Mammography in Nordic countries: screening and new developments

Can 3D mammography be the next large scale population screening tool? The quest for cost-effective individual screening methods remains a priority for breast cancer imaging specialists, but the complexity of different factors in screening presents a huge challenge to researchers. Results from several trials in Europe may spell change for screening programmes.

While individual screening is most likely to be the optimal weapon to wield in the fight against breast cancer, the evidence to support large-scale implementation remains scarce, and limited health budgets also hamper such programmes. The compromise of a ‘middle way’ using evidence-based 2D mammography that has proved a cost-effective method for most women, would seem a practicable tool. But 3D mammography (digital breast tomosynthesis, DBT), which is considered to have clear advantages for detecting cancer in dense breasts, is now emerging as a potentially viable population screening method.

"For the moment we must stick to evidence-based screening methods for women at moderately increased risk of breast cancer, and at the same time, build on existing data for other methods to prove that there could be another more cost-effective protocol," said Dr. Sophia Zackrisson, senior consultant radiologist and associate professor of radiology, Skåne University Hospital, Malmö, Sweden. "These large prospective trials in 3D mammography have taken place in Norway, Sweden and Italy and are yielding some initial promising results."

During their design, it was believed that the trials would show that 3D mammography would prove most beneficial for screening women with dense breast tissue, said Zackrisson, who is presenting at today’s ECR meets Nordic countries’ session. However, the first results are now in from all three trials, and startlingly, additional cancers have been found with 3D mammography in all types of breast, with no clear trend for dense breasts categorised as BIRADS 3 and BIRADS 4, she said.

Other screening methods, such as handheld or 3D automated ultrasound and also contrast-enhanced MRI, are not suitable to roll out in large-scale screening programmes, but remain tools for individual screening of high-risk women. In handheld ultrasound, a recent U.S. report of a large modelling trial found no cost benefit when comparing the yield of extra cancers detected versus the high number of false positive findings. Meanwhile, MRI is already used as an individual screening tool in high-risk women who are BRCA 1&2 positive.

"The problem is that we have an established screening strategy for low and average risk in the fatty breast and for women at high risk and very high risk. However, for women with dense breasts, some of whom will be at a higher risk than those with fatty breasts, there is no

continued on page 2
such screening strategy,” said Zackrisson, who is also head of oncolytic imaging.

DBT may provide an alternative to 2D mammography, given that it seems to already be detecting additional cancers in all breast types. However, the question of changing screening methods for the general population is a complex issue that needs long-term trials to ascertain certainty of improved results. Such long-term trials will establish cost-effectiveness in terms of false-positive rates, human resources required, reading time and overdiagnosis of indolent slow-growing cancers that wouldn’t have caused harm or death during the individual’s life time. While none of the DBT trials were designed or powered to measure overdiagnosis, interval cancer rates can be used as a surrogate measure of whether or not new screening methods are picking up an increased number of relevant cancers.

“Because already we have to screen a lot of healthy women to find cancer; any new methods shouldn’t introduce a too high number of false positives or more overdiagnosis into results. If we get good trustworthy data we might see some changes in five to ten years but it will take a long time for a transition from 2D to DBT,” in the general population, or if at all,” she noted, adding that if no decreased interval cancer rate could be perceived then the evidence would not support a change.

Zackrisson also pointed to the need for risk estimation models as part of the strategy to catch women who might slip through the current screening net. These models would help to assess each woman’s individual risk, and the Gail model and the Tyrer-Cuzick model are two examples to help assess individual risk. These two models are not yet accurate enough to be used in clinical practice, but the idea is that the pre-imaging data provided by a tried and trusted risk estimation model would take into account not just breast density but also age, reproducibility and hormonal influences, family history, and breast disease problems such as cysts, benign pre-cancerous stages and cellular pattern change.

A good risk prediction model would provide a number for individual risk, and this would help screen programme organisers decide the cut-off point for moderate, high, and very high risk.

There should be a frank, objective and open discussion about the pros and cons of any screening programme, according to Zackrisson, both to find the optimal method, and provide the latest information so that women can make up their own minds as to whether or not they wish to participate.

“The bigger question is are we using the money in the right way? With limited budgets we need to ask whether instead of funding breast cancer screening we should not instead be helping people to quit smoking,” she noted. “I am always open to debate on the topic. This is a complex issue. Individual screening sounds easy but it’s not. One should always think twice before implementing such programmes.”

ECR delegates will also learn about mammography screening in Denmark, which has a high incidence of breast cancer and high age-standardised breast cancer mortality. Mammography screening in Denmark has been intensively discussed for over two decades. While the Danish Parliament decided in 1999 that Danish women aged 50–69 should be offered mammography screening every second year, national mammography screening was not implemented until 2007.

“At the same time we have two longstanding programmes which combine have covered around 30% of the target population of women aged 50–69 years in Denmark. As we – in contrast to, for instance, Norway – have had a very low percentage of opportunistic screening we have had a ‘natural experiment’ which has given us a unique opportunity to perform research on a screened population of women compared to an unscreened,” said Dr. Ilse Vejborg, head of radiology University Hospital of Copenhagen, and head of the Regional Mammography Screening Programme.

After 10 years of mammography screening in the Copenhagen municipality, breast cancer mortality was cut by 24% in the whole target group of invited women, and by 37% amongst those who participated one or more times. Before screening started, women in Copenhagen had significantly higher breast cancer mortality than the rest of the country. After 25 years of screening breast cancer mortality in Copenhagen was significantly lower than in the rest of Denmark, she added.

Combined statistics from the two longstanding programmes in Copenhagen municipality (started 1995) and Funen county (started 1998) show that overdiagnosis among participants is between 2% and 5%.

“Mammography screening without doubt has an impact on breast cancer mortality but it is important to be aware of the balance between benefits and harms. To minimise the harms and optimise the benefits the screening programme must have a high quality standard which should be monitored continuously,” Vejborg said, pointing to 11 indicators used to monitor the quality of the Danish programme.

Such high quality screening programmes work in accordance with European Guidelines for Quality Assurance in Mammography Screening and Diagnosis, she noted. The criteria include the following: the programme should provide personal invitations based on population registers; each woman who does not decline should be invited every second year or in accordance with the defined interval in the programme; double blind readings should be undertaken by two radiologists at least one of whom should be a high volume reader of more than 5,000 mammograms a year; and performance and early surrogate indicators e.g. participation rate, recall rate, technical recall rate, operation ratio for benign versus malignant lesions, percentage of small cancers, size and percentage of DCIS should be monitored and be in line with the recommendations.

The five regions involved in the Danish trial are required to send data to the National Mammography Screening Database. “We now have data from three mammography screening rounds showing that the Danish mammography screening programme is working to a high quality standard,” she concluded.

Overall, invited women participating in the Copenhagen programme experienced a drop in breast cancer mortality of 25%. (Provided by Dr. Ilse Vejborg, Rigshospitalet, Copenhagen.)
In recognition of her contribution to abdominal imaging and commitment to the advancement of radiology, Professor Valérie Vilgrain from Clichy, France, will give the Josef Lissner Honorary Lecture, titled 'Liver imaging: where do we stand now?' at ECR 2016.

Valérie Vilgrain is chair of the radiology department at Beaujon University Hospital in Clichy and full professor of radiology at Paris Diderot University – Paris 7, France. She obtained her medical degree from René Descartes University in Paris in 1985. She then did a residency in internal medicine, neurology and radiology at Paris University.

"I started my residency programme in internal medicine and neurology. While I was trying to examine patients very carefully, I realised that the heart of the diagnosis was imaging. During the next rotation, I chose radiology and immediately knew it was the specialty I wanted to do. At that time, ultrasound and CT were booming and it was incredible. Ever since, radiology has played an even more important role with multidisciplinary team sessions, where radiologists are key players, and the expansion of interventional radiology,” she said.

Prof. Vilgrain chose to subspecialise in chest and abdominal diseases, and completed a fellowship in radiology at Beaujon University Hospital, an institution well known for its expertise and outstanding clinicians in abdominal diseases. She subspecialised in the gastrointestinal tract, with a special focus on liver, biliary and pancreatic diseases, an area that still fascinates her to this day.

Her major research interests are diagnostic and interventional imaging of the liver, pancreas and bile ducts, focusing on multidetector CT, MRI, contrast-enhanced ultrasound and functional imaging.

"I still like my clinical activities very much: contrast-enhanced ultrasound, MR imaging with all the morphologic and functional tools, patient visits and MDT sessions. My academic work focuses on advanced imaging and especially the combination of morphological and functional tools. An interesting aspect is translational research; the research lab affiliated to the department, led by Bernard Van Beers, has clearly facilitated such an approach,” she said.

In addition, Prof. Vilgrain is involved in several ongoing research projects, and she is the principal investigator of the SARAH trial, which aims to compare Sorafenib, the reference treatment of advanced hepatocellular carcinoma (HCC), against radioembolisation. She has also involved in a combined academic/company project on HCC, which aims to develop imaging solutions for better patient management.

She has authored or co-authored 332 articles original articles, mainly on abdominal imaging, and co-edited 36 books on abdominal imaging.

Prof. Vilgrain holds membership of many societies, including the European Society of Radiology (ESR), the Radiological Society of North America (RSNA) and the European Society of Gastrointestinal and Abdominal Radiology (ESGAR).

She has served as vice-chairperson of the French Radiological Society and chairperson of the Education Programme Committee for the society’s annual meeting. She serves on several committees for the European Congress of Radiology and chairs the RENA Regional Committee for Europe.

She has regularly attended the ECR since its creation and the congress has helped her forge friendships with many colleagues worldwide. "I started to come when I was a fellow in the early nineties. At the beginning, I did not know many European radiologists. The ECR and other related meetings – ESGAR and the Cardiovascular and Interventional Radiological Society of Europe – have allowed people to connect with each other and share many professional issues, besides offering key scientific content,” she said.

"I feel extremely honoured by this distinction. I deeply thank the ESR and especially ECR 2016 President, Katrine Riklund. I will try to give new insights in liver imaging but most importantly, I would like to show how an academic career can be wonderful. Its three pillars – clinical duties, academic and education – allow us to move forward for a better medicine.”

Don’t miss today’s Honorary Lecture

Friday, March 4, 12:15–12:45, Room A

Josef Lissner Honorary Lecture

* Liver imaging: where do we stand now? 
Valérie Vilgrain; Clichy/FR
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Cardiovascular and Interventional Radiological Society of Europe
Innovating and integrating radiology across the curriculum

Today's undergraduate teaching demands innovative ways of engaging with trainees who have relatively short attention spans, as well as ensuring that radiology and radiologists maintain an active presence across the medical curriculum. These are the core messages of speakers at today's session.

Under discussion will be methods of engaging students including using novel technology and online resources in an effort to keep the undergraduate learning experience stimulating over time. There will also be discussion on how to ensure radiology and radiologists play a central role in planning and delivery of the subject across all institutions medical curriculum.

In an interview with ECR Today, Prof Dr Birgit Ertl-Wagner, professor of radiology at Munich University Hospital, Germany, stressed that in nearly every specialty, students need a grasp of radiology. "There is hardly any field of medicine that does not, in some way, pertain to radiology. Imaging is omnipresent."

"The undergraduate curriculum: how to ensure undergraduate students in a team effort," she pointed out, as opposed to having other clinicians teach radiology in the absence of radiologists.

"Essentially, radiologists themselves are instrumental in ensuring that radiology as a discipline remains in the centre of the medical curriculum, ensuring that students remain acquainted with the subject and its role," said Ertl-Wagner. "Radiologists need to ensure they do not back off and think other specialties can teach the radiology aspects of their topic," she said. "We should never let the responsibility for teaching radiology slip from our hands. If we don't stay involved then we as radiologists lose touch with medical students and thus our future colleagues."

Curriculum planning is one particular aspect of medical education where radiologists can have considerable influence. "If you are not at the table, then you'll be on the menu," she remarked. "Curriculum planning might not be the most exciting topic for some people, but for the future of radiology we need to be there and we need to be involved." Together with the members of the ESR's Education Committee and Undergraduate Education Subcom-
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Follow three essential steps for effective cardiothoracic imaging

There are three vital requirements for thorough and effective cardiothoracic imaging, says Prof. Edwin van Beek, director of the Clinical Imaging Research Centre, Queen’s Medical Research Institute, University of Edinburgh, UK. ‘The first is to fully reconstruct the field-of-view; volumetric CT with a 1 mm reconstruction now provides a more complete picture of the chest than high-resolution 3 mm slice CT did previously. The second is to promote collaboration between the cardiologist, pulmonologist and the chest and heart radiologists. Third is that radiologists must ensure everyone can understand what the report means so that the referring doctor can be guided as to how to proceed. ‘The patient’s referrer is the shepherd, and the radiologist is the wolf. If the shepherd spots a fox, it must bark,’ he told ECR Today in an interview ahead of the congress. Persistence and attention to detail are important not just for the patient’s wellbeing but also to avoid legal proceedings. He cites real cases of chest CT patients later experiencing an acute cardiac event. In these cases, coronary calcifications could be seen on CT but had, for one reason or another, been overlooked. Therefore, education in this area remains crucial.

Common reporting mistakes include not mentioning the coronary arteries in relation to age and gender, or calcifications of the aortic valve. Van Beek, who is also Scottish Imaging Network (SINAPSE) chair of clinical radiology points out that in a contrast CT scan, aortic valve stenosis and coronary artery disease can be visualised, as can anomalies in the pulmonary artery related to pulmonary hypertension. ‘In the medical area, our chief responsibility is to the clarity of the report,’ he said. ‘Cardiologists and radiologists are working towards a lexicon but this is not the main solution. Instead the answer for our report is to be thorough and understandable. We must bark loudly and clearly when required.’ Evidence is increasing that chest CT can reveal alternative findings and greater interdisciplinary collaboration, thorough reconstructions, and clear reporting styles are necessary to ensure pathologies in either the heart or lungs don’t escape detection.

Delegates attending today’s session will hear from experts how the cross-over in presentation between cardiac and pulmonary problems and their shared risk factors has led to growing demand for comprehensive cardiothoracic imaging for cardio pulmonary patients. Given the close interrelation of the lung and the heart, radiologists must always take a close look at the heart when assessing the lung and vice versa, says cardiothoracic imaging experts. This requires multiple reconstruction methods to visualise the whole chest cavity and dedicated focused areas of interest, plus an eye for alternative findings.

‘In an aging population, it would be a mistake to only look at the lung aspects of a chest CT and ignore the cardiac aspects. The reverse is also true: cardiologists may ignore the non-cardiac portion of a cardiac CT angiogram,’ said van Beek. ‘Lung cancer screening may show significant coronary calcifications, a direct predictor of a likely cardiovascular event over a five-year period. Similarly, lung cancer or emphysema may be revealed from cardiac studies, however if you don’t reconstruct the full field-of-view, these diseases will be easily missed.’

A case in point, van Beek remembers a CT scan that showed a right coronary artery anomaly shown in Figure 1 a–d. He insisted on a reconstructed full field-of-view, and discovered metastatic breast cancer which changed management of the patient to extensive chemotherapy before coronary surgery. This also led to a shift in the cardiologist’s mind at the time as to the usefulness of reconstructed full field-of-view images. ECR 2016 delegates will also be reminded of the subtle information available on CT and MRI such as abnormal shape (D-shaping) of the interventricular septum which may indicate pulmonary pressure overload or how thickened interlobular septa and pulmonary ground glass opacities on CT may point to pulmonary congestion secondary to heart failure. In many patients suffering from pulmonary diseases, the final lethal event is right heart failure. This occurs because the right ventricle which supplies blood to the pulmonary artery is not designed to cope with pressure overload associated with pulmonary hypertension. Today the most relevant parameter for right ventricular function is measuring the ejection fraction by means of MRI. This parameter, which indicates how much percent of its volume the heart can eject with each beat, is easy to measure and is an excellent parameter to predict outcome, and to guide and to monitor therapy, according to Prof. Dr. Jens Bremerich, head of the division of cardiovascular imaging at the University Hospital of Basel, Switzerland. He will be presenting perspectives from cardiac imaging, specifically the role of the heart in cardiopulmonary disease. At Basel University Hospital, there has been co-operation between cardiologists and radiologists for over 10 years, he explained. Prescriptions for cardiac imaging are seen by both cardiologists and radiologists, and approximately 1,000 MRI heart studies per year, or around 25 per week, are read and then reported on by both parties. This relatively low volume of MRI versus 20,000 conventional chest x-rays and 5,000 chest CTs makes dual reading/reporting more feasible. These cases are also discussed locally between cardiology and radiology, with 10 cases covered in an hour long session twice a week. ‘This set-up is a little more costly than usual but it is very interesting and provides an excellent setting for cardiology and radiology residents to train,’ Bremerich said. ‘I think all hospitals should strive to carry out dual reading and report-in-such cases, and in general there should be a low threshold for exchange with the referrer in cardiothoracic imaging’.

ECR TODAY | FRIDAY, MARCH 4, 2016

CLINICAL CORNER
A future made of subspecialists and new synergies

What will radiology look like a decade from now? Will it consist of subspecialists and hybrid consultants? Or will things remain as they are? A panel of experts will gaze into a crystal ball today in a dedicated professional challenges session at the ECR.

Digitalisation has transformed radiology. With PACS, images have become separated from the interpretation, and other clinicians can access and interpret the images themselves. The radiologists’ role has consequently changed: today more than ever, they must be consult-ants in imaging, according to Christoph Becker, professor of radiology and chairman of the department of imaging and medical information science at Geneva University Hospital, Switzerland, who will moderate today’s session on the future of radiology.

"The radiologist's added clinical value is more and more to guide the referring clinician as to which exam is the appropriate one and to act as a consultant in patient management," he said.

Radiologists must now secure their role in the multidisciplinary continuum demanded by modern healthcare. Therapeutic decisions are increasingly being made on a case-by-case basis by a team of specialists in dedicated organ-related or disease-related centres, tumour boards, etc., in which radiologists are the imaging experts.

Radiologists must take this workload in addition to the rest of their work – organizing and managing imaging protocols and interpreting images – which is a less visible part of their jobs. The only way to gain their places in this new environment is to subspecialise.

"Radiologists must not only master organisational and technical aspects of imaging but also know the clinical background of their specialty to be suitable counterparts to subspecialised surgeons, interventionalists and oncologists. Subspecialization enables radiologists to become clinically relevant whereas just focusing on general descriptive reporting will leave them invisible," Becker explained.

In large departments, a sufficient number of radiologists must be trained in each subspecialty. This is only possible by creating lifetime positions for subspecialists, which is still a challenge in Europe. "The implementation of such a system does not exist everywhere in Europe yet, but we hope that this concept will be increasingly adopted," Becker said.

Where radiologists fail to be of clinical relevance, radiological services risk being seen as a commodity or a technical service that can be offered anywhere, at any time, without any added medical value. Clinicians may wish to take over image interpretation in their respective fields, and may even hire technicians to acquire images, Becker warned.

"There will be situations in which the referring clinicians wish to do the radiologists’ job themselves, although they are not trained for that. So the radiologist must absolutely provide added value by taking on this consulting role," he said.

Jim Reekers, professor of Interventional Radiology at the University of Amsterdam, the Netherlands, will tackle these questions during the course.

An interesting development in the future may be the development of synergies between radiology and pathology. Pathology may follow the same path as radiology: once digitalised, pathological images can be made available in the hospital just like radiological images. Interaction between pathology and radiology is already increasing, for instance in procedures such as image-guided biopsies.

"Pathologists already like to come to the radiology department to assess the quality of biopsy specimens before the patients leave,” Becker said.

The correlation and complementarity between both specialties could lead to the creation of joint departments and reports. "We already compare what we see on radiological images with histological slices, and molecular and genetic pathology, so it's totally imaginable that a diagnostic platform imaginating these specialties could be created in the hospital, and that they provide a joint, tailored report for each patient," Becker said.

"The beauty of subspecialisation is that it will provide added medical value. Clinicians may access and interpret the images anywhere, at any time, without any risk being seen as a commodity or a service," said Becker.

"Potential synergies between radiology and pathology is something that might develop in the coming years, but it’s not going to be easy," he said.

Prof. Christoph Becker from Geneva University Hospital, Switzerland, will moderate today’s session on the future of radiology.
Imaging orthopaedic hardware is no longer mission impossible

When plain films are inconclusive on patients with prosthetic implants, either CT or MRI can be the next step, depending on the clinical question. Dedicated sequences for MRI in the presence of metallic hardware are now being applied to prosthetic implants to optimise image quality, but to keep scan time reasonable for patients, these dedicated sequences must be complemented by normal sequences wherever possible.

Even up to 10 years ago, MRI was considered problematic for patients with orthopaedic hardware, and results were commonly regarded as “hit and miss”, but advances in technology and technique now mean MRI is more feasible and yields more reliable diagnostic information than ever before.

“MRI is both a challenge and an opportunity for patients with a prosthesis,” said Dr. Johan Dehem, staff radiologist at Jan Yperman Hospital, Ypres, Belgium, who performs MRI exams of metal on metal implants regularly in general practice. Orthopaedic hardware is only slightly magnetic and thus safe to enter the magnet, but it distorts the local magnetic field, which significantly degrades image quality. To minimise the drawbacks of this and to retain imaging quality, parameters and sequences must be tailored — it’s not easy, but it’s doable.

For imaging the field of view around the prosthesis, new sequences should be used if available, such as “view angle-tilting” and slice-encoding, even though they take more time. For larger fields of view, operators should opt for less time-consuming sequences, he said.

When carrying out a hip prosthesis exam, for example, the procedure should include normal sequences with adapted parameters for the larger pelvic area, thus normally taking less than an minute. Dedicated sequences tailored to the small area of the prosthesis will take an additional one to two minutes. This compromise will help to keep the procedure time shorter for the patient and make the image clearer, according to Dehem.

MRI is useful for depicting common soft tissue musculoskeletal (MSK) problems such as tearing of the abductor tendons and muscles. When this is suspected, MRI may reveal tears directly or indirectly, through fatty atrophy. Muscular atrophy may also be an indirect sign of nerve damage. MRI is considered an excellent tool for depicting the sciatic nerve in particular.

“One can depict the muscular oedema (acute setting) or the fatty atrophy/chronic setting in the target muscles,” Dehem said. “The sciatic nerve itself is thick and surrounded by fat, so you can easily check for continuity or compression by ectopic bone or surgical material.”

Specifically in cases of metal on metal implants, orthopaedic surgeons are interested in soft tissue visualisation by MRI to spot any local adverse tissue reactions. However, metal on metal implants can either take signal away or provide too much, and sometimes, for example, the signal of two slices is contained all in one slice.

“Metal on metal implant imaging used to be tough,” he continued. “Before the advent of the new sequences, radiologists would have to keep the patient in the scanner for a very long time trying to obtain something that looked like an image in between the artefacts and still ended up searching medical records and PACS for every bit of information to try and interpret the final image.”

He described how MSK surgeons avoided referring patients with a prosthesis because the scan time was too long, image quality was poor, and reports were likely to contain more disclaimers than results, with no clear diagnostic message. However, new sequences resulting in a drastic improvement in MRI prosthesis imaging over the past two years have brought about a shift in mindset. Surgeons now actively send patients to MRI units for soft tissue visualisation.

Sounding a note of caution, he warns radiologists not to use 3T in hardware cases, because artefacts will double in size and scanning will involve automatic waiting times between sequences to avoid overheating the tissue. Instead, 1.5T is best for patient with a prosthesis. With lower-field scanners, metal implants may sometimes yield no signal even when new sequences are deployed, but this should not be considered a major problem.

“The prosthesis may be black, but the bone around it can be imaged and information extrapolated. For example, if you don’t see a pathology anywhere up to the contours of the prosthesis, then there is none present. This lack of signal doesn’t impact on the diagnostic capacity of the scan,” Dehem said.

He believes that patients with prosthesis are entitled to the best diagnostic techniques available, and shouldn’t be denied MRI just because it takes longer and can be more artefact-prone than non-hardware imaging.

“Orthopaedic hardware takes more time and thought than normal MSK imaging, but it is not mission impossible. Surgeons recognise the possibilities of new sequences. This is just the beginning,” he noted. “Looking forward, the future lies in the development of a new type of implant not based on cobalt and chrome, which will involve automatic waiting times between sequences to avoid overheating the tissue.”

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“The prosthesis may be black, but the bone around it can be imaged and information extrapolated. For example, if you don’t see a pathology anywhere up to the contours of the prosthesis, then there is none present. This lack of signal doesn’t impact on the diagnostic capacity of the scan,” Dehem said.

He believes that patients with prosthesis are entitled to the best diagnostic techniques available, and shouldn’t be denied MRI just because it takes longer and can be more artefact-prone than non-hardware imaging.
Sound, reliable radiographers are the backbone of radiology departments across Europe, and today Sweden offers its own perspective on what makes a successful, autonomous radiographer and on their remit in delivering quality services to patients.

**The Swedish radiographer programme**
- The students meet the patients from the very beginning of the education
- The students are encouraged to take the patients’ perspective
- The students learn to have a holistic approach
- Technology and care is intertwined
- Technology is the radiographers’ extended arm
- Combines medical care, inserting intravenous catheters distributing drugs as well as performing all sorts of radiological examinations, imaging processing, radiation safety and technological knowledge associated with the examinations

**Radiography programmes in Sweden teach patient-centred care from the first term (Figure provided by Maud Lundén, PhD)**

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**Radiographers must be prepared to adapt to the imaging environment and their patient’s requirements.**

In Sweden, radiography was undertaken by nurses working in radiology departments until 1990, when it became a discipline in its own right. However, only eight universities in Sweden currently offer radiography programmes, and educational front-runners are pushing to increase the 35 placements available each year to 50.

Radiographers accompany the patient before and after the examination in Sweden. Their work involves performing insertions and catheterization, for example, as well as the imaging procedure itself. This means that registered radiographers need expertise in nursing care as well as specialist radiography skills, which are both covered in the radiographer undergraduate programme.

"Swedish radiographers have a unique role because they are responsible for both the technical equipment and the patient in the pre-, intra- and post-radiographic stages. They are one of a kind who take on the role of nurse, technician, partner, and chauffeur," said Bodil Andersson, PhD, university lecturer in radiography and head of department, Medical Faculty, Lund University.

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The ‘ins and outs’ of imaging dense breasts

In women with dense breasts, mammography sensitivity can be as low as 60%. In other words, up to 60% of breast cancers can be misdiagnosed in these women. Clearly, something must be done, and something is: today, presenters are showcasing tools for quantification and will explain how high breast density may lead to changes in imaging strategies.

First up, Prof. Fiona Gilbert from the Department of Radiology, University of Cambridge, U.K., will address the ‘problem child’ modality radiologists must deal with on a regular basis: mammography. FCB delegates will learn about the definition of dense breasts and what they look like on mammography. In addition, they will understand the different methods to measure breast density on mammography and analyse details that can be associated with abnormalities in dense tissues.

Breast density can be measured using different techniques such as the Boyd and Cumulus techniques, and there are different scoring systems for assessing the amount of breast density on mammography, particularly the BI-RADS system, and the Royal College of Radiologists (RCR) breast group system. In addition, quantitative methods are becoming available, such as Volpara and Quantra software.

“The reason these techniques are important is because firstly, and most importantly, an assessment of breast density on mammography gives the reader an indication of sensitivity of the mammogram to detecting breast cancer. BI-RADS 4, BI-RADS D, or ‘dense breast’ in the U.K., implies that the sensitivity is reduced compared with someone who has fatty breasts or BI-RADS A or B,” she said. “There is a masking effect because of dense breast tissue, reducing the likelihood of detecting breast cancer.”

Thus, knowing breast density provides essential information. Delegates will be particularly keen in Gilbert’s talk as she’ll go through the different ways of measuring breast density addressing how reliable they are.

“Everyone encounters dense breasts, so it will be relevant, also there is increasing concern about whether something additional should be offered to women who have dense breasts on mammography,” she said.

However, sometimes additional imaging techniques need to be performed and that’s where the other presenters come in.

Dr. Luis J. Pina Insaurriart from the Department of Radiology at Clinica Universitaria de Navarra in Pamplona, Spain, will discuss ultrasound and dense breasts. Ultrasound can detect additional breast cancer in dense breasts after negative mammography, increasing the detection rate of breast cancer by up to 31%.

Handheld ultrasound can only be performed for selected patients in a clinical setting, and it cannot be offered in a screening setting for all patients, he explained. Automated breast ultrasound, on the other hand, can play a central role in increasing the detection of additional cancers in the screening of dense breasts; the technologist performs the examination and later the radiologist reads the images.

“Breast ultrasound is an excellent tool that can significantly increase the sensitivity of mammography.” Insaurriart said.

The American College of Radiology BI-RADS lexicon describes three patterns for ultrasound breast composition: homogenous echotexture-fat, heterogeneous echotexture-fibroglandular, and heterogeneous echotexture. The patterns have similarities with mammographic density patterns (dense mammographic patterns can be seen as homogenous echotexture-fibroglandular and heterogeneous echotexture-fibroglandular and heterogeneous echotexture-patterns).

“Due to the fact that most benign and malignant lesions are usually seen as hyperechoic masses, these lesions are better detected on homogeneous echotexture-fat and heterogeneous echotexture-fibroglandular than on the other patterns,” he added.

Moreover, there are other less obvious factors that can influence the detection of lesions with ultrasound volume of the breast (attenuation of ultrasound in large-sized breasts can decrease the sensitivity of ultrasound), localisation of the lesion (e.g., visualization in deeply or superficially located lesions, or lesions located behind the nipple or scars), and atypical appearance of some breast cancers (hyper- or inchoatic cancers, subtle distortions, etc.).

Rounding out the session, Dr. Pascal Baltzer from the Department of Radiology at the Medical University of Vienna, will discuss breast density in MRI, which is considered an ambiguous term.

“It mainly refers to the amount of fibroglandular tissue that should be assessed and categorised according to the BI-RADS lexicon,” he said.

As known from mammography studies, the amount of fibroglandular tissue is an independent risk factor for development of breast cancer and MRI may assess this risk factor in a volumetric, 3D manner.

“This is why some authors consider MRI assessment of breast density superior to mammographic assessment,” Baltzer noted.

After contrast agent administration, breast parenchyma can show various levels of enhancement, referred to as background parenchymal enhancement, which is referred to as MRI breast density by some authors. Thai connection is based on the assumption that a marked background parenchymal enhancement may decrease the diagnostic performance of breast MRI in analogy to the amount of fibroglandular breast tissue in mammography.

Baltzer’s talk will deal with both aspects of breast density and provide delegates with evidence-based clinical knowledge. Following his presentation, there will be a panel discussion on how to overcome the dense breast in screening.
The RSNA/ESR initiative on structured reporting

BY OSMAN RATIR

In October 2016, a formal memorandum of understanding (MoU) between the ESR and RSNA initiated a joint effort to promote and host a common open repository for multilingual sets of templates of structured reports. The resulting platform is based on the IHE technical framework for Management of Radiology Report Templates (MRRT), that promotes an HTML5-based format for encoding structured content, which can be displayed in any web browser or on a mobile device. This initiative is an extension of the RSNA RadiRef.org project, started in 2007 to create an open library of XML-based report templates. This early project also initiated the concept of linking structured report contents to the RadLex ontology lexicon. RadLex is a comprehensive lexicon - a unified language of more than 30,000 medical terms - for standardizing indexing and retrieval of radiology information resources.

By ‘tagging’ standard terms in structured content, it allows for easy indexing and retrieval of studies with specific findings. It also allows for similar presentation of reports in other languages by using RadLex codes as keywords for converting the essential findings of the reports into different languages. In 2017, the RSNA agreed to adopt the MRRT standard and switch from HTML5 to XML format. At the same time, the RSNA Radiology and Informatics Subc ommittee initiated a European effort to join the RSNA initiative and to contribute to the promotion of a common repository of standardised templates. The MoU between the two societies aims toward providing access to that repository to their members and establishing a common strategy for management and promotion of these collections of templates. An open repository accessible to everybody allows any member of the two societies to upload templates of structured reports. Subspecialty societies and working groups were solicited to join their efforts in submitting specific templates. A management editorial board (renamed the Template Library Advisory Panel – TLAP) was constituted to expand the Open Library with a ‘Select’ set of templates that have been vetted and annotated by the TLAP, adding appropriate RadLex codes to the key elements of the report. A software tool is under development (T-Rex report template editor from karunhealth.com) to help in creating structured report templates and associating RadLex codes with different elements of the reports. While this open tool will report it allows the development of templates, it has limited functionalities for creating advanced structured reports that associate graphs and images. The aim of our initiative is to encourage vendors and developers who have already initiated very advanced software platforms for generating structured reports to adhere to the MRRT standard and open their platforms for importing and exporting templates to and from the RSNA/ESR repository.

EHR systems can log in to the RadiRef.org repository and upload their own templates either in MRRT format or simplified text or word processing formats. Selected reports will then be converted to MRRT standard and uploaded to the Select repository. These templates are available to the whole community at large and a scoring system is available to ESR and RSNA members, who can grade the different templates and post their comments and suggestions. Users are also encouraged to generate translated copies of existing structured templates in other languages. This can be particularly valuable in the multilingual European community.

An effort to promote and encourage such participation was initiated by the ESR by soliciting national societies to nominate local delegates who will assist in such efforts in national professional communities. Special attention is given to subspecialty associations that have already developed libraries of templates and recommendations for the standardization of diagnostic reports.

The RSNA/ESR initiative is intended to be a community effort that can only succeed if adopted by a large number of participants. The open-access and non-profit strategy should accelerate and facilitate wider adoption of standard templates. The adoption of a unified coding system like RadLex will also help future data mining of existing imaging databases as well as retrospective reviews for large multi-centre clinical trials. Wider adoption by industry and software developers can only occur by peer pressure of users and a community effort in defining the guidelines and recommendations for unified structured reports, which can result from a harmonisation of imaging protocols, and image analysis and diagnostic criteria.

G. Božović1, C. Adlercreutz1, P. Höglund1, I. Bjorkman-Burtscher1, P. Emanuelsson1, C. Enhorning1, H. Enoksson1, E. Persson1, A. Svedberg1, M. Wallin1, E. G. Gudmundsson1, I. Björkman-Burtscher1, G. Božović1

Lung transplantation is at present the only treatment for terminally ill lung patients with 3,800 procedures performed each year worldwide. As for most solid organ transplantations, organ access is based on available organs from brain dead organ donors, which is limiting in itself. In addition, for the lungs, the overall use of accessible organs is not much higher than 30%, due to development of poor oxygenation, oedema and apoptosis.

With the introduction of ex vivo perfusion and reconditioning of the lungs, the organ can be retrieved, bettering the overall usage together with acceptance of older and in a good storage state. In addition, for the lungs, the overall use of accessible organs is not much higher than 30%, due to development of poor oxygenation, oedema and apoptosis.

Addressing this subject, we have analysed the imaging from brain dead organ donors, up to 7 years of age, and potential organ donors. We have analysed the mandatory bedside chest radiographs as well as all the imaging, including the lungs completely or incompletely (e.g. chest CT or CT angiography of the neck including the upper third of the chest). This was done by MR radiologists who had already nominated the patient. Special attention is given to ‘tagging’ standard terms in structured reports, which can result from a harmonisation of imaging protocols, and image analysis and diagnostic criteria.

Dr. Gracijela Božović is Senior Consultant Radiologist at the Department of Medical Imaging and Clinical Physiology, Skane University Hospital, Lund, Sweden.

Screencast of the Open Library of structured report templates available in different languages and categories. A star rating system allows users to grade the templates.

BY GRACIJELA BOŽOVIC

Can we do better? Radiological interpretation quality in lung imaging of organ donors

Lung transplantation is at present the only treatment for terminally ill lung patients, with fewer than 3,800 procedures performed each year worldwide. As for most solid organ transplantations, organ access is based on available organs from brain dead organ donors, which is limiting in itself. In addition, for the lungs, the overall use of accessible organs is not much higher than 30%, due to development of poor oxygenation, oedema and apoptosis.

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We found that a systematic analysis contributed substantial information about the issue of lung donation, we can certainly do much better. In the light of the essential role of HRCT in following up lung transplanted patients, adjusting the imaging in the pre-transplant setting would indeed complete the circle.
Obstructive sleep apnoea (OSA) syndrome is a common disorder caused by recurrent pharyngeal collapse during sleep and is characterized by disrupted sleep and excessive daytime sleepiness. Patients have lower productivity at work, are more often involved in traffic accidents and develop a number of chronic diseases such as hypertension, heart failure and stroke. Treatment with a positive airway pressure device is the most effective therapy; however, it has a poor clinical outcome in a minority of patients. Surgical methods are less effective and successful only in certain patients. New treatment methods such as hypoglossal nerve stimulation are effective even in the most severe patients; however, there is a new distinct group of patients who do not respond to this novel therapy.

The mechanism and level of pharyngeal collapse is not fully understood. Better understanding should help target treatment such as selecting candidates for surgery and hypoglossal nerve stimulation.

In our sleep MRI study we wanted to evaluate the mechanism and the level of upper airway obstruction in OSA patients during natural sleep, together with synchronous electroencephalography (EEG) and respiratory event registration. The study was done during the night; patients were left to fall asleep in the scanner, noise was attenuated with white noise headphones and earplugs. Each subject was allowed to remain asleep for several hours while continuous real-time dynamic MR imaging was performed. EEG and airflow were continuously recorded during imaging, retrospectively scored to identify periods of apnoea and synchronised with MR images.

We found persistent isolated obstruction at the retropalatal level (behind the soft palate) in all patients that were able to complete spontaneous sleep. Interestingly, we did not find any complete collapse behind the tongue base or a multiple level obstruction (i.e. behind epiglottis and the tongue base). We describe two novel mechanisms of obstruction depending on the position of the soft palate. The soft palate was either attached to the tongue base and moved backwards together with it, compressing the airway (Figure 2), or it was detached from the tongue base and moved backwards on its own, compressing the airway (Figure 2). These two mechanisms may provide a new insight into selecting candidates for hypoglossal nerve stimulation or surgery. Hypoglossal nerve stimulation produces anterior displacement of the tongue, thus enlarging retrolingual space. We assume this type of treatment might not be beneficial in patients with isolated retropalatal obstruction where the soft palate is detached from the tongue base.

The main disadvantages of our study is the fact that patients were limited to sleeping in the supine position only. Sleep MRI provides a new approach in studying OSA and may present a new diagnostic method for OSA patients.

Figure 2: Type one mechanism of upper airway obstruction: open airway (left) and complete obstruction (right). Soft palate is attached to the tongue base and moves backwards together with it, compressing the airway. Note additional narrowing of the retrolingual space.

Figure 2: Type two mechanism of upper airway obstruction: open airway (left) and complete obstruction (right). Soft palate is detached from the tongue base and moves backwards on its own, compressing the airway. (Images provided by Dr. Pavel Kavcic)
Infectious mediastinitis after sternotomy is a life-threatening condition requiring thorough diagnosis and swift therapy to avoid high mortality in affected patients. Besides the common parameters used for clinical diagnosis, CT is often employed to evaluate the presence and the extent of infectious mediastinitis. Unfortunately, previous studies have shown that the accuracy of diagnosing this infection in post-surgical patients using CT is insufficient due to lack of specificity. This especially applies if the timeframe between initial cardiac surgery and the CT scan is short, resulting in difficult differentiation between post-surgical residuals and signs of infectious mediastinitis. Considering how critical a short timeframe is for therapy, fast and reliable diagnosis remains mandatory. Moreover, there is a lack of clearly defined CT criteria for diagnosing acute mediastinitis, which leads to a high number of inconclusive radiological reports. There are only a few current and comprehensive studies available, the majority of which have only evaluated limited numbers of patients.

Therefore, we performed a study enrolling more than 100 patients and including all qualitative criteria that previous studies have possibly suspected to be related to acute mediastinitis. We approached this objective from two different directions – using the qualitative image analysis described in previous studies on the one hand and adding a quantitative evaluation on the other. During qualitative analysis we assessed more than 22 different possible CT findings, including mediastinal tissue composition (e.g., whether and where fluid collections or free gas were visible), sternal and lymph node condition, as well as secondary paramedastinal findings. For quantitative analysis, which, to our knowledge, has not been assessed for the diagnosis of mediastinitis in previous studies, we measured the volume of fluid, fat and air in the anterior mediastinum as well as the total volume and attenuation of the anterior mediastinal region. All included patients had received a contrast-enhanced chest CT and a consecutive deep retroversion surgery with collection of microbiological samples. Hence, we were able to compare the qualitative and quantitative CT parameters with both microbiological results and evidence of mediastinitis seen during operation.

Our study takes into account the main qualitative results of previous studies, complements these with quantitative analysis of mediastinal tissue and investigates these aspects in a large patient population, with the main aim of increasing diagnostic accuracy of CT in patients with suspected infectious mediastinitis after sternotomy. During our presentation we are going to inform you about the results of our study, whether any qualitative/CT findings were deemed to be the most relevant, and whether employing quantitative analysis could be used to improve diagnostic accuracy.

BY MARTIN MUELLER

Increasing diagnostic accuracy of acute mediastinitis after thoracic surgery

MR-guided microwave ablation of hepatic malignancies

First cases in clinical routine

An effective ablation system and a guidance modality that enables exact positioning and ablation assessment are essential for patient safety and therapy outcome in percutaneous hepatic tumour ablation. Several studies on MR-guidance in tumour ablation have emphasized the value of this modality, due to its high soft-tissue contrast, high sensitivity in depicting small parenchymal lesions, free selection of imaging planes, near real-time fluoroscopic imaging, and monitoring of ablation effects without application of intravenous contrast agent. However, MR-guided tumour ablation is currently restricted to a small number of centres due to the higher operating costs of suitable MR scanners combined with longer durations of MR-guided interventions. Microwave ablation is a relatively new ablation technique with time-saving advantages in comparison with RF ablation; microwave ablation enables higher intratumoural temperatures, resulting in larger coagulation zones in a shorter time. Therefore, introduction of a MR-compatible microwave system will combine both promising techniques and might increase the status of MR-guided tumour ablation by decreasing the procedure duration and consequently the intervention costs.

In our study, we report our initial experience with a new commercially available MR-compatible microwave ablation system. We conducted microwave ablation in 14 patients with primary or secondary hepatic malignancies. The whole procedures including planning, applicator placement, therapy monitoring and control imaging were carried out with the patient laying in a 1.5 T MR system. In ablation procedures under CT-guidance, intravenous contrast agent application is mostly necessary for tumour localisation and assessment of the ablation zone. However, the effect of contrast media is limited to a few minutes after application and repetition of application is restricted. In our series, targeting and therapy monitoring could be conducted with non-enhanced MR imaging enabling unlimited acquisition of control sequences for a reliable assessment of the ablation process. Furthermore, due to a minimal MR artefact of the microwave antenna, retraction was not necessary for therapy monitoring. Consequently in cases where an adequate ablation zone was suspected, the ablation could be continued without need for repetition of the applicator.

Besides conventional sequences, MRI enables diffusion weighted imaging (DWI) with a high sensitivity for hepatic metastasis as an additional option for planning imaging. In one of our patients, intended for treatment of a single colorectal hepatic metastasis, a small, but new and consequently suspicious, second lesion was revealed in DWI. This lesion was barely visible in conventional sequences but could be treated in the same session using DWI for orientation.

We reached technical success after all procedures and technical effectiveness was achieved in all treated hepatic tumours one month after treatment. During the initial follow-up period, no patient developed local recurrence; however future studies are necessary to evaluate the long-term outcome. Moreover, MR thermometry might be helpful for therapy monitoring during MR-guided microwave ablation and should be subject to further investigations.

BY RUDGER HOFFMANN

MR-guided microwave ablation in hepatic tumours: initial results

The unenhanced T1w control imaging after ablation shows the ablation zone as a hypointense area. The assessment of the ablation zone is possible without retraction of the microwave antenna.

FLesh. A characteristic lesion was revealed in DWI. This lesion was small, but extremely difficult to assess due to its location in a densely heterogeneously contrast enhanced liver lobe. Therefore, we performed an additional MR-guided biopsy and histological examination.

Examples of examined qualitative CT parameters.

Scientific Session: Interventional Radiology

Friday, March 4, 10:30–12:00, Room D1

SS 1009 Liver ablation

Moderators: T. Albrecht; Berlin/DE
J. Garrett; Strasbourg/FR

» MR-guided microwave ablation in hepatic tumours: initial results in clinical routine

R. Hoffmann, H. Rempf, D. Kessler, J. Weisk, K. Nikolaus, S. Claesen, Tübingen/DE

myESR.org
CT’s seemingly unstoppable ‘wheel of innovation’ just keeps turning

There are plenty of things that are different about the CT technologies on show in the exhibition halls at ECR this year: novel clinical applications, next-generation scanners, and even a new name among the manufacturers displaying their wares. This all shows that the ‘wheel of innovation’ is still turning in a modality that has been driving improvements in diagnostic accuracy, patient safety, and cost-effective healthcare since the first commercial CT scanners were rolled out in the 1970s.

Given the huge costs of developing a new product for the radiology market, it is rare for a company to plant its feet on the territory of the big-name vendors, but that is exactly what Carestream has done for the second year running. Long established as a supplier of PACS and digital radiology equipment, the company announced its first ultra-wide door opening for easy, step-in systems that offer excellent high-resolution 3D visualization of bone and soft tissue, providing images that can help to reveal subtle or occult fractures and capture weight-bearing images, using systems that are both compact and affordable and deliver less radiation than traditional CT units. Its OnSight 3D Extremity System is being developed to provide 3D images at the point of care, with wide door opening for easy, step-in patient access and allowing the sort of weight-bearing studies that are not possible with traditional scanners.

According to a Carestream statement, "The system's small footprint and simplified design will cut the time and cost of system installation, compared to conventional CT systems, while site and install requirements will be low to enable a fast, affordable, convenient imaging process for timely diagnosis and commencement of treatment.”

Described as the first of its kind by manufacturer Philips, the IQon Spectral CT uses on-demand colour quantification to help radiologists to better interpret what they are seeing on the image. They will no longer have to choose in advance whether a scan should focus on anatomical structure or material content, because the new equipment allows the acquisition of in-depth spectral information on demand and retrospective analysis, delivered at the same low dose.

A key feature of the new technology is the NanoPanel Prism detector, which simultaneously delivers conventional anatomical information and colour quantification with the ability to characterise key structures, along with monoenergetic image information in one scan, the company explains. Users will have access to all the standard dose management features available in a conventional CT scanner mode, and to obtain the advantages of spectral imaging, the dose modulation tool does not have to be discarded.

Siemens was an early pioneer of dual-source CT, and at ECR 2016 it is unveiling the successor to the Somatom Definition Flash, launched in 2005. As yet unnamed when ECR Today went to press, the new scanner will be aimed at the general hospital market, but it will feature many of the advanced capabilities of the company’s premium dual-source machine, the Somatom Force.

While sharing the concerns of others in the CT market on the need to minimise patient exposure to ionising radiation, Siemens is equally focused on reducing any potential hazards associated with the use of contrast agents in patients with impaired kidney function, so the new scanner will offer the same dose management features available in a contrast agent-free patient’s examination, the company says.

There are plenty of things that are different about the CT technologies on show in the exhibition halls at ECR this year: novel clinical applications, next-generation scanners, and even a new name among the manufacturers displaying their wares. This all shows that the ‘wheel of innovation’ is still turning in a modality that has been driving improvements in diagnostic accuracy, patient safety, and cost-effective healthcare since the first commercial CT scanners were rolled out in the 1970s.

Given the huge costs of developing a new product for the radiology market, it is rare for a company to plant its feet on the territory of the big-name vendors, but that is exactly what Carestream has done for the second year running. Long established as a supplier of PACS and digital radiology equipment, the company announced its first ultra-wide door opening for easy, step-in systems that offer excellent high-resolution 3D visualization of bone and soft tissue, providing images that can help to reveal subtle or occult fractures and capture weight-bearing images, using systems that are both compact and affordable and deliver less radiation than traditional CT units. Its OnSight 3D Extremity System is being developed to provide 3D images at the point of care, with wide door opening for easy, step-in patient access and allowing the sort of weight-bearing studies that are not possible with traditional scanners.

According to a Carestream statement, "The system's small footprint and simplified design will cut the time and cost of system installation, compared to conventional CT systems, while site and install requirements will be low to enable a fast, affordable, convenient imaging process for timely diagnosis and commencement of treatment.”

Described as the first of its kind by manufacturer Philips, the IQon Spectral CT uses on-demand colour quantification to help radiologists to better interpret what they are seeing on the image. They will no longer have to choose in advance whether a scan should focus on anatomical structure or material content, because the new equipment allows the acquisition of in-depth spectral information on demand and retrospective analysis, delivered at the same low dose.

A key feature of the new technology is the NanoPanel Prism detector, which simultaneously delivers conventional anatomical information and colour quantification with the ability to characterise key structures, along with monoenergetic image information in one scan, the company explains. Users will have access to all the standard dose management features available in a conventional CT scanner mode, and to obtain the advantages of spectral imaging, the dose modulation tool does not have to be discarded.

Siemens was an early pioneer of dual-source CT, and at ECR 2016 it is unveiling the successor to the Somatom Definition Flash, launched in 2005. As yet unnamed when ECR Today went to press, the new scanner will be aimed at the general hospital market, but it will feature many of the advanced capabilities of the company’s premium dual-source machine, the Somatom Force.

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This means that the benefits of a function designed to safeguard infant health can be available, even for obese adults.

A second major feature of the Form scanner that is now available in its lower cost counterpart is the ability to carry out ultralow dose single-energy scans using that system's tin filter technology for spectral shaping. Used in conjunction with the company's iterative reconstruction software, the system has been shown to be highly sensitive for detecting pulmonary nodules. The company's academic partners have demonstrated that there is no loss of accuracy, even at doses as low as 0.06 mSv. "We believe that we can reduce the radiation dose to roughly the same level as that used in diagnostic x-rays. This opens up the possibility for using this technology in routine screening for lung, colon and breast cancer, without compromising its diagnostic power," said Peter Aulbach, head of clinical marketing for Siemens' CT business.

Toshiba staff is showing a model-based iterative reconstruction product that will be available on its Aquilion ONE family of CT systems. Known as FIRST (Forward projected Iterative Reconstruction Solution), the software should automatically lower the patient's radiation exposure by up to 80% in routine clinical use. It offers improved high-contrast spatial resolution, while making exams safer for patients by providing ultra-low dose examinations. Using dedicated hardware, the reconstruction of a complex volumetric data set takes only approximately three minutes, according to senior product manager Henk de Vries. "Advanced iterative reconstruction should not be a technological challenge, but an automated technology that fits seamlessly into daily clinical practice," he commented. "FIRST includes anatomy-based noise regularization and works in the raw data domain to improve spatial resolution; it is incredibly robust for data with extremely low photon counts and improves image quality. The automated process translates into an easy and fast application to significantly reduce radiation and improve image quality."

GE Healthcare has announced the arrival of a new addition to its Revolution CT scanner family. The new Revolution CT ES is a premium unit offering wide coverage for all patients, high speed rotation, and quick table travel to reduce acquisition time, and it has a new iterative reconstruction algorithm to help optimize dose and novel iterative reconstruction software. Overall, the system delivers a high image quality fast volumetric scanning and lower dose with optimized contrast use, the company says. The scanner has a large bore with a new spectral detector.

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Novel minimally invasive treatment for patients with metastatic gastrointestinal stromal tumours

A multidisciplinary consortium will develop and validate an innovative closed-loop molecular environment to effectively treat patients with metastatic gastrointestinal stromal tumours (GIST) that are resistant to 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 and integrated, closed-loop process to effectively treat patients with metastatic GIST resistant to current medication. The innovative treatment concept combines new strategies for biopsy, intra-operative tissue analysis, molecular tumour characterisation, and therapeutic effectiveness. In addition, synergistic concepts of minimally invasive treatment will be applied.

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

MITIGATE recently entered its third year, and the consortium is proud to already present notable achievements:

- An integrated endoscopic biopsy and tissue-dissociation system was developed. Mass spectrometry of biopsy revealed that cells which are responsive and non-responsive to drugs can be distinguished and differ from other types of cancer.
- The synthesis and in-vitro evaluation of precursor tracers targeting GIST are in progress. A reproducible procedure for radiolabelling peptides with high affinity for somatostatin and bombesin receptors using Gallium-68 was developed.
- GIST xenograft animal models, which enable the preclinical evaluation of potential new radiotracers, were successfully established.
- MRI protocols for tumour microenvironment characterisation have been set up and validated in vivo in different GIST animal models. A dedicated and optimized protocol for sequential acquisition of MRI and PET images has been validated, 23Na/1H dual-tuned coils were developed and optimized.
- Abdomen array developed by Rapid Biomedical GmbH for optimised 23Na/1H imaging of the abdomen at a field strength of 3T.
- A concept study design for minimally-invasive treatment for patients with metastatic GIST was set up, and an robotic assistance system is being developed.
- A clinical trial in patients with drug-resistant GIST is set to start in summer 2016. The trial will provide data on GIST tumour visualisation and characterization as well as dosimetry of novel radiopharmaceuticals.

In the upcoming years, 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 personalized, combined multimodal treatment approach in patients with advanced disease.

Participate in our End-User Survey and help us to bring MITIGATE’s innovative results to the European patient.

In order to gain a better understanding of how the community might want to exploit innovative results, we have created a set of short and user-friendly surveys tailored to end user interests and fields of research. The survey can be accessed via our website (www.mitigate-project.eu) or at the EIBIR booth in the entrance hall.

MITIGATE SESSION AT ECR: WHAT DOES IT TAKE TO PERFORM CLINICAL TRIALS IN INTERVENTIONAL RADIOLOGY?

The session aims at presenting an overview of the clinical trials in interventional oncology in Europe. A member of the Scientific Programme Committee of the Cardiovascular and Interventional Radiological Society of Europe (CIRSE) will present the overall situation and challenges ahead.

Two successful case examples of respective investigator-initiated and industry-sponsored trials will be introduced. Finally, the concept of a clinical trial in oligometastatic GIST will be introduced. The trial will start in mid-2016, will be presented by a partner from the MITIGATE consortium. MITIGATE is an FP7-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/

Joint Session
Friday, March 4, 14:00–15:30, Room L8
ECR Session 2 (European Institute for Biomedical Imaging Research)

MITIGATE: What does it take to perform clinical trials in interventional radiology?

- Introduction
  S.O. Schöberg; Mannheim/DE
  W.R Jaschke; Innsbruck/AT
- Overview on clinical trials in interventional radiology in Europe
  A. Gangi; Straßburg/FR
- How to implement investigator-initiated or industry-sponsored trials in interventional oncology: SORAMIC vs SIRELIX
  J. Ricke; Magdeburg/DE
- Design of a clinical trial in oligometastatic GIST: results from the MITIGATE consortium
  C. Decribo, Innsbruck/AT
- Discussion

ECR Professional Development Programmes 2016

Visitng Scholarship Programmes (Europe)
- Residents in training years 3–5
  - three months

Visitng Scholarship Programmes (USA)
- Residents in training years 3–5
  - three months
  - MSKCC, New York
  - Case Western Reserve University, Cleveland

Exchange Programmes for Fellowships (Europe)
- Board-certified radiologists within their first three years of practice
  - three months

Education in partnership

One-year Fellowships (Europe)
- Board-certified radiologists within their first three years of practice
  - 12 months

Exchange Programmes for Fellowships (USA)
- Board-certified radiologists (three to six years professional experience)
  - at least a one-year involvement in breast imaging
  - six months
  - MSKCC, New York

For further information on the detailed programmes and applications, please visit myESR.org

by Pamela Zolda
Enhanced Diagnosis of Breast Cancer project for enhanced breast cancer diagnosis

Breast cancer is the most common type of cancer in women. Despite the advances of modern genomic or proteomic medicine, and in spite of the huge advances that have been made with regards to contemporary targeted therapies of breast cancer, breast cancer stage at the time of diagnosis is still the most important driver of patient survival. Since breast cancer continuously be one of the most important causes of cancer death in women, there is an obvious and persisting need for improved early diagnostic and intervention methods. At the same time, increasing concerns with regards to overdiagnosis and over-treatment of asymptomatic or minimally important (pseudodisease) explain the ever-increasing demand for improved methods for treatment stratification of women diagnosed with breast cancer.

The EU-funded project Digi- tal Hybrid Breast PET/MRI (HYPMED), with the European Institute for Biomedical Imaging Research (EIBIR) serving as project coordinator and University Hospital Aachen (UKA) as scientific coordinator, aims to develop a fully digital, fully MRI-transparent PET detector, which will be integrated into a novel multi-channel, fully PET-transparent MRI surface coil. This PET-RF insert will, for the first time in medical history, enable synchronous high-resolution PET and high-resolution functional MRI imaging of breast cancer, including also minimally invasive MR and PET-guided targeted biopsy.

This unprecedented combination of MRI and PET has the potential to greatly improve the detection and characterisation of breast cancer and its precursors. "The HYPMED project combines visionary clinical expertise with excellence in physical and engineering sciences, and it is thus a perfect fit for the research environment offered by the UKA," said project leader Prof. Christine Kuhl, chairman of the department of radiology at RWTH Aachen University. Together with Prof. Volkermar Schulz, head of the department of physics in molecular imaging (PfMI) at the Institute of Experimental Molecular Imaging and member of the department of physics, and eight further European partners, and EIBIR, will work to make the HYPMED project a success. "The HYPMED approach means that it will be possible to transform any regular clinical MR scanner into a high-resolution MR/PET hybrid system – just by plugging in a surface coil," explains Prof. Schulz. "Moreover, due to the focused PET approach, plus the unprecedented PET sensitivity, we will be able to allow PET/MR hybrid imaging at the dose of a regular digital mammogram," adds Prof. Kuhl. The aim is to use this technology to identify even the smallest breast cancer foci, and to better characterise cancer as well as its response to therapy. "The HYPMED technology will greatly help us to choose an appropriate treatment that is exactly right for a given cancer in a given woman," explains Prof. Kuhl. "Such advanced imaging strategies will thus address some of the most important and pressing clinical challenges.

The HYPMED approach is likely to be transferable to other clinical applications, such as prostate cancer detection and hybrid cardiac imaging. "We believe that this will introduce a paradigm shift in the field of PET/MR hybrid imaging with many new applications in other diseases. With the success of the HYPMED project, we will open up a whole new chapter of medical hybrid imaging," said Prof. Schulz.

The European Commissioners evaluators gave the HYPMED proposal the highest score possible, which is all the more impressive considering the highly competitive nature of the Commission’s current Horizon 2020 funding programme. The proposal preparation and submission was supported and coordinated by EIBIR, who worked closely with the nine other partners from academia and industry in the HYPMED consortium. EIBIR’s support ensured seamless communication between the various partners based all over Europe and offered crucial advice and feedback on the proposal.

The project officially began on January 2016 and EIBIR is responsible for project management, dissemination and exploitation of the project’s results. This is particularly beneficial given the nature of the HYPMED consortium, a mix of universities, research institutes, small and medium sized enterprises and a major corporate partner, and EIBIR’s past experience leading multi-partner European research projects.

For those interested in the project and who want to gain some insight into how such a successful research proposal was made, the EIBIR Session at ECR 2016 Gateway to European funding for research projects will feature a talk from Prof. Kuhl about the preparation of the HYPMED proposal and the secrets behind its success.

Joint Session
Friday, March 4, 16:00–17:30, Room L8
EIBIR Session 3 (European Institute for Biomedical Imaging Research)
Gateway to European funding for research projects
• Introduction
  G.P. Krestin; Rotterdam/NL
• Maximising your chances to obtain European research funding: opportunities, strategies, services
  P. Zolda; Vienna/AT
• An evaluator’s perspective
  M. Dewey; Berlin/DE
• Success story of a maximum score project in Horizon 2020
  C.K. Kuhl; Aachen/DE
• Questions and answers

Joint Session
Friday, March 4, 12:15–13:45, Room D2
MRI @ ECR Session (Management in Radiology)
MRI in Communication in radiology
Moderators: B. Hamon; Berlin/DE
S. Mornator; Moscow/RUS

Friday, March 4, 14:00–15:30, Room D2
MRI @ ECR Session (Management in Radiology)
MRI and improving quality and safety in radiology
Moderators: R.S. Adams; London/UK
D.A. Koff; Hamilton, ON/CA

Friday, March 4, 16:00–17:30, Room D2
MRI @ ECR Session (Management in Radiology)
MRI in improving quality and safety in radiology
Moderators: J.K. Bell; Manchester/UK
P. Mühlenberger; Mainz/DE
The ESR and HERCA (Heads of the European Radiological Protection Competent Authorities) have organised the joint session ‘EuroSafe Imaging Session 3’ on the new EU-BSS Directive—a step forward in patient safety. ECR Today interviewed HERCA representatives Dr. Jürgen Griebel of the German Bundesamt für Strahlenenschutz and Steve Ebdon-Jackson of Public Health England on this major piece of legislation.

ECR Today: From the regulators’ perspective, what are the most important changes in the new Basic Safety Standards (BSS) Directive compared to the previous Euratom perspective?

ECRT: What have been the main challenges in transposing the BSS Directive into national laws so far, and what challenges do you foresee for the remainder of the transposition period until February 2018?

ECRT: Do you think that tools such as clinical audit and clinical decision support will affect (positively or negatively) the performance of imaging departments with regard to BSS requirements, particularly regarding justification of exposures?

ECRT: Justification being perhaps the single most important aspect for radiologists in the Directive, can you provide some parameters for what regulators would regard as a ‘best practice’ implementation of BSS requirements in an imaging department?

ECRT: Do you think that tools such as clinical audit and clinical decision support will affect (positively or negatively) the performance of imaging departments with regard to BSS requirements, particularly regarding justification of exposures?

ECRT: What can delegates expect from today’s joint HERCA-ESR session on the BSS Directive?

ECRT: Today’s session offers the opportunity for delegates to get a better understanding of the viewpoint of regulators and practitioners and to see how both parties are committed, through different methods, to improving patient safety in imaging departments.

The European Society of Abdominal and Gastrointestinal Radiology (ESGAR) is a leading educational and scientific society composed of a highly diverse group of members, which grew by more than 12% in 2015.

For more than 20 years, ESGAR has been promoting abdominal imag- ing education and research for the benefit of patient care. The ESGAR Annual Meeting is a well-recognised and well-attended forum that meets the educational and scientific needs of all abdominal radiology professionals and the young and younger members to present their research. The ESGAR workshop list, which includes technically oriented, organ-oriented and multidisciplinary sessions, is always enriched with the presence of radiologists in foreign hospitals and the continuous changes in imag- ing capabilities present challenges for our Society in identifying opportu- nities for change in the forthcoming years.

As for other imaging subspecial- ities, the way we study and apply abdominal and gastrointestinal imaging is continuously changing. Today, we are looking at new areas focusing the diagnostic and interventional imaging strategy on only anatomy and morphology, but also on functional and molecular imaging.

Since the beginning of the century, we have witnessed the progressive develop- ment of new ways of studying biolog- ical tissue with a larger spectrum of imaging modalities from which we can extract an enormous diversity of measurable parameters.

Along with the tremendous developments in digital technology and computer science, functional and molecular imaging techniques have advanced, resulting in a higher understanding of biological processes and of how responses to therapy transform the diagnostic, treat- ment and follow-up pathways. It has also created a new paradigm which is empowering radiologists to take part as doctors and partners in clinical decision-making and add value to patient care and outcomes.

Yet the adoption of functional and molecular imaging by the medi- cal community will be a lengthy process that will require a tremen- dous effort by the whole imaging community to find an agreement on how to measure, to standardize and to improve the measurement analysis and display before clinical validation.

Much like many other professional societies, one of ESGAR’s main concerns is to create the space for the expansion of knowledge and its dissemination abroad. The aim is to accumulate what has been shown to subspe- cialisation in training and practice. Along with clinical involvement, it is crucial in order to improve the global quality of medical imaging.

And to improve the visibility of the abdominal radiologist, ESGAR has approved the creation of subspecialty training programmes that allow its members to master technological advancements and incorporate clinical and biological knowledge into their daily prac- tice.

ESGAR members are therefore prepared to become active players in defining the appropriate quali- fication steps needed for full clinical adoption and validation of these new imaging techniques and technology and physiology.

Looking forward within such an environment means ESGAR should provide tools on how to use new imaging tests appropriately, accurately and safely. ESGAR must devote more resources to enhanc- ing the evidence-based practice skills of abdominal radiologists and to supporting abdominal radiology research for the ESGAR created a guideline steering group to produce and disseminate guidelines and consensus recommendations via European Radiology and national radiological societies.

As part of the ESGAR effort to promote research among the younger generation, and as an investment in the future success of our field, a learning centre has been launched in Lisbon. Small groups of talented young ESGAR members will have the opportunity to invest in research and understand how to translate it into patient care. ESGAR should also improve links with partners from the industry since their contributions to radi- ological research and development cannot be ignored.

Although the future is somewhat uncertain in this era of economic crisis, all of this should be a cause of great optimism for the ESGAR community in the years to come.

ESGAR Annual Meeting in Prague

The ESGAR Annual Meeting has become the largest and most pres- tigious gastrointestinal radiology meeting in Europe and attracts more than 1500 radiologists, physicians, researchers, academics from around the world. The 2nd ESGAR Annual Meeting and Postgraduate Course will take place from June 14–17, 2016 in Prague, Czech Republic.

Radiologists and radiographers share unbreakable connection in Macedonia

The Macedonian Society of Radi- ology brings together all the radiologists working in the Republic of Macedonia. It has around 40 members, but that number is constantly changing and increasing.

The current management team of the society, under the leadership of the president, Prof. Nada J. Mitreska, is focusing on various points of interest, but the most important is improving the management of radiological approaches in diagnostic and interventional treatments.

The society is also cooperating with the Ministry of Health in the area of training of specialists. Namely, the society is giving suggestions about training of radiologists in foreign hospitals as part of their professional develop- ment.

The education and training for radiologists in Macedonia are held in September 22–25, with international participation, with guests from Europe and the Balkans.
Dutch society creates future-proof radiologists

EDUCATION

The most important milestone in 2011 for the Radiological Society of the Netherlands was the start of a new integrated residency programme for radiology and nuclear medicine. This new residency programme will result in a medical imaging specialist who is familiar with general radiological and nuclear medicine skills. The integrated residency programme consists of a common trunk of 2–5 years covering general radiology and a differentiation phase of 2 years during which residents choose one or two specialities. The general and differentiated residency programme is based on eight themes:

1. Cardiothoracic radiology (6 months)
2. Abdominal radiology (8 months)
3. Interventional radiology (6 months)
4. Nuclear medicine and molecular radiology (6 months)
5. Neuro and head & neck radiology (9 months)
6. Musculoskeletal radiology (24 months)
7. Breast radiology (8 months)
8. Paediatric radiology (8 months)

Besides the specific differentiation for nuclear medicine and molecular radiology, nuclear medicine is also included in three differentiations:

1. Cardiothoracic radiology
2. Breast radiology
3. Musculoskeletal radiology

A differentiation with a length of 6 or 12 months may be combined up to a maximum of 18 months. At least one year of the differentiation phase is spent on general radiology with an emphasis on emergency radiology, frequent procedures and radiology for primary care.

In conjunction with the new radiology residency programme, radiologists and nuclear medicine physicists have the opportunity to gain experience in nuclear medicine or radiology in the form of subspecialty certificates. For example, a radiologist can follow dedicated education and clinical training to gain experience with PET in conjunction with CT for tumour staging, whereas a nuclear medicine physician can be trained and certified in CT reading in conjunction with PET. In 2016, the first subspecialty certificate training programmes will start, and many participants are registered for this so-called cross-over training programme.

Based on the integration of the residency programme for radiology and nuclear medicine along with the possibility for cross-over training between radiologists and nuclear medicine physicians, a consensus was reached to use radiology as the name for the new integrated imaging specialty.

CLINICAL PRACTICE

Since the introduction of advanced imaging techniques, such as CT and MRI, the clinical workload has increased exponentially. Reading and reporting of large datasets takes more time. Patients and society demand high-quality radiological diagnostics. Multidisciplinary discussion of medical imaging results is an important added value for radiologists as imaging consultants, but potentially disrupts the balance between time spent on reporting and communicating medical imaging results.

Therefore to cope with the continuous increase in workload and maintain the existing high level of radiological practice, more radiologists and nuclear medicine physicians are needed. On the other hand, the increase in costs for medical care in general has been caused to guarantee the sustainability of healthcare. As a consequence, the ‘volume-versus-value’ ratio is under pressure. In that light, it is hard for young radiologists to find suitable employment.

As radiological societies, we have to develop a future-proof vision to solve the above-mentioned challenges. One potential solution is innovation in the healthcare system by increasing the incorporation and efficiency of ICT solutions, and emphasizing the value of supportive personnel, such as imaging analysts, radiological technicians, physician assistants, etc. Support personnel can help radiologists save time preparing image reconstructions and image analysis, e.g. RECIST measurements and other quantitative radiological evaluation techniques. We also need an open-minded approach to other medical subspecialties to co-rehabilise our common challenges. An example is a recently published quality document concerning cardiac imaging using CT and MRI, written in consensus by the cardiovascular section of the Radiological Society of the Netherlands and the Dutch Society for Cardiology. In addition, in the Netherlands several experiments have been initiated to strengthen the relationship between radiologists and primary care physicians. Patients are being referred directly to radiology for diagnosis and imaging results are communicated to the requesting general physician, thereby preventing more expensive secondary and tertiary care.

SCIENCE AND RESEARCH

In a rapidly changing landscape with medical imaging for the radiological society worldwide, including the Netherlands, innovation and scientific research form the core of radiological value for medicine and society. Other medical subspecialties are knocking on our doors to be trained in the application of existing radiological techniques, whether we like it or not. Technical and clinical innovation demands more dedication and clinical knowledge and the application of existing imaging techniques. Therefore, one of the main added values of radiology is its continued focus on and expansion of innovation and scientific research. Based on general economic challenges, research budgets are under heavy pressure in the Netherlands. Therefore, help from national radiological societies is now maturing to become clinical reality. The integration of radiological and nuclear medicine techniques in hybrid imaging approaches is of particular importance. For example, it is currently considered good clinical practice to include both CT and PET for lung cancer staging, forming the basis for selecting potentially the most effective chemotherapy and for follow-up of therapy effect.

In scientific research, major efforts are undertaken to boost personalised medicine. For example, biomarkers from mamma carcinoma are amplified in living animal models to yield tumour-specific proteins that can be labelled by nuclear medicine and other tracers for detection of multifocal disease, sentinel nodes and distant metastases. Furthermore, these specific tracers can be coupled to therapeutic agents that are delivered to tumour cells only and used for therapy monitoring. Radiologists should be aware of and involved in this new branch of medical imaging, since it will further increase workload and involve other medical and non-medical specialties.

In summary, the future of radiology is bright!
ESHNR stays ahead of advances with state-of-the-art teaching and training

Over the past decade there has been growing interest in head and neck imaging. This is partially due to advances in modern imaging (functional imaging techniques, hybrid imaging, MRI imaging of previously difficult areas), but it is also greatly influenced by evolving surgical techniques and the growing popularity of non-surgical treatment options. Therefore, head and neck radiology is in constant change. The demand for improved health care is greater than ever, and diagnostic capabilities have greatly improved.

Subspecialty radiology, including the subspecialty of head and neck imaging, is slowly becoming an obvious necessity in busy academic hospitals as well as other settings. The specialized knowledge required for the interpretation of head and neck diseases is now unquestioned. Furthermore, research, either basic or clinical, is essential for the advancement of this specialty.

Since it was founded in 1987, the European Society of Head and Neck Radiology (ESHNR) has been highly successful in accomplishing its mission of teaching the state-of-the-art practice of head and neck radiology. At the end of 2015, the ESHNR had 332 active members from 33 countries. Its main goal – along with other societies – is to support and stimulate the exchange of knowledge in all aspects of head and neck imaging and diseases; and to promote the highest standards of research, education and training.

With that in mind, the ESHNR has introduced institutional membership. Since 2015, the head and neck section of the Radiology Society of the Netherlands (NVvR) and the British Society of Head and Neck Imaging (BHSNI) joined ESHNR as institutional members. The working group for head and neck imaging of the German Radiological Society (DRG) joined in January 2016.

The ESHNR, besides organizing conferences, courses and scholarships, is evolving to become a truly multidisciplinary body bringing together clinicians (head and neck surgeons, radiation therapists and medical oncologists), pathologists, other health professionals, basic scientists and patient organizations involved in any aspect of head and neck imaging and treatment.

The ESHNR also seeks close collaboration with allied radiological societies – both European and American – such as the Society of Neuroradiology, Society of Head and Neck Cancer and European Society for Radiotherapy and Oncology (ESTRO) to name a few. During its little less than three decades of existence, the ESHNR has enjoyed a friendly and collegial relationship with a number of these professional medical societies (national and international), hosting joint annual meetings, symposia, lectures and holding courses together. We believe such relationships are mutually beneficial to our various member constituencies and will continue to pursue such a policy in the future.

In 2015, the Annual Meeting was held in Poland for the first time, in the historical city of Krakow, and it proved to be just as successful as past meetings. The 2016 meeting will be dedicated to head and neck oncology and multidisciplinary treatment of cancer and will be held in Leiden/NL. A substantial part of the meeting will also be dedicated to discussing the properties of tumours in functional imaging.

The whole meeting will consist of keynote lectures, hands-on workshops, special focus sessions, Make Your Own Diagnosis interactive sessions, scientific papers and posters. Prizes for the most outstanding oral and poster presentations will be, as usual, offered by the ESHNR.

There will also be a chance to take the European Board in Head and Neck Radiology Diploma examinations.

If you are a member of the ESHNR, please join us during our sessions and courses. If you are not a member, please stop by our booth to learn more about our warm, friendly and dynamic society.

More information about the ESHNR can be found at www.eshnr.eu
New examination module for the European Diploma in Radiology

On Wednesday and Thursday, examinations for the European Diploma in Radiology (EDiR) took place at the ECR for the sixth year in a row. Before the congress, ECR Today spoke to Prof. José Vilar from Valencia, Spain, who is the EDiR Scientific Director and has been involved with the European Board of Radiology (EBR), the organiser of EDiR, since 2013.

ECR Today: Since you have been a part of the working groups that were in charge of creating the examination, how would you define the quality of the EDiR?

Prof. José Vilar: I have been involved with the EBR since 2013. Initially, I was asked to participate as an examiner and later on as the coordinator of the quality control, facilitates the scoring procedures.

ECRT: How did you become an examiner for the EDiR and what was your experience like?

JV: I had previous experience examining radiologists for the American Board of Radiology and in 2013 for the previous European Board of Radiology which unfortunately only lasted for three years.

I was asked to participate as an oral examiner for the EDiR in 2013. The fact that I was examining along with other senior radiologists helped me a lot. This experience was interesting because I felt that on one side I was helping a candidate and on the other I was assuming an important responsibility.

ECRT: Could you briefly explain how the content of the examination is actually put together and who is involved in the process?

JV: Under the auspices of the European Board of Radiology, EDiR has a scientific committee responsible for the implementation of the examination. The Scientific Committee has three main branches: the Written Examination Committee, headed by Prof. Pia Sundgren; the Oral Examination Committee, consisting of multiple response questions and short cases with questions that were published online that could be accessed by the candidates online and eventually have online examinations. We also believe that this new format improves the process of quality control, facilitates the scoring and allows a closer analysis of the questions and answers.

ECRT: In your opinion, does the EDiR improve the holders’ career prospects? Do you think it can be a decisive factor for employers?

JV: A survey conducted after the first EDiR examination revealed a very positive opinion of the candidates. Over 95% said they thought that their decision to take the examination was positive and they would recommend it to colleagues. In 90% of the cases the EDiR holders indicated that the diploma had positively influenced their work position. In those countries where EDiR has been accepted as an alternative or a substitute to their national examination, the role of EDiR is obviously clear. In other countries, leading medical centres are suggesting to their last year residents that they take EDiR, and we are happy to hear the value that the heads of these centres are recognising in EDiR.

ECRT: How do you think the EDiR meets the current and future challenges of radiology?

JV: The EDiR is a very mobile world. The classical structure of medicine has given way to a new society where interchange of professionals is common, especially among the young ones who move without limits. EDiR is prepared for that world where international certifications will be more and more in demand. It is for these reasons that, particularly in Europe, EDiR can help in the harmonisation of radiology and we aim to have EDiR recognised as a certificate throughout Europe.

ECRT: As the Scientific Director of the EDiR, what do you enjoy about this task? How has being involved affected you personally?

JV: Enjoy is probably not the word I would use to define how I feel working for EDiR. I feel excited about the experience, I know there is a lot to do to keep going, but being part of a great team makes me feel comfortable. The EDiR office in Barcelona is a great group of young professionals that works very hard every day and demonstrates imagination and intelligence. The EDiR Scientific Committee, composed of excellent radiologists who believe in the project and the EBR Board who are the creators and supporters of the project, guarantee the success of EDiR. Therefore I am honoured to be a part of this project and consider it as one of the most rewarding moments of my professional life.
The ESR Patient Advisory Group (ESR-PAG) is holding two sessions dedicated to patient safety issues during this year’s ECR. The group was launched at the European Congress of Radiology (ECR) in 2013 and consists of representatives of pan-European patient organisations, the radiology community, and people involved in medical education. The ESR-PAG has therefore developed a driver diagram on patient-centred care in close collaboration with the ESR Audit & Standards Subcommittee. The driver diagram is based on best practices and improvement examples of both practices and improve quality of care, and was launched during a session at ECR 2014 in Vienna.

Tomorrow, on Saturday, the follow-up session on the implementation of the driver diagram ‘Patient-centred care in clinical radiology: do we really put our patients first?’ will take place. Providing both the patients’ and radiologist’s perspective, this session aims at exploring concrete examples of best practices in implementing patient-centred care in the radiology department and how these might be replicated.

The session will be chaired by ESR-PAG chair, Nicola Bedington, and Dr. Peter Cavanagh, chair of the ESR Audit & Standards Subcommittee, and it will culminate in an exchange of views based on the following key questions: Does your department perform well in patient-centred care? Is it really all about the patient?

The second session held by ESR-PAG this year is entitled ‘The context of a political dossier, as the collaboration on European political topics of common interest are among the key objectives of ESR-PAG, and the ESR-led Alliance for MRI campaign has shown how vital collaboration with patient groups on political dossiers can be. The group thus decided to organise the session “Mind the gap – data-sharing for better patient outcomes – the key issues for patients and the radiology community”.

The background to the session’s topic is the European Commission’s next proposal to revise the existing data protection legislation aiming at a harmonisation of the standards for data access and processing, published in 2012.

Following Edward Snowden’s disclosures on US and British mass surveillance of digital communications in 2013, the European Parliament revised the proposal adding several amendments in order to increase the protection of personal data.

These amendments have led not only to a heated debate on the EU member state level, in particular with regard to sovereignty issues, but they have also caught the attention of several stakeholders. These include representative of the health sector as the measures proposed by the Parliament would have posed a serious threat to the use of health data for research purposes.

Numerous health alliances, involving medical professionals, researchers, patient advocates and industry representatives, called on the EU institutions for a more balanced approach between promoting both privacy and research in order to ensure continued access to health data for research purposes.

After prolonged discussions, the revised General Data Protection Regulation was formally adopted by the European Parliament and Council of Ministers earlier this year, including a more balanced approach and an easing of restrictions on the use of health data for research purposes.

The session was launched at the European Congress of Radiology (ECR) in 2013, the European Patient Advisory Group to address challenges at European political level during ECR 2016.

The ESR-PAG represents a unique collaboration between medical professionals and patient groups, with the ESR being the first medical specialty to collaborate with patient representatives from various disease-specific fields and actively involve patient representatives during its annual congress.

Further information on the composition as well as the objectives and activities of the group can be found in the sessions section of the ESR website (www.myESR.org).

Joint Sessions
Saturday, March 5, 09:30–10:00, Room L8
ESR Patient Advisory Group
ESR-PAG 1 Patient-centred care in clinical radiology: do we really put our patients first?

Saturday, March 5, 10:30–12:00, Room L8
ESR Patient Advisory Group
ESR-PAG 2 Mind the gap – data-sharing for better patient outcomes – the key issues for patients and the radiology community.

In 2016, Insights into Imaging (I³) was founded to provide a platform for educational material, guidelines and recommendations, topics of controversy, as well as statements on the basis of article citations in other scientific publications, and is thought to reflect the scientific impact of a journal.”

The journal is currently under evaluation, and will hopefully receive an Impact Factor by 2017. As calculated by the journals publisher, Springer, the Theoretical Impact Factor for 2015 was around 1.5, virtually ranking Insights into Imaging in the upper two thirds of the ISI category “Radiology”.

Prof. Hermans is confident. “Hopefully, once the evaluation is complete, an even higher initial Impact Factor might be possible.”

Looking back on 5 years of Insights into Imaging

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Early detection breast cancer screening in Kazakhstan

Breast cancer is the most common oncological disease and the fourth leading cause of death among women in Kazakhstan. There are more than 25,000 women registered with a diagnosis of breast cancer in Kazakhstan, while breast carcinoma is diagnosed in more than 3,500 women annually.

The National Screening Programme for women of 50–60 years of age has operated since 2008 in order to improve the breast care service in Kazakhstan. Within the frames of the project breast care in the country has been re-equipment. In 2018, 4 analogue mammography units were purchased thanks to the support of the state programme. This represented great progress in the healthcare sector of Kazakhstan, because we had not been provided with such equipment and specialists before. Nowadays, all the analogue mammography units have been digitised, and currently new digital mammography units or digitised machines are being purchased, which leads to the reduction of radiation induced risks for women and enables radiologists to diagnose better.

For full functionality of the national programme, new organisational methods of awareness training are being used actively, which includes telematic, seminars, master classes, conferences, women’s health schools, primary self-screening training, etc. At the same time, the modern technological solutions for early cancer diagnostics, non-radiology training, and local screening for adolescents and women younger than 50 years of age, and rapid organ-saving treatment. The important point is training the highly qualified radiologist-mammographers.

New possibilities in digital technologies, the automation of patient screening steps and the creation of databases, which contain all data of the department, which are integrated with all other departments of the health institution, will ensure an even higher level of organisation in breast care, significantly enhancing the medical service for Kazakhstan citizens.

by RAUSHAN RAKHIMZHANOVA

Faculty of Radiologists in Ireland launches quality and safety initiative

The Faculty of Radiologists, Royal College of Surgeons in Ireland is the body responsible for the provision of postgraduate training in diagnostic radiology and radiation oncology in Ireland. Both programmes are spread over five years of training. After satisfactory completion of five years of training, having passed the fellowship exam, candidates are eligible for inclusion on the specialist registrar of the Medical Council of Ireland. Most of our trainees pursue further training abroad, after completion of training in Ireland, principally in the United States, Canada and the UK, but increasingly in other European countries and Australia.

There are approximately 300 Consultant Radiologists in practice in the Republic of Ireland. The population to doctors ratio to the population is low in comparison to most EU countries, and the numbers of studies performed by individual consultants is high by international standards. Understandably, this places great pressure on practising radiologists and radiation therapists. But despite this, the research output of our trainees and consultants is consistently very high.

The specialties of radiation therapy and diagnostic radiology are strong and well respected in Ireland. We aspire to continue our leadership role in the development and deployment of programmes designed to help radiological professionals deliver safe, high-quality care.

We place a high priority on making tools and resources available that enable our members to provide the highest quality services to their patients. Our specialties attract among the brightest graduates every year, and competition for places among our training schemes is very intense. We work closely with employing and regulatory authorities to keep our standards high, and we look forward to a strong future with our fellows and trainees remaining at the centre of high-quality medical care delivery.

QUALITY INITIATIVES AND THE NATIONAL QUALITY IMPROVEMENT (QI) PROGRAMME

For decades, the faculty of radiologists has devoted time and resources to quality initiatives. Most recently our activities have focused on how the Faculty can provide resources, such as workflow integrated solutions, for our members to provide value to their patients, referring clinicians and health systems through-out the imaging value chain.

The Radiology QI Programme (combined for diagnostic and interventional radiology) is a national clinicians-led programme launched by the Faculty of Radiologists in 2009 to promote patient safety and to enhance the quality of patient care with accurate, timely and complete radiology diagnoses and reports.

The QI programme provides guidelines for practical and implementable QI measures, which, in conjunction with existing local quality systems, enables each hospital to measure and evaluate its own performance in an effort to improve patient safety.

Four key quality activities are:
- Peer review
- Multidisciplinary meetings
- Quality improvement meetings
- Critical alerts
- Focused audit
- Report completeness

Like many diagnostic services, radiology involves decision-making under conditions of uncertainty and a certain degree of error is inevitable. The programme, supported by a national information system, will capture information on quality activities, such as peer review and the communication of radiology alerts, and will evaluate quality statistics against national targets to measure the public that error is kept to an absolute minimum.

The Programme is recognised as a key initiative in enhancing patient safety and has received widespread support from organisations within the healthcare sector that are driving the agenda of improved patient care.
Benefits of the QI Programme include:
- Improved patient care and increased public confidence in diagnostic and interventional radiology services,
- Standardised QI systems
- Data available to individual departments to review their own performance against national targets, called quality marks
- Identification of good practice and areas of improvement
- Improvement in communication within and between institutions

**WHAT’S NEW IN VERSION 3 QI GUIDELINES?**

In our recent revision of the National Quality Improvement Programme, quality continues to be the core value. The third revision of the QI guidelines includes dispensing with the RadPeer scoring system, and moving to a category-based system, which has been shown to have greater educational value.

In the same vein, discrepancy meetings have been renamed Radiology Quality Improvement meetings, to allow for a greater spread of referrals to the assertion, e.g. on the basis of teaching, complementary referrals, and expertise sharing within groups. This name change is primarily to focus attention on the learning potential in the meeting with a view to constantly improving the quality and safety of our work.

In order to implement a National Quality Improvement Programme in radiology an IT solution was required. Following the successful tender and purchase of a national technical solution (PeerVue) to support quality improvement data collection, roll-out occurred rapidly. The PeerVue tool provides a simple web-based solution that allows peer reviews to be performed during the routine interpretation of current imaging.

With the evolution of better tools, radiology practices have the capability to conduct peer review and learning as part of their normal practice without having to allocate dedicated time. The tool can optimise case selection and streamline workflow to better integrate peer learning.

The PeerVue software permits the replacement of the previous cumbersome paper-based systems and facilitates these processes to occur seamlessly, without the need for dedicated time. In doing so, it allows for a greater spread of reporting, as part of the quality and safety in radiology.

The Radiology Quality Improvement Programme has completed roll-out of the information system to as of 50 hospitals using a single, national ICT system provided by McKesson. The programme will be implemented in all 50 radiology departments, making it the first national QI programme. It includes a workflow rules engine that has already been extended by radiology departments to increase the efficiency of hot reporting and to improve other processes.

The resultant data will ultimately be uploaded to a national primary assurance database (National Quality Assurance Information System – NOAMS – currently in development by Open Apps in conjunction with the QI working group of the Faculty), which will in turn feed back to departments as to how they are performing relative to the national median. It appears self-evident that any deficiencies identified will provide evidence to support the correction of departmental resource deficiencies and the promotion of patient safety.

The Radiology Quality Improvement Programme has won the Award for Best Improvement in Patient Safety at the recent Irish Medical and Surgical Trade Association (IMSTA) MedTech Awards. Earlier this year, the Radiology Quality Improvement Programme was also short-listed for the Public Sector Project of the Year at the Tech Excellence Awards.

Eventually, benchmarking and reporting as part of the quality management framework initiatives, will identify all aspects of radiological care that are most meaningful for monitoring performance.

**CONCLUSION**

The Faculty of Radiologists has a long-standing commitment to quality and safety in radiology. The Faculty QI programme is just one step designed for advancing safe and effective radiological care for the foreseeable future.

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**New equipment and increased use of teleradiology in Hungary**

Even though there has been rapid installation of the latest CT and MRI technology, funded by the European Union, there remains a lack of well-trained radiologists and radiographers. Hungary is still below the OECD average in equipment, and has introduced more extensive use of teleradiology. These are the main factors that will influence the future of radiology in Hungary.

Golden letters will outline the year of 2015 within the history of Hungarian radiology. More than 50 CT and MRI machines, along with more than 500 digital x-ray machines were installed, partly replacing old equipment. New sites were also opened, due to government decisions and EU funding. Furthermore, several new CT and MRI installations were opened in government-funded clinics and private imaging sites, which bring Hungarian standards closer to the OECD average. As a result, the average number of CT units has increased from 7.3 per million inhabitants to 9.8 per million. The average number of MRI units has also increased from 3 per million inhabitants to 5.5 per million.

Although these numbers are far below the OECD average, the scope of technological development is still promising.

Technological development is an important issue to address. For instance, are there enough radiologists in the increasing numbers? Well, maybe not yet, nevertheless the number of radiology residents given training has increased. In the past three years about 70 young radiologists completed their specialisation and it seems that there is an increasing interest in diagnostic imaging among medical students. The four chairs of radiology from Hungary’s medical schools have joined forces in order to establish a national test bank for radiological specialisation and to also create a national teaching file that can be used in undergraduate, as well as in postgraduate education. Another important goal is to increase the duration of diagnostic imaging studies for medical students, which could be done in cooperation with the Hungarian Nuclear Medicine Society.

Although the relative number of radiologists is similar to Sweden (Hungary 127 radiologists per million inhabitants, Sweden 132 radiologists per million inhabitants), the age profile and geographic distribution of radiologists is creating a growing access problem throughout the country. There are several outpatient services where the presence of radiologists is limited, and interestingly this problem is also present in the capital, Budapest.

Consequently, teleradiology is being used to extend access primarily by radiologists working in larger centres, such as the Keskey County Hospital in Debrecen, the radiology department at Semmelweis University (Budapest), as well as many freelancing radiologists in Hungary and some from abroad. The aim is to connect more radiologists from the larger departments to the single-platform teleradiology system that is in use. The other burden is the subspecialty reading of CT and MRI exams which is also successfully solved by teleradiology.

Despite the well-known drawbacks of teleradiology services, the advantages are well recognised, giving us the opportunity to introduce professional quality standards and quality assurance.

Imaging research also received substantial support in 2015, primarily from grants from the National Brain Research Program. A dedicated MRI centre opened with a Siemens 3T Prisma scanner in Budapest (Hungarian Academy of Sciences), and a 3T Bruker small animal unit was installed in the Szentagothai Research Center at University of Pécs. The neuroradiology-focused 3T research magnet at Semmelweis University is to be replaced as well. Nevertheless, internationally recognised research and publication activity should be improved.

The Hungarian Society of Radiology is facing the challenges of teleradiology, the increasing need for highly qualified radiologists and radiographers, and the brain drain to Western Europe and the challenges of teleradiology, in order to build a sustainable radiology network within the country.
Healthcare systems around the world face ever growing economic pressures, which demand that staff become more efficient and cost effective. Scanning and reporting of studies is sometimes planned like a factory line. Where do anxious patients’ complaints come from? Do carers or relatives find due consideration? How does it feel to be on the other side? Maybe you have time to pause briefly and read this thought-provoking article by Lorenzo Derchi.

Lorenzo Derchi, the distinguished radiologist of radiation recently found himself ‘on the other side’ relative to hospital. This may make you lessen efficient sometimes, but definitively more human and understanding. This can happen either before or after the examination. When the patient is in the hospital, the patient is happy to be treated as a doctor who will provide information. However, the main problem I had was the difficulty of managing my anxiety, as well as that of all the other members of the family about what was happening. I can imagine what may happen to patients and their relatives if they do not know anyone. The wish to immediately know about the results of examinations, about the doctor’s thought of new change, for better or worse, was always there, even though I knew that examinations take time to be performed in case of radiological ones, to be read. Concern about how care was taken of our beloved one was another problem; when a venous line got blocked and a peripheral vein got broken, I concluded it to be a mistake, even though I knew these problems may have a variety of causes (and many due to the patient) and also happen in radiology. I cannot say this exception of the everyday, I can say this daily.

What I know is that I am more sure that informed patients deal better with their problems; that they have to try to provide my reports in as timely a fashion as possible; and that any time spent talking with a patient is well spent (and I am pretty sure that the topic of the conversation does not matter too much).

ECRT: What awareness of what radiologists and radiographers do is generally deemed poor among patients and the public. They can probably relate better to the doctors they see on daily ward rounds than to the radiologists who diagnose patients based on their images. How can we raise the profile of our profession?

LD: Patients who come to the radiology department do not see the radiologists working there. They mainly meet a technical worker or a secretary depending on which examination they have to do, but almost never meet or even see a physician radiologist. Exceptions to this rule are interventions, where the radiologist’s role in many countries, also ultrasonography. To raise the profile of our discip- linary we must become visible. This can happen either before or after the examination. When the patient is in the hospital, the patient is happy to be treated as a doctor who will provide information. However, the main problem I had was the difficulty of managing my anxiety, as well as that of all the other members of the family about what was happening. I can imagine what may happen to patients and their relatives if they do not know anyone. The wish to immediately know about the results of examinations, about the doctor’s thought of new change, for better or worse, was always there, even though I knew that examinations take time to be performed in case of radiological ones, to be read. Concern about how care was taken of our beloved one was another problem; when a venous line got blocked and a peripheral vein got broken, I concluded it to be a mistake, even though I knew these problems may have a variety of causes (and many due to the patient) and also happen in radiology. I cannot say this exception of the everyday, I can say this daily.

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ECRT: What awareness of what radiologists and radiographers do is generally deemed poor among patients and the public. They can probably relate better to the doctors they see on daily ward rounds than to the radiologists who diagnose patients based on their images. How can we raise the profile of our profession? What would you advise when you think a patient may be likely to complain?

LD: Misunderstandings arise when the doctor is not perceived as corresponding to the needs of their patients and, vice versa, when patients do not understand the methods we have in our work. It is always a bidirectional relation, if any radiological examination has to be a dialogue between the radiologist and their patient. On our side, we have to regard each patient as a human being and not simply as a clinical case or a number in the day’s ledger. Patient representatives are found by all means, in my experience, a periodic look at the waiting room, together with an explanation of the concept to the people sitting there, is a good way to reduce the number of complaints on this topic.

ECRT: These days many patients come prepared and have researched their symptoms and presumed diag-nosis online. Which innovative ways could you advise to consider keeping patients better informed and giving them quality good information?

LD: There is a lot about medical topics on the internet. Many hospita- lites have a website providing information about their services and many radiology departments have pages describing the examinations they perform, what they are and how to prepare for them. This can be greatly helpful to the patients. However, it is not easy to write this information in a language that is understandable to all. A number of papers reviewing the information provided on the websites of many scientific societies have shown that those dedicated to patients are usually written in a way that can be difficult for the layman to understand, by the general public. The ESR has an additional problem, since we have many different languages, so we cannot expect that English will be understood by all European citizens. This is the reason why it has been decided to put, in the section of our website dedicated to patients, links to hospitals in different nations or to national radiological societies where such information is presented in the many languages spoken in Europe.

ECRT: How can misunderstandings be avoided when patients raise common complaints that could be avoided?

LD: Misunderstandings arise when the doctor is not perceived as corresponding to the needs of their patients and, vice versa, when patients do not understand the methods we have in our work. It is always a bidirectional relation, if any radiological examination has to be a dialogue between the radiologist and their patient. On our side, we have to regard each patient as a human being and not simply as a clinical case or a number in the day’s ledger. Patient representatives are found by all means, in my experience, a periodic look at the waiting room, together with an explanation of the concept to the people sitting there, is a good way to reduce the number of complaints on this topic.

ECRT: What communication practices make a difference when you feel scared and vulnerable as a patient or relative?

LD: Doing my experience as a close relative of a patient, I had problems talking with the nurses in the ward. They were quite busy and they were few, always running around, very often tided. I was not at ease with dropping with them my questions and distracting them from their work. It has a matter of time. As a matter of fact, these days, the organisation of healthcare systems gives too much attention to effi- ciency. Everything is (or this seems the goal to reach) organized as in a factory. In order to ensure that good communication develops between patients and personnel in the hospital, it is not sufficient to campaign for a friendly welcome or a warm climate. It is the whole organisation that needs to be re-considered in order to allow room for the possibility of relation- ships among doctors, technicians, nurses, patients and their relatives that are not only ‘professional’, but also ‘human’.
VIENNA 1900. ART FROM THE LEOPOLD COLLECTION

AN EXHIBITION AT THE LEOPOLD MUSEUM
The Leopold Museum is presenting a totally reconfigured exhibition of Viennese art at the turn of the century, titled Vienna 1900.

The Jugendstil, Vienna’s Art Nouveau movement, endeavoured to encompass all areas of life within a so-called ‘gesamtkunstwerk’ (‘total work of art’). Its main exponents Gustav Klimt, Koloman Moser and Josef Hoffmann are synonymous with the art of the Vienna Secession around 1900. This new presentation of the Leopold Museum’s holdings — complemented by several significant works on loan — features the works from the Vienna Secession together with paintings and prints from Expressionism to the end of the First World War (Egon Schiele, Oskar Kokoschka, Anton Kolig, Herbert Boeckl and many others) as well as several fascinating examples of Wiener Werkstätte design. Furniture, silver, glass and jewellery are presented together with paintings and graphics, showing what could be termed the most exciting era in the history of Viennese art as a unique aesthetic experience.

In a way, ‘Vienna at the turn of the century’ was also a ‘programme for a hundred years’ as the achievements of art around 1900 have been a lasting influence on twentieth century art. The floral elements of the Secession and Jugendstil are just as sensitive and playful as the furniture designed by the Wiener Werkstätte is cool and sophisticated. The exhibition clearly communicates this ‘evolution in taste’ which began around 1900. Expressionism’s profundity (Egon Schiele, Oskar Kokoschka, Richard Gerstl) is equally highlighted as the influences of psychoanalysis on the ‘unlettered country of the soul’ and the exploration of ‘sex and character’. The grand furnishings of the aristocracy was the motive to provide information about the historical background and social movements in the last days of the monarchy. The end of the First World War concludes the exhibition. The presentation in the new rooms is based on an informal chronology of ‘the end of taste’. The exhibits are arranged thematically around the most important artistic inventions from what can be termed as the most fertile era in the history of Austrian art.

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The unconventional manner in which this exhibition covering an entire floor of the museum is set up, opens exciting vistas for those well-versed in the subject and a compact introduction to the theme and the epoch to those new to ‘Vienna around 1900’. The view from the panorama windows – from the Art History Museum to the New Hofburg – put Vienna’s Ringstrasse in an overall context. The decision to build some of the city’s famous Art Nouveau buildings was made in the course of the urban renewal in the last third of the nineteenth century. City maps, historical photographs and films presented in this exhibition space document the ground-breaking achievements of Vienna’s architects around 1900 – from Otto Wagner to Adolf Loos.

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The Jugendstil, Vienna’s Art Nouveau movement, endeavoured to encompass all areas of life within a so-called ‘gesamtkunstwerk’ (‘total work of art’). Its main exponents Gustav Klimt, Koloman Moser and Josef Hoffmann are synonymous with the art of the Vienna Secession around 1900. This new presentation of the Leopold Museum’s holdings — complemented by several significant works on loan — features the works from the Vienna Secession together with paintings and prints from Expressionism to the end of the First World War (Egon Schiele, Oskar Kokoschka, Anton Kolig, Herbert Boeckl and many others) as well as several fascinating examples of Wiener Werkstätte design. Furniture, silver, glass and jewellery are presented together with paintings and graphics, showing what could be termed the most exciting era in the history of Viennese art as a unique aesthetic experience.

The unconventional manner in which this exhibition covering an entire floor of the museum is set up, opens exciting vistas for those well-versed in the subject and a compact introduction to the theme and the epoch to those new to ‘Vienna around 1900’. The view from the panorama windows – from the Art History Museum to the New Hofburg – put Vienna’s Ringstrasse in an overall context. The decision to build some of the city’s famous Art Nouveau buildings was made in the course of the urban renewal in the last third of the nineteenth century. City maps, historical photographs and films presented in this exhibition space document the ground-breaking achievements of Vienna’s architects around 1900 – from Otto Wagner to Adolf Loos.

In a way, ‘Vienna at the turn of the century’ was also a ‘programme for a hundred years’ as the achievements of art around 1900 have been a lasting influence on twentieth century art. The floral elements of the Secession and Jugendstil are just as sensitive and playful as the furniture designed by the Wiener Werkstätte is cool and sophisticated. The exhibition clearly communicates this ‘evolution in taste’ which began around 1900. Expressionism’s profundity (Egon Schiele, Oskar Kokoschka, Richard Gerstl) is equally highlighted as the influences of psychoanalysis on the ‘unlettered country of the soul’ and the exploration of ‘sex and character’. The grand furnishings of the aristocracy was the motive to provide information about the historical background and social movements in the last days of the monarchy. The end of the First World War concludes the exhibition. The presentation in the new rooms is based on an informal chronology of ‘the end of taste’. The exhibits are arranged thematically around the most important artistic inventions from what can be termed as the most fertile era in the history of Austrian art.
WHAT’S ON TODAY IN VIENNA?

FRIDAY, MARCH 4, 2016

THEATRE & DANCE

› DIE MACHT DER FINSTERNIS
  by Leo Tolstoy
  Akademietheater | 19:30
  1010 Vienna, Lisztstraße 1
  Phone: +43 1 51444 445
  www.burgtheater.at

› BEI EINBRUCH DER DUNKELHEIT
  by Peter Turrini
  Burgtheater | 19:30
  1010 Vienna, Universitätsring 2
  Phone: +43 1 51444 445
  www.burgtheater.at

› SONNY BOYS
  New interpretation of the American comic classic
  by Christoph Grissemann and Dirk Sterman, the “bad guys” of Austrian entertainment
  Rabenhof | 20:00
  1030 Vienna, Rabengasse 3
  Phone: +43 1 712 82 82
  www.rabenhoerfertheater.com

› IMPERIUM
  by Jan-Christoph Gockel & Tobias Schuster, based on the novel by Christian Kracht
  Schauspielhaus | 20:00
  1010 Vienna, Porzellangasse 1
  Phone: +43 1 712 82 82
  www.schauspielhaus.at

› DER GOCKEL
  by Georges Feydeau
  Theater in der Josefstadt | 19:30
  1080 Vienna, Josefsträßer Straße 38
  Phone: +43 1 42 700 300
  www.josefstadt.org

› LOST AND FOUND
  by Yael Ronen & Ensemble
  Volkstheater | 19:30
  1070 Vienna, Neustiftgasse 1
  Phone: +43 1 52111 400
  www.volkstheater.at

CONCERTS & SOUNDS

› TONKÜNSTLER-ORCHESTER NIEDERÖSTERREICH, conductor JUN MARKL
  MOMO KODAMA, PIANO
  T. Hosokawa: Lotus under the moonlight; W.A. Mozart: Concerto for piano and orchestra a major KV 488; J. Brahms: Quartet No. 1 g minor op. 25
  Musikverein (Classical Music) | 19:30
  1010 Vienna, Bösendorferstraße 12
  www.musikverein.at

› 40 Years of Smoking Drums
  PINK INC REUNION / JOHN MEGILL / ANNA F. / BARTOLOMEY & BITTMAIN (Austria/US)
  Porgy & Bess (Jazz) | 20:30
  1010 Vienna, Riemergasse 11
  www.porgy.at

› THE BAR AT BUENA VISTA
  The Cuban legends are back! A unique show full of Caribbean lightness and atmosphere of 1940s Havana
  Museumsquartier – Halle E+G (Latin) | 20:00
  1070 Vienna, Museumsplatz 1
  www.kalineg.at

› ROBIN SCHULZ
  Gasometer (Pop & Alternative Music) | 21:15
  BA-CA Halle Gasometer
  1110 Vienna, Guglgasse 8
  www.planet.tt

OPERA & MUSICAL

› CARMEN
  by Georges Bizet
  Arranged by Georg Breinschmied and Tscho Theissing for accordion, violin and double bass
  Directed by Andreas Zimmermann
  Kammeroper | 19:00
  1010 Vienna, Fleischmarkt 24
  www.theater-wien.at

› LA TRAVIATA
  by Giuseppe Verdi
  Volkstheater | 19:00
  1090 Vienna, Währingerstraße 78
  www.volksoper.at

› ARIADNE AUF NAXOS
  by Richard Strauss, conducted by Cornelius Meister
  With Peter Matic, Jochen Schmeckebieber, Sophie Koch, Gerhard A. Siegel, Daniela Fally, Krassimira Stoyanova
  Wiener Staatsoper – Vienna State Opera | 19:30
  1010 Vienna, Opernring 2
  www.wiener-staatsoper.at

› MOZART!
  by Michael Kunze & Sylvester Levay
  Raimundtheater | 19:30
  1060 Vienna, Wallgasse 18–20
  www.musicalvienna.at

Please note that all theatre performances are in German.