMS benefit accreditation in the Imaging field?

Dragoş Negru: ACI has two committees: the Reviewing Committee and the Policy Committee. In both committees there are UEMS representatives and we work in close cooperation with the UEMS Radiology Section. The specialist reviewer is carried out by the ACI Reviewing Committee and the accreditation part is done by the EACME®. Review of applications by the ACI is done using the UEMS-EACME® criteria. The ACI already offers a larger number of specialists reviewers as well as a larger number of administrative staff, which adds quality to the process and helps the whole process to be faster in the future. Can we see the work with the EACME®? The answer is yes, by providing even more support. On March 7, 2015, Prof. Lorenzo Bonomo, President of the European Board of Radiology (EBR) Shareholders Board for the term 2015–2017, and Prof. Romuald Krajewski, President of the European Union of Medical Specialists (UEMS) signed an agreement to cooperate in the accreditation of international live educational events and accreditation of e-learning material in imaging. The EBR carries out the accreditation procedure via the Accreditation Council in Imaging (ACI). The ACI is a one-step approach to CME. The ACI was established as a collaboration between the European Accreditation Council (EACCME®) in delivering and harmonising the highest level of CME in imaging. The ACI’s primary purpose is to make managing CME quick and easy for all applicants and to work together with providers to offer imaging specialists the Continual Medical Education (CME) crediting system. CME is widely practiced in Europe and, in most EU Member States it has even become mandatory (e.g. in Italy and Germany). Many UEMS Sections of Radiology and member of the ACI.

ECRT: After the implementation of EACME 2.0, the revised EAC- CME criteria for accreditation, are the new challenges for accreditation in the imaging field?

Dragoş Negru: Within the next few years, CME will become increasingly sought after in Europe and on a global scale. In addition, education and the way it is provided will develop in the direction of worldwide collaboration and harmonisation. The EBRACI wants to be part of this process by putting itself at the forefront of a new CME, a development which will ultimately benefit all patients.

ECRT: Are CME and CPD moral and ethical obligations for all doctors? Is CME simply a means to professional development or a commercialised activity?

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Dragoş Negru: Within the next few years, CME will become increasingly sought after in Europe and on a global scale. In addition, education and the way it is provided will develop in the direction of worldwide collaboration and harmonisation. The EBRACI wants to be part of this process by putting itself at the forefront of a new CME, a development which will ultimately benefit all patients.

ECRT: After the implementation of the revised application criteria (EACME 2.0) what are the main changes that should be highlighted?

Paolo Ricci: With EACME 2.0, the entire application, review and accreditation process has been made more flexible and efficient, in particular through the introduction of a fast lane for ‘trusted providers’ whose quality level has been assured. A brand-new IT platform has been designed to better support the application process and assist users and providers remotely. Concerning the recognition of CME activities beyond live events, new innovative contents will be reviewed, such as e-learning modules, educational e-platforms, educational apps and educational e-libraries. Also the recognition of CME-CPD activities will be provided by EAC- CME, including publications in journals, reviews of publications, participation in UEMS-recognised exams and learning by teaching activities. Finally, EACME 2.0 will embrace a much broader spectrum of healthcare profes-
Many important developments that come with the implementation of the EACCME 2.0 are being applied. The review process has been reduced to 12–14 weeks and will hopefully be even further reduced in the future, provided that the quality control can be ensured. Furthermore, as underlined by Prof. Lucic, the enhancement of the 'trusted provider' status will benefit frequent providers without affecting the quality of the events accredited. Additionally, the accreditation for e-learning materials, as a growing educational tool, has been revised and enhanced to cover the needs of a constantly changing and growing form of education provision. Our duty as expert reviewers is also to identify these needs and changes to meet demand in future reviews of the EACCME® criteria.

The role of the ACI and the EACCME® as experts in assessing events is important for achieving standardisation in radiology education. The CME-CPD system in Europe is harmonised for various reasons. In some European countries, CME is mandatory, in others at a national level. Recognition of EACCME® at European level is a fundamental element for the homogenisation and standardisation of radiology education. The role of the EBRUAC is to constantly work to achieve such development in order to hold a robust basis to that end and to provide a good service to the educational providers.

Paolo Ricci: To provide high quality e-learning strategies has been one of the major goals of the latest EACCME®. The ACI Policy Committee and the EACCME® work together to ensure a smooth implementation of the revised and new criteria. The accreditation process presents some developments that allow a faster and more efficient review process, preserving the quality of the accredited events and materials. Some of the most remarkable development for that end is the enhancement of the ‘trusted provider’ concept, which enables a fast lane for frequent providers. In addition, other forms of accreditation are considered, such as the accreditation of e-learning and Image-Guided Therapy at the Medical University of Vienna. He is Chairman of the ACI Reviewing Committee, of the European Board on Cardiovascular Radiology (EBCR) and of the European Society of Cardiovascular Radiology (ECSR). He is also responsible for the EACCME® at European level. EBRUAC works closely with the ACI Reviewing Committee.

The work of the committee is of utmost importance in order to ensure and preserve the quality of the events. The specialist reviewers ensure that the criteria for each event or e-learning material are fulfilled as well as the quality and adequacy of its content. Moreover, the committee, together with the EACCME®, ensures that there is no commercial influence or bias in the events accredited, as independence of the events or e-learning materials is essential for achieving the necessary quality in education.

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ESMRMB proves its commitment to education

The 34th Annual Scientific Meeting of the ESMRMB will take place in Barcelona, Spain, from October 19 to 21, 2017.

“Nothing to add, absolutely excellent!” What could be nicer than such positive feedback? Over the last 15 years, quality and expertise have grown to be the guarantor of a highly satisfied audience. The European Society for Magnetic Resonance in Medicine and Biology (ESMRMB) is very proud to offer highly regarded education for professionals working in the field of MR.

School of MR

Physicians and MR radiograph/technologists are cordially invited to in-service advanced clinical courses with a course duration of 2–3.5 days. These courses have an inter-active character with 50% of the total teaching time used for repetition and case discussions in small groups. 65 participants are the maximum per course.

Lectures on MR

MB physicists and other basic or clinical scientists are warmly welcome to seven courses in 2017, with a duration of 2–2.5 days. 45% of the total teaching time will be used for repeat examinations and practical demonstrations. The maximum is 50 participants per course.

ESMRMB Annual Scientific Meeting 2017

The 34th Annual Scientific Meeting of the ESMRMB will take place in Barcelona, Spain, from October 19 to 21, 2017. There is still time to contribute to the congress by submitting your abstract. Join other clinicians, physicists, engineers, biochemists and radiographers from around the world for the premier meeting in the MR global community in mid-October in the beautiful city of Barcelona. Submit your abstract by May 18, 2017.

Find out more at www.esmrmb.org and join us on Facebook and Twitter!
The earliest documents about classes in radiology for medical students at the Jagiellonian University in Krakow date from 1877. The first Polish textbook on radiology was published in 1920 in Krakow as well, and the first radiology department providing systematic education to students opened in 1932 in Poznań. Later, other newly established faculties of medicine opened radiology departments. The courses which they provided to university students presented the current state of radiological knowledge with the use of methods available at that time. This is also true today when medical students in Poland are trained at 30 universities of medicine.

The project in diagnostic imaging, methods of teaching radiology to students must be based on tools equivalent to those used in clinical practice. To this end the Polish Medical Society of Radiology focuses on two basic schemes. Its main endeavour is designed to promote the knowledge of ultrasonography among students, not only by means of lectures, but also, or indeed most importantly, by means of practical classes. In its optimal version, the programme involves arranging separate ultrasound rooms designed only for students, and equipped with ultrasound equipment (two probes, Doppler function). The training is conducted in groups of two to four students, who examine each other under supervision of a doctor. At this elementary stage students acquire the skills to operate an ultrasound unit and perform functional and diagnostic examinations to improve their knowledge of the normal appearance of specific organs and structures of the body. Of great help for this purpose are video materials used as teaching aids to show examination techniques and interpretation of the images. At this point operate at some Polish schools of medicine. The next stage involves examinations with the use of simulators. As a result of a national programme designed to equip schools of medicine with simulation, this option will soon be available in all locations providing education to medical students.

The second programme involves launching computer radiology laboratories for students. Such laboratories are made up of a local area network consisting of a central server and client computers, and perform the following functions:

1. Loading anonymised imaging data from the server and viewing them on client computers. Sets of data for study are selected and accessed in the learning areas of the systems. Students are thus brought to the examination by ensuring those specialists themselves in their practice.

2. Loading Power Point presentations and Adobe Reader documents and viewing them on client computers. The presentations and documents are related to the topics currently discussed in class and can be viewed simultaneously or independently from the instructor. Transmission is carried out with the use of an SMB protocol.

3. Viewing radiology-related websites (Radiopaedia, AuntMinnie, etc.) on client computers, depending on the topic of the classes. This way it is possible to present diagnostic images related to rare diseases for example.

Both the client computers and the server are managed by Windows 7 Professional customised. The client software runs on the instructor’s machine. The station used by the instructor is additionally equipped with an option to display large images by means of a digital projector.

A modular structure allows for expanding the system by including other diagnostic areas as the need arises. RAID 1 is used to ensure the security of data stored in the server, and a BlueRay drive is available for periodic archiving. Such laboratories are gradually opening in more and more medical universities.

According to the Polish Medical Society of Radiology, the EBIR examination will significantly improve the quality of education provided to medical students in the field of diagnostic imaging.

Polish Society promotes education of medical students in imaging

Undergraduate radiological education is becoming one of the priorities of the European Society of Radiology. The Polish Medical Society of Radiology is also involved in similar pursuits, and we would like to use this opportunity and share some of our experiences.

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The Swedish Society of Radiology continues to be the main society for radiologists in Sweden, representing a vast majority of Swedish radiologists. The Society handles matters of significance to Swedish radiology, aiming to facilitate, develop and improve the field of Swedish radiology through knowledge and research.

A current issue includes easing the implementation of the Standardised Cancer Pathways Directory as directed by the Swedish government. The Directive aims to shorten diagnostic waiting times in radiology for patients not included in the pre-defined cancer pathways. Imaging diagnostics are an important step in most of the cancer pathways, and thus we are struggling to adequately meet the demands. The cancer pathways are specifically designed not to take current lack of resources into consideration, and are not always designed with the latest knowledge in mind. The Swedish Society of Radiology works to facilitate the introduction of the Cancer Pathways Directory to the national radiology departments by offering standardised recommendations of protocols, standardised reporting structure and other forms of support. The Swedish Society of Gastrointestinal and Abdominal Radiology has taken the lead in this field, and we hope our efforts will be of national value.

The Swedish Society of Radiology also facilitates the spread of knowledge by endorsing the Swedish Guide pilots, as well as supporting a newly founded Quality Register in Interventional Radiology. We are also discussing an update to the Swedish radiology textbook and creating a Swedish radiology Wiki website. We continue to give courses in radiology, which are appreciated throughout the country, as well as organise the annual national radiology meeting, including the European Diploma in Radiology (EDSR) examination, and to award research stipends each year.

We are proud to announce that in December 2016 we received approval of our first subspeciality certificate. Our subspecialty radiology Sweden previously had only one other official subspeciality (neuroradiology). This certification follows our determination to offer more official subspecialities. Challenges include finding ways to inform and involve our members in our work. Our quarterly members’ journal is well appreciated, as is our website, but these ways of communication do not sufficiently provide dialogue with our members. In 2017, we will pay more attention to creating a more diverse communications platform, possibly embracing Twitter, Facebook and a radiology Wiki to further support and facilitate seamless interaction with our members, as well as the public.

However, we continue to make sure that the different regions in Sweden and the different levels of healthcare are represented on the board of our Society, and we know from local discussions that the Society is highly thought of and appreciated. As always, we continue our work with enthusiasm!

Prof. Henriette Ståhlbrandt is assistant head of the department of radiology in Skåne County, Sweden, and President of the Swedish Society of Radiology.
Special Exhibition:
The Klewan Collection. Portrait(s) of Modernism

BELVEDERE
1030 Vienna, Prinz Eugen-Str. 27
www.belvedere.at
WHAT’S ON TODAY IN VIENNA?
SATURDAY, MARCH 4, 2017

THEATRE & DANCE

Diese Geschichte von Ihnen
by John Hopkins
AKADEMIETHEATER | 19:30
1030 Vienna, Lisztstraße 1
Phone: +43 1 51444 4145
www.burgtheater.at

Kunst
by Yasmina Reza
BURGTHEATER | 20:00
1010 Vienna, Universitätsring 2
Phone: +43 1 51444 4145
www.burgtheater.at

Die Kehrseite der Medaille
by Florian Zeller
KAMMERSPIELE DER JOSEFSTADT | 19:30
1080 Vienna, Josefstaedter Straße 26
Phone: +43 1 42 700 300
www.josefstadt.org

Kottan ermittelt
Austrian cult TV show from the 1970s brought to life on stage
RABENHOF | 20:00
1030 Vienna, Rabengasse 3
Phone: + 43 1 712 82 82
www.rabenhoftheater.com

(Ein) Käthchen.Traum
by Gernot Plass, based on ‘Das Käthchen von Heilbronn’ by Heinrich von Kleist
TAG – THEATER AN DER GUMPENDORFER STRASSE | 20:00
1060 Vienna, Gumpendorfer Straße 67
Phone: + 43 1 5865222
www.dastag.at

Das Mädl aus der Vorstadt
by Johann N. Nestroy
THEATER IN DER JOSEFSTADT | 19:30
1080 Vienna, Josefstaedter Straße 26
Phone: +43 1 42 700 300
www.josefstadt.org

Klein Zaches – Operation Zinnober
based on a story by E.T.A. Hoffmann
VOLKSTHEATER | 19:30
1070 Vienna, Neustiftgasse 1
Phone: 43 1 52111 400
www.volkstheater.at

CONCERTS & SOUNDS

Wiener Symphoniker
Conductor Philippe Jordan
J.S. Bach: Johannespassion (St. John Passion)
BMV 245
KONZERTHAUS | 19:30
1030 Vienna, Lothringerstraße 20
www.konzerthaus.at

Concentus Musicus Wien
Maria Hinojosa Montenegro, soprano
U. van Wassenaer; A. Vivaldi; L. Boccherini
MUSIKVEREIN | 19:30
1010 Vienna, Bösendorferstraße 12
www.musikverein.at

La Bandada Mancini
Accordion Festival
PORGY & BESS (JAZZ) | 20:30
1010 Vienna, Riemergasse 11
www.porgy.at

Kalkbrenner Fritz
GASOMETER (POP & ALTERNATIVE) | 20:00
1110 Vienna, Guglgasse 8
www.planet.tt

OPERA & MUSICAL

Die lustige Witwe
Operetta by Franz Lehár
VOLKSOPER | 18:30
1090 Vienna, Währingerstraße 78
www.volksoper.at

Onegin
Ballet by Pyotr Ilyich Tchaikovsky
Choreography by John Cranko
WIENER STAATSOPER | 19:30
1010 Vienna, Opernring 2
www.wiener-staatsoper.at

Schikaneder
Musical by Stephen Schwartz & Christian Struppeck
RAIMUNDTHEATER | 19:30
1060 Vienna, Wallgasse 18-20
www.musicalvienna.at

Don Camillo & Peppone
Musical by Michael Kunze & Dario Farina
RONACHER | 19:30
1010 Vienna, Seilerstätte 9
www.musicalvienna.at

Please note that all theatre performances are in German.