

ECR TODAY 2010

DAILY NEWS FROM EUROPE'S LEADING IMAGING CONGRESS

MONDAY, MARCH 8, 2010

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Radiation exposure during pregnancy ignites impassioned debate

By Philip Ward

Who should tell pregnant women about the potential risks of radiation exposure? And what should happen if an accidental dose is administered?

These two burning questions prompted a lively discussion during Sunday's session about diagnostic radiology and pregnancy.

Dr. John Damilakis, associate professor and chairman of medical physics at the University of Crete in Iraklion, Greece, thinks medical physicists should play a central role in informing gynaecologists, patients and their relatives, and physicians about dose and risks. "Many patients come to my office to ask about dose. As medical physicists, radiologists and gynaecologists, we must be very careful. Patients must sign a consent form after we have informed them about the dose and risks," he said.

In the case of accidental exposure, the gynaecologist is the best person to inform the patient and address the anxiety of the patient, he said. This view was supported by a delegate who sprang to her feet and spoke eloquently on the topic.

"I think it's vital that the person looking after the patient is the one who is giving the information. What happens in real life is that there is a lot of anxiety and misinformation. When these patients actually come to someone who understands the subject, then you will save lives," said Dr. Josephine McHugo, a consultant radiologist at Birmingham Women's Hospital in the U.K.



John Damilakis from Iraklion/GR.

She doesn't think there should be any termination of pregnancy because of exposure to radiation. "If you know when radiation's been given and at what dose, then you can manage it appropriately. If it's going to be a structured abnormality, then you should put the patient in a programme for looking after it."

Damilakis described two particularly complex cases. For instance, a 22-year-old woman who is 15 weeks pregnant is admitted to hospital to rule out appendicitis, but her appendix cannot be visualised adequately with ultrasound and the referring clinician recommends a CT examination of the abdomen, with and without contrast. Similarly, a woman in her sixth week of pregnancy requires a cardiac ablation procedure involving a total fluoroscopy time of 42 minutes.



Janet De Wilde from Edinburgh/UK.

In such situations, radiologists must ask themselves if the risk of irradiating the foetus is less than that of not making the necessary diagnosis and if a termination is recommended, he said. Conceptus doses below 100 mGy should not be considered a reason for termination.

It is essential to investigate thoroughly the reproductive status of a female of childbearing age prior to imaging and ensure that posters are displayed prominently in the hospital to encourage patients to inform staff before an x-ray examination if they think they may be pregnant, he noted.

Damilakis and his colleagues have recently submitted a paper to *Radiology* about the measurement of conceptus dose from multidetector CT examinations during early gestation. The

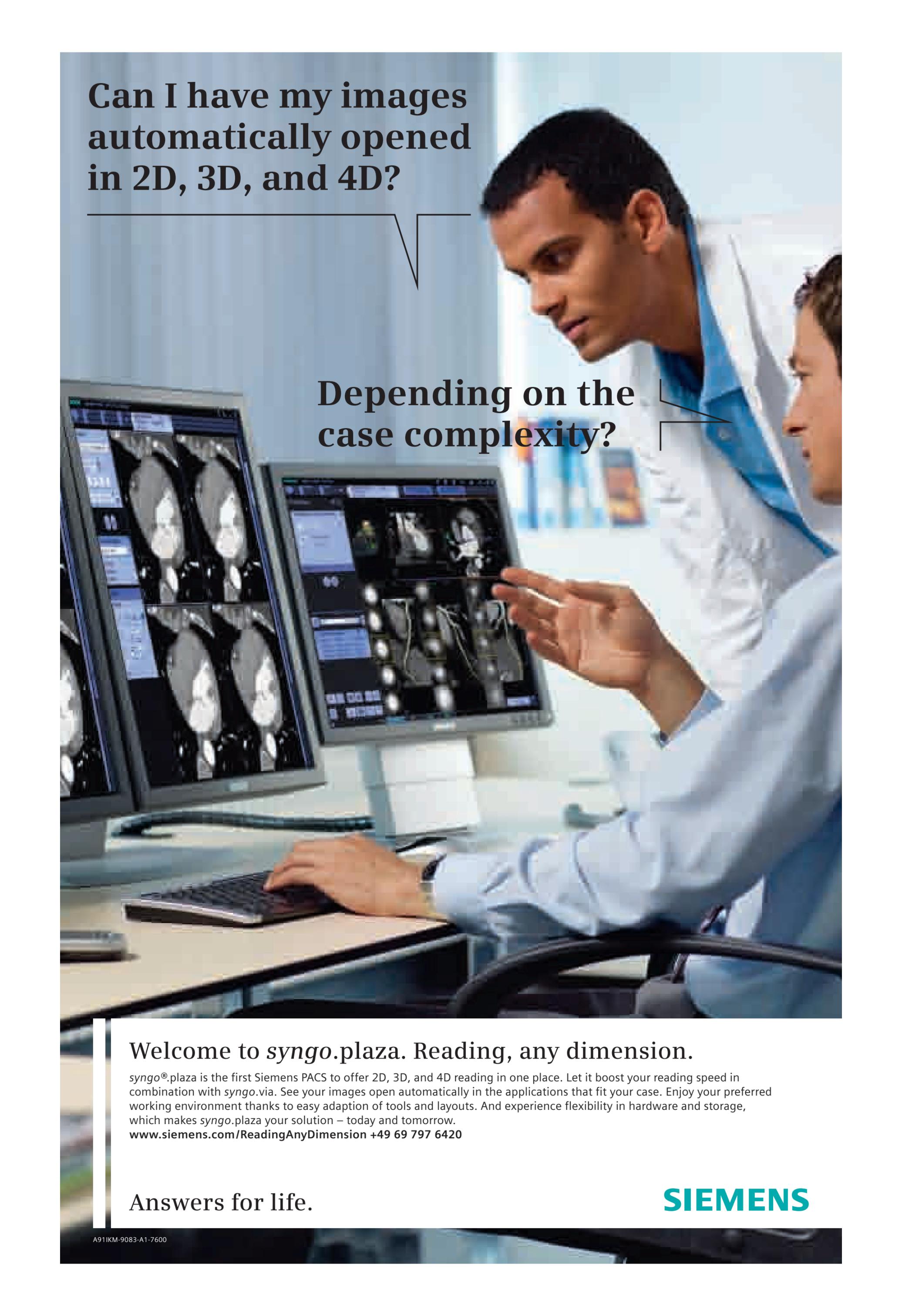
researchers tested a method that considers maternal body size and conceptus position variations. They assessed patient-specific Monte Carlo simulations based on 117 patient models created using image data of young women who underwent abdominal CT studies.

When performing MRI on pregnant women, be careful to avoid scanning above the normal controlled limit, advised Dr. Janet De Wilde, SINAPSE coordinator at the University of Edinburgh, U.K. If you need to exceed the limit, then high specific absorption rate (SAR) sequences should be applied for as short a time as possible, and high SAR sequences should be interspersed with low SAR sequences.

"If the foetus or maternal abdomen are not the target organs of interest, then the foetus should be kept out of the transmit field of the RF coil if possible," she said. "Particular care must be taken when scanning foetuses with poor placental function, for example in foetal growth restriction."

Also, be aware that maternal heat stress may reduce placental perfusion, explained De Wilde. Special care must be taken when scanning pregnant women with conditions leading to impaired thermoregulation, and never scan pregnant women who are febrile. Make sure the patient's heat loss pathways are optimal (no blankets, good bore air flow, reasonable room temperature).

"Overall there is no indication that the use of clinical MR procedures during pregnancy produces adverse effects," she concluded.



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Lung MR imaging looks set to enjoy a highly promising clinical future

By Paula Gould

The lungs have quite literally been a black hole for MRI for many years. Now advances in hardware and imaging techniques are helping lung MRI to move into the clinical arena.

There are several reasons to use MRI for lung studies, Prof. Hans-Ulrich Kauczor, director of diagnostic radiology at the University Hospital in Heidelberg, Germany, told delegates at Sunday's New Horizons Session. The modality can provide a comprehensive structural and functional assessment of the lungs in a single examination, and has the potential to yield quantitative measurements. The chief advantage, however, of MRI over CT is the absence of ionising radiation.

"No radiation is better than a lot of radiation, and no radiation is also better than low radiation," said Kauczor, who chaired the session.

Although lung MRI started about 25 years ago, with the first studies being conducted in the 1980s, researchers were unable to show any clinical value. The techniques were revived in the 1990s by select groups who explored the idea of hyperpolarised gas imaging, but once again they failed to make the transition into clinical practice. Over the past 10 years, however, the development of MR-specific contrast agents and the launch of next-generation systems offering parallel imaging have improved the quality of lung MRI.

Will the removal of technological barriers lead to broad clinical acceptance and applications in the forthcoming years? Kauczor followed this question with a provocative vision: MRI can simplify the current diagnostic work-up for patients presenting with suspected pulmonary disease.

"Pulmonary lung function test, lab test, chest x-ray, echo, CT, bronchoscopy, scintigraphy ... Why not try to solve all the stuff that is addressed nowadays by four or five imaging techniques with a single imaging technique, namely MRI?" he said.



Hans-Ulrich Kauczor from Heidelberg/DE.

The wide variety of lung MRI techniques was set out by Dr. Jim Wild, a medical physicist at the University of Sheffield, U.K. His checklist included standard proton MRI, oxygen-enhanced imaging, contrast-enhanced pulmonary angiography, perfusion imaging, and hyperpolarised gas MRI (helium and xenon).

Wild acknowledged that some of the methods he presented would only ever be of value to radiology researchers. Others could make the transition into clinical practice, so long as the methods were simplified. "Overall, the future looks bright for lung MRI," he stated.

There is definitely light at the end of the tunnel for lung MRI, according to Dr. Jürgen Biederer, radiologist at the University Hospital in Kiel, Germany. Biederer drew on examples from the published literature to show the clinical merits of breath-hold and free-breathing sequences when seeking out neoplasms or evaluating inflammatory lung disease.

In the case of small nodular lesions, for example, MRI was shown to rival CT in terms of sensi-



Jürgen Biederer from Kiel/DE.

tivity. CT can detect 65% to 85% of nodules sized between 5 and 10 mm in diameter. Depending on the sequence, MRI has a sensitivity of ~75% to ~90% for 3 to 5 mm nodules, rising to ~95% to ~100% for 6 to 10 mm nodules.

"It is easier to read lung nodules on MRI than CT because they really stand out on a black background," Biederer said.

Lesion detection with MRI is not always trouble-free, though. Calcified metastases will be difficult to spot and there can also be problems with artefacts.

Different sequences may be put together to make a comprehensive lung MRI protocol, he noted. This protocol should be able to address a number of clinical questions, including pneumonia, solid lesions, pulmonary embolism, chronic airway disease, and tumour staging (mediastinal and chest wall invasion).

He showed a selection of 10 T1- and T2-weighted sequences that could be combined in various ways to make such a protocol. The ideal 'in-



Jim Wild from Sheffield/UK.

room' time for such a protocol is 15 minutes. Some of the suggested combinations fit into this time window, others need an extra five or 10 minutes.

Speaking in the same session, Dr. Sebastian Ley, radiologist at the University Hospital in Heidelberg, explained how steady-state free precession (SSFP) and contrast-enhanced MRA sequences can both be used to visualise the pulmonary arteries. The SSFP technique has the advantage of being free-breathing, whereas MRA is a breath-hold imaging technique, requiring patient cooperation. The two can be combined to make a seven-minute protocol for pulmonary embolism screening.

Ley predicted that CT angiography would typically be preferred in the acute setting, owing to the logistics of MRI. Either MRI or CT could be used when assessing patients with chronic pulmonary vascular disease. In the case of congenital abnormalities, then MRA and MR perfusion imaging are the best choice, he said.

Wieczorek outlines crucial role for radiology in diagnosis of female urinary incontinence

By Paula Gould

Radiologists should work together with gynaecologists and urologists to improve the treatment of women with urinary incontinence, urged Dr. Andrzej Wieczorek during Sunday's Marie Skłodowska-Curie honorary lecturer.

Approximately 30% of surgical procedures to counter pelvic-floor weakness are actually repeat operations. This number could potentially be reduced if surgeons used radiological images to guide their work.

Surgical treatment for female incontinence involves the insertion of plastic tapes or meshes to support the urethra. Although surgeons typically rely on finger guidance alone when positioning these 'slings', this is not always sufficient. Incorrectly placed pieces of plastic will not only fail to prevent incontinence, but they can also lead to post-operative complications.

"Surgeons are the captains of the boat, but with tools like ultrasound and MRI, radiologists can be good navigators," said Wieczorek, associate professor of radiology at the Medical University of Lublin, Poland.

Urinary incontinence affects more than 30% of the female population, with incidence increasing with age. Women sufferers feel stressed and alienated from society. Research has also shown that women with severe urinary incontinence have an 80% higher chance of presenting with clinical depression.

The three main imaging options for evaluating female urinary incontinence are cystocoloproctography, MRI and ultrasound. The first of these techniques is highly embarrassing for patients and is seldom used, he noted. MRI is considered to be the gold standard for pelvic floor imaging, but it is not widely available and is expensive. Most imaging examinations consequently comprise 2D transperineal ultrasound, a method that is cheap, provides dynamic assessment and is widely available in urology and gynaecology departments.

Wieczorek showed how 2D transperineal ultrasound can visualise pelvic floor anatomy clearly. Radiologists need to identify the defect that is leading to urinary incontinence and then work out what it is, he said. Is the defect an avulsion, atrophy or a tear? Additional information can be gathered from 3D endovaginal ultrasound, particularly when viewed in render mode.



Andrzej Pawel Wieczorek from Lublin/PL.

High-frequency ultrasound could provide valuable insight into pelvic floor physiology, but this approach to imaging is not included in urogynaecological or proctological guidelines for the management of urinary tract dysfunctions, he said. Pelvic floor MRI is not mentioned either. Radiology researchers are nonetheless pursuing both of these imaging

strategies. The fusion of MRI and ultrasound is now being explored as a tool for the future.

The role of imaging in female urinary incontinence will grow as novel surgical techniques for treating female urinary incontinence are developed, predicted Wieczorek. It is important, however, that the imaging is performed by trained radiologists, not clinicians. He illustrated what might happen otherwise by showing a post-operative ultrasound scan that had been performed incorrectly.

"Small defects can easily be missed, potentially vital dynamic information can be lost because the surgeon is not able to capture biomechanical parameters," he said.

Wieczorek concluded his talk by reiterating the importance of teamwork in female urinary incontinence. Radiologists should be prepared to be flexible and work with clinicians.

"We have a lot of technology, we have a lot of equipment. If we used the latest achievements, we could reduce the very high re-operation rate, and we could be of much help to these patients who are stressed, who have huge problems in life because of this disease," he said.

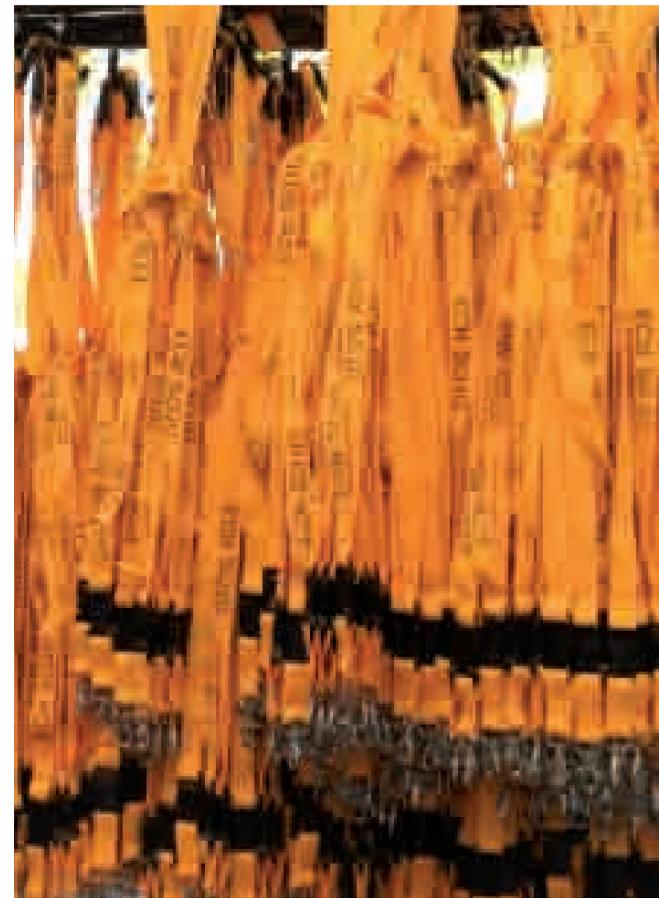


ECR Today's contributing editor and chief news reporter, Paula Gould, decided to test the cake recipe published in the preliminary programme for ECR 2010. This is the outcome. **Placek Swiateczny**, or Polish Christmas Bread, is typically served as part of a 12-course meal known as Wigilia, which is eaten after sundown on Christmas Eve.



Hot Shots from Day 4





Young breast imaging researcher ready to give his first lecture at ECR

By Mélanie Rouger

He might look inexperienced, but appearances can be deceptive. Claudio Spick, a 23-year-old medical student from Graz, Austria, is about to attend his first ECR ... as a lecturer. "I submitted an abstract and received an invitation via e-mail," he explained.

The only student in his research project, he is probably the youngest speaker ever invited to ECR and has never been to a medical congress before. "I visited Room F2, where I will give my speech, on the day I registered for the congress. It looked big and the audience was packed," he said, both happy and nervous.

This morning, he will present new results in breast MRI, a modality which has been gathering pace among researchers. While extensive data are available on BI-RADS® 3 classification, his topic, 'Predictive value of magnetic resonance imaging in patients classified as BI-RADS® 1 to 3', will present results on BI-RADS® 2, which have been almost non-existent until now.

Spick, who works under the supervision of Prof. Dieter Szolar at the Diagnostikum Institut Süd West Graz, would like to continue with his



Claudio Spick from Graz/AT.

project and observe the outcome in even more patients in both the short and long term. But the young researcher is also interested in oncologic imaging and treatment monitoring, a field he discovered while doing a research rotation at the University of California, Los Angeles (UCLA) two years ago during his summer holidays.

Instead of choosing a residency after his graduation next year, he plans to carry on researching, probably through a fellowship. "I would like to

gain experience in research because it enables you to learn a lot, you have much time to read and gather knowledge," he said.

For the moment, he is looking forward to giving his first lecture and seeing his two best friends in the audience. He remains casual about it. "I have some results to present and I hope the delegates will appreciate my work. I will also probably ask them to remember their first time as a speaker," he smiled.

EPOS™ prize-winners are announced

The winners of the best scientific/educational exhibits at ECR 2010 have been announced.

Six posters were awarded the Magna Cum Laude this year. The lead authors were Dr. Simona Espejo, Prof. Young-Sun Kim, Dr. Luis Cerezal, Dr. Rosa Lorente-Ramos, Dr. Shuo Zhang, and Dr. Loic Boussel. All Magna Cum Laude awardees will receive free registration to ECR 2011.

The 10 Cum Laude winners are Dr. Tae Kyong Kim, Dr. Sergi Juanpere, Dr. Eun-Young Kang, Dr. Hiroyuki Horikoshi, Dr. Jeremy Rabouhans, Dr. Se Kyoung Park, Dr. Anne-Laure Brun, Dr. Eiji Matsusue, Mr. Benjamin Schmitt, and Dr. Takuya Ueda.

Certificates of Merit have been awarded to Dr. Michele Anzidei, Dr. Darragh Halpenny, Prof. Hadassa Degani, Dr. Noriko Oyama, Dr. Tomoaki Sasaki, Dr. Riccardo Ferrari, Dr. Yaling Han, Dr. Mayumi Takeuchi, Dr. Boris Guiu, Dr. Mansi Rajpopat, Dr. Luc Merth, Prof. Jose Echevarria, Dr. Raffaello Sutera, Dr. Naomi Morita, Dr. Ignacio Delgado, Mr. Ernst Klotz, Ms. Kaoru Shimizu, and Dr. Adriana Caldera Dias.

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The Alliance for MRI aims to safeguard the future use of Magnetic Resonance Imaging (MRI) in Europe through an EU-wide exemption for the medical use of MRI and related research from any exposure limit values set in the Physical Agents 2004/40/EC (EMF) Directive.

This petition will be sent to European institutions, national governments, parliaments and other decision-making bodies to enhance the profile of the Alliance for MRI and demonstrate the significance of this issue.

You may sign up at the EU Affairs information booth in Foyer F on the entrance level or online at

<http://petition.myESR.org/>

N.B.: The European Science Foundation is preparing a Position Paper "ESF-EMRC Position on the Implications of the EMF Directive 2004/40/EC for European Biomedical Magnetic Resonance Research" to be published in May 2010.

Unmasked: our bearded wonder featured on Sunday's cover



This cover photo aroused great interest, but who was he?

By Philip Ward

Many readers of ECR Today will have been puzzled by the identity of the zany-looking, bearded man who got star billing on the front cover of yesterday's issue. Now, after an extensive search through the technical exhibition, we can reveal him to be Adam St. John Lawrence, a 41-year-old British comedian and actor who has lived in Germany for the past 20 years.

Adam has worked at the Siemens booth during ECR, but not in a conventional way. As part of a novel marketing ploy, he has had a touch-screen flat-panel monitor from the Artis zee biplane system draped around his neck. To engage delegates and lure them to the booth, he has displayed fake clinical images on the contraption. Various everyday items have been embedded into the images, such as a beer bottle, a rubber duck, and a doughnut.

"The thing weighs over 10 kg, so it does get quite heavy, but they've given me a harness, plus regular breaks," he said. "I just love to see how people react. Because radiologists tend to look at such a tiny, specialised area, it sometimes takes them a while to see the funny objects."

This is Adam's debut performance at a medical congress, but he has worked in similar roles at other shows, particularly the large annual leisure event in Nuremberg. He does stand-up comedy, but his specialist field is interactive humour and entertainment.

If you'd like to meet Adam, he will be on duty today until 14:00, when the technical exhibition closes. He hands out a card to each of his 'victims' that entitles them to a free doughnut at the booth. Siemens has given out 300 doughnuts every day, but still thinks the promotion represents great value at around €4,000. Adam has also been tweeting from the congress at: twitter.com/adamstjohn

EU legislation, training and public awareness are top priorities for incoming ESR President

By Mélisande Rouger

Maximilian Reiser is professor of radiology and chairman of the department of clinical radiology of the Ludwig Maximilian University of Munich, as well as being dean of the medical faculty at Munich University and the incoming ESR President. *ECR Today* presents to you the new face of European radiology.

ECR Today: What are your plans and ambitions regarding your presidency?

Maximilian Reiser: Several issues have been initiated by previous ESR Presidents and these tasks need to be continued. I would like to put emphasis on issues that are particularly important to me. The first chapter concerns EU affairs. Initiatives such as the directive on electromagnetic fields (EMF) may have a major impact on the practice of radiology by posing problems for contracting MR examinations. The Alliance for MRI, a group largely driven by the ESR, has been instrumental in postponing this directive.

European initiatives concerning e-health and telecommunication, such as the Cross-Border Healthcare Directive, have to be modified to ensure the quality of radiological examinations. The medical device directive, which promotes the development of devices and guarantees patients' access to modern equipment and modern diagnosis, must also be monitored to ensure that radiology is well represented, and that all legislation is practicable by radiologists.

The ESR will remain involved in the EU Action Against Cancer, a partnership that aims to support countries in their efforts to tackle cancer. Right now, we are collaborating with the Radiological Society of North America (RSNA) for the implementation of oncological imaging as a subspecialty.

Finally, we need to extend the presently organ-oriented European curriculum to diseases. Some diseases, such as diabetes or cancer, do not just affect one organ. Their treatment may involve brain, lung, heart or spine specialists. The same applies to the management of emergency pati-



Prof. Maximilian Reiser from Munich/DE is the incoming ESR President.

ents, who often suffer fractures and bleeding. We want to introduce a multidimensional matrix including specialisation in the different organ systems and cross-sectional organ systems according to diseases. Personalised treatment is the current trend in medicine. One must be able to assess therapy at an early stage to decide upon the most efficient and least costly treatment.

ECRT: Potentially damaging EU legislation and new requirements for patient care mean that the ESR will have more battles to fight in the future. Are there other topics on the society's agenda?

MR: Yes, and one concerns radiology's perception among the public and policy decision makers. ESR will attend thoroughly to this issue. It is most important that radiology is recognised as a clinical discipline by the public. Many patients think that a radiologist is a technician who is not really involved in patient care, and often contact between the two is limited.

Another problem is that radiation risks are not realistically perceived. We have made major efforts to reduce radiation exposure, but it remains an emotional issue, and radiologists should be able to explain radiation protection. The public should also be educated to realistically assess the risks and the risk-benefit ratio. We will tackle this problem by launching public campaigns and increasing training in communication skills for our residents. These campaigns should be directed at policy decision makers, but also medical students, to show them that radiology is a fascinating and expanding discipline.

If we want to get support and recognition in the future, we will have to prove that what we are doing is really useful to the patient. Other disciplines than radiology have put importance on epidemiology, technology assessment and public health, and I am deeply convinced that this is a good thing. We will address ESR

members so that they contribute and recognise this as an important issue.

ECRT: What future trends do you foresee in radiology in Europe?

MR: What we are doing is very important for the maintenance of health, especially in view of demographic changes, which will put more and more load on EU healthcare systems. This is not only true for Europe and North America but also for China, where life expectancy has increased by 20 years within a short period of time. The situation is even more pressing there because it is combined with the one-child-per-family policy. In Russia, the population is also decreasing. This is really a global problem.

ECRT: Do you plan to increase your cooperation with any societies in particular?

MR: The 'ESR meets' programme and the European School of Radiology (ESOR) enable us to create closer connections to other societies. In the future, direct contact with the RSNA and American College of Radiology, with whom we have many common interests, will continue. We will also pursue our efforts towards Middle East and Asian societies after inviting India and Saudi Arabia to ECR in 2008 and 2010 through 'ESR meets'. We are now trying to build our contacts with South America, and started by inviting Argentina to be a host nation at ECR 2010, which will be followed by Brazil in 2011.

ECRT: What would be your message to aspiring radiologists?

MR: What I tell them in my lectures is that radiology is a dynamic, fascinating and very diverse discipline. Whether it is interventional radiology or diagnostic imaging, you can cover a large spectrum, so if you are interested in technology and computer science, you are in the right place, and likewise if you like to treat patients and have contact with every other discipline. On top of that, incidental findings you might encounter may be more important than what you were originally looking for. This is a very rewarding thing.

Turf battles loom large in molecular imaging

By Philip Ward

Molecular imaging is hugely expensive, risky, difficult to understand, heavily regulated, without immediate clinical benefit, and not reimbursed, and these factors are halting progress. The solutions for radiology are to collaborate, co-operate, co-own, and co-train.

That's the opinion of Prof. Gabriel Krestin, professor of radiology at the Erasmus Medical Center in Rotterdam, The Netherlands. He addressed this emerging area at Sunday afternoon's professional challenges session about the radiologist of the future.

"Big sharks are waiting out there," warned Krestin, referring to the turf battles that are on the horizon. These battles will be against the powerful, who want to become even more powerful (cardiology, internal medicine, and neurology/neurosciences); the knowledgeable, who know more and do it better (molecular biology and biochemistry); and against the weak, who want to survive (nuclear medicine, neurosurgery).

Radiology must care about molecular imaging (MI) because it represents the future and opens the way for personalised medicine, he said. Furthermore, clinicians will ask for it increasingly

often, it boosts imaging research and is a good source of funding, it is sexy, and if radiologists don't do it, others will do.

He estimated the number of molecular imaging hits on Google at 3.41 million, and the equivalent figures for MI and MRI together is around 689,000 hits and for MI and PET is about 327,000. An impressive 17,854 MI papers from 2000 to 2009 are listed on Pub Med, of which 4,022 (22%) focused on translational research towards clinical applications.

Krestin noted that surveys have shown the following: the main focus of MI is oncology, followed by cardiovascular diseases and technology development (U.S.) or neurosciences (EU); most programmes, both in the U.S. and EU have access to clinical MRI and nuclear medicine modalities, but animal imaging is less frequently available in the EU; there is a positive correlation between the number of radiologists in a department and available MI modalities and funding, and the amount of grants is negatively correlated to the number of exams in the U.S., but this is not the case in the EU; larger research-oriented and well-funded departments of radiology in the EU tend to participate in enterprise-wide MI programmes; and multidisciplinary teams are characteristic for MI programmes, both in the US and EU.



Gabriel Krestin from Rotterdam/NL spoke about turf battles in molecular imaging.

His short-term recommendations are to create a network of centres of excellence, which could be certified as reference training centres in MI; set up and sponsor specific workshops and scholarship on MI; guarantee a growing part of MI topics in major radiology meetings; sponsor young radiologists to attend MI workshops and major MI meetings; and develop collaboration with the other European societies involved in MI (EANM, ESMI) for a common and multidisciplinary approach.



Mathias Goyen from Hamburg/DE addressed marketing in radiology during the same session.

His mid-term suggestions are joint application for research grants in MI to develop new applications or new imaging technologies, set up research grants for development of translational projects or pilot clinical trials in MI, sponsor training in new hybrid technologies, build up a web-based collection of teaching material accessible to ESR members, raise public and private funds for development of MI in radiology, and implement a specific training curriculum for acquiring knowledge in cell and molecular biology, genetics and MI.

ESIR 2010

European School of Interventional Radiology

IR Treatment of Critical Limb Ischemia

April 9-10, Prague

Embolisation

May 7-8, Rome

Stenting (course in Spanish language)

June 4-5, Zaragoza

Vascular Liver Interventions

June 25-26, Berlin

Advanced Vascular

June 25-26, London

Spinal Interventions

July 9-10, Strasbourg

Biliary and Oncologic Interventions

September 3-4, Tbilisi

Basic Vascular

November 12-13, Zagreb

Acute IR

November 26-27, Amsterdam

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April 21 -24, Florence, Italy

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ICCIR 2010

International Conference on Complications in Interventional Radiology

June 10-12, Poertschach, Austria

www.iccir2010.org

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The role of CT in abdominal imaging

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How interventionalists treat acute aortic syndrome

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Imaging services prepare for tighter radiation safety regulations

By Paula Gould

The topic of radiation protection has moved steadily up the political agenda over the past decade. Headline-grabbing research containing details about the rise in medical radiation exposure and forging a link between imaging and cancer has helped to focus attention on the need to 'do something'. But what exactly should be done? Tighter legislation, better self-regulation or improved education? The probable answer is all three of these actions.

Speakers at this afternoon's professional challenges session will describe how politicians, international organisations, and professional societies are all working to shore up radiation safety standards in European radiology departments. ECR delegates will learn about the likely impact of this work on their daily practice and about where to go for information and advice.

The exposure of patients throughout the European Union to ionising radiation – whether during a simple chest x-ray, a contrast-enhanced CT angiography examination, or a fluoroscopy-guided intervention – is currently regulated by European Directive 97/43/Euratom. Radiation protection for practitioners, such as interventional and diagnostic radiologists, nurses, technicians, and radiographers, is covered within a separate piece of legislation, Directive 96/29/Euratom.

This bureaucratic division is about to change. As part of a broader project to simplify its legislation, officials at the European Commission are working towards a unified Directive called 'Basic Safety Standards', which will include the protection of patients and 'other individuals' who are exposed to ionising radiation. The new Directive will not merely restate the existing regulations, though; it will include some additional requirements for imaging services and radiology professionals to adhere to.

"The European Commission and its technical committees have used this opportunity to improve some specific aspects of legislation in the medical arena, where radiation safety is more and more relevant," said Prof. Eliseo Vaño, professor of medical physics at Complutense University, Madrid, Spain. "With the increase in the number of medical imaging procedures and the high doses delivered to patients, especially in CT and interventional radiology, more and more patients are demanding information about the risks of their examination. There is also the issue of occupational risk."

EC officials expect to publish this revised legislation either towards the end of 2010 or in 2011. Vaño will be giving ECR delegates a sneak preview of the major changes that have been decided upon. These draw on recommendations made in 2007 by the International Commission on Radiological Protection (ICRP) and a preliminary, Europe-wide consultation with EU member states and scientific societies.

The early warning will give radiology departments time to prepare for the tighter regulations. For example, the forthcoming Directive will require practitioners performing CT scans and interventional procedures to include information about scan dose in patients' clinical records



Madan Rehani will report on radiation safety initiatives undertaken by the Vienna-based International Atomic Energy Authority.

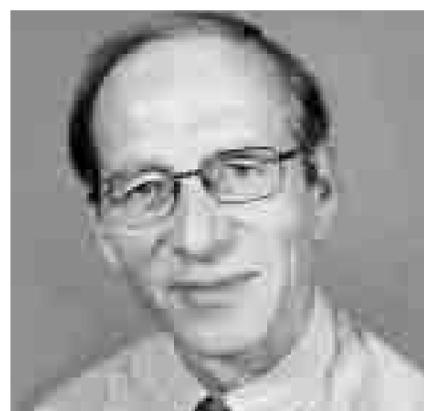
each time they undergo an imaging procedure. Some hospitals and clinics may be using systems at the moment that cannot display this information easily. As with the 97/43/Euratom Directive, however, EU countries will have two or three years' grace to incorporate the new requirements into national law, he noted. Thus, institutions will have a bit more breathing space to update their imaging hardware.

Education and training is another area that the revised legislation will reinforce. For example, it will become mandatory for all medicine and dentistry students to take a course in radiation protection.

Although information on radiation safety and dose-lowering techniques is widely available online, there is a real danger of information pollution from sources on the internet, according to Madan Rehani, a radiation safety specialist with the International Atomic Energy Authority (IAEA), based in Vienna. Rehani will use his presentation to highlight trusted sources of training material, including projects undertaken by the IAEA, both alone and in collaboration with the International Society of Radiology (ISR), the International Society of Radiographers and Radiological Technologists (ISSRT), the International Organisation of Medical Physicists (IOMP), and the World Health Organisation (WHO).

Prof. Peter Vock, director of the University of Bern's Institute of Diagnostic, Interventional and Paediatric Radiology, University Hospital Inselspital, Switzerland, will be introducing session attendees to a brand new Europe-wide network that is devoted to the promotion of radiation safety. Launched in October 2009, the European Medical ALARA Network (EMAN) is a joint venture between seven organisations that represent key stakeholder groups, for example, radiologists, radiographers, medical physicists, and radiation safety experts. Consortium members include the European Society of Radiology (ESR) and the European Federation of Radiographer Societies (EFRS).

One of the project's main aims is to foster discussion between different groups that share an interest in conforming to the ALARA principle – that is, keeping medical radiation exposure as low as reasonably achievable. EMAN representatives will also offer feedback and suggestions to the European Commission (EC) with respect to



Prof. Peter Vock will be explaining about the work of the European Medical ALARA Network.



Prof. Eliseo Vaño will chair today's professional challenges session on radiation protection.



Radiation safety is particularly important during interventional procedures. (Provided by E. Vano)

its legislation and guidance on radiation protection.

The network will receive financial support from the EC for three years, Vock noted. Three key topics will be examined during this period by separate working groups: exposure to ionising radiation during CT examinations; exposure to ionising radiation during interventional radiology procedures; and the radiological safety of x-ray procedures performed outside of radiology departments.

Final reports from the three working groups will eventually appear on the EMAN web site. The site will, in the mean time, provide a way for

partners and stakeholders to exchange information, as well as highlighting the presence of the network. A fourth working group has been given the task of maintaining EMAN's online presence and keeping the web site up to date.

Vock is hopeful that the EMAN project will continue beyond October 2012. A fifth working group will be examining how the network could be sustained once the current EC grant runs out.

"First we have to build the network, and we have the money for these three years. But we have to provide continuity afterwards," he said.

Professional Challenges Session

Monday, March 8, 16:00–17:30, Room F2

PC 18 Radiation protection

- **Chairman's introduction**
E. Vaño; Madrid/ES
- **New European Directive on basic safety standards**
E. Vaño; Madrid/ES
- **EMAN – The European Medical ALARA Network**
P. Vock; Berne/CH
- **Radiation protection training and practice: Bridging the gap**
M.M. Rehani; Vienna/AT
- **Panel discussion:**
What do radiologists need to know about the new recommendations of the ICRP and the new European Directive?

CT colonography makes sustained progress in cancer diagnosis

By Katrina Megget

Radiologists have not always been at the forefront when it has come to screening for colorectal cancer, but this is now changing rapidly, given the technological advances and the growing endorsement of CT colonography (CTC).

"With the advent of optical colonoscopy, the double contrast enema was losing popularity as a total examination of the colon in the 1980s and 1990s, and gradually radiology was losing an important diagnostic instrument in the detection of colonic tumours to the gastroenterologists," explained Dr. Philippe Lefere from the department of radiology at Stedelijk Ziekenhuis, Roeselare, Belgium. "But with the advent of CTC, radiology has gained back this loss and seems more and more likely to be able to play a crucial role again in the detection of colonic tumours."

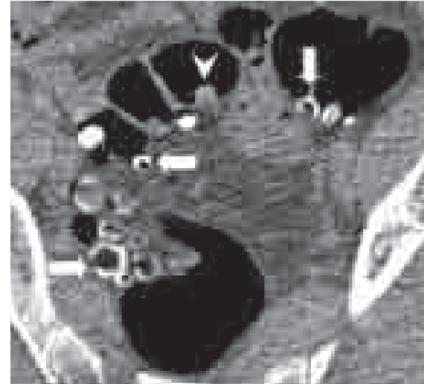
Delegates at this morning's refresher course will hear how radiology is making a leap forward in the diagnosis of colorectal cancer. They will learn about advances that are being made and why CTC, also known as virtual colonoscopy, is becoming an increasingly attractive technique. Furthermore, as noted by Dr. Franco Iafrate, radiologist and head of the CTC unit at Sapienza University of Rome, colorectal cancer is the second most deadly cancer in men and women in the western world. But the fact it is a preventable cancer makes the advances in CTC even more exciting, moving it from a promising technique to a real tool, he said.



Dr. Franco Iafrate is head of the CTC Unit at Sapienza University of Rome.



Endoluminal 3D view shows three polypoid images (white arrows). (Provided by P. Lefere)



CT scan shows multiple diverticular fecaliths (white arrows) as a possible pitfall and easy to distinguish from the true polyp (white arrowhead). (Provided by P. Lefere)



Endoluminal 3D CT colonography image shows a pedunculated polypoid sigmoid lesion. (Provided by F. Iafrate)

colonic lumen. This faecal tagging is important as the faeces or fluids appear white (hyperdense), which helps with diagnosis.

"It is well known that if you ask a patient which part of the examination is the worst, he or she will definitely mention the preparation," said Iafrate. "Faecal tagging is a reality with CT colonography examination – in fact, at the moment patients have to perform a reduced bowel prep compared with colonoscopy. But we finally believe that in a few years it will be possible to talk of 'prepless examination' and probably a 'same day' examination, leaving the possibility that the patient can have the bowel prep on the same day as the exam."

However, Iafrate said that when talking about CTC and colonoscopy, it wasn't so much an issue of which technique is better but more about the right clinical indication and patient adherence to the examination. While reliable population data on CTC are not currently available, adherence may well be higher with CTC. He thinks this is because CTC appears to be preferred by patients for several technical reasons like the lighter bowel preparation, absence of sedation, low number of complications, length of the examination, and the possibility for the patients to walk away immediately and carry on with their daily activities.

"From a technical point of view, this examination is quite easy and in the very near future it is possible that double barium enema – its real competitor – will vanish and CTC will take its place, with the further advantage to be much more accurate in detecting polyps and cancer, in defining the location of lesions, in evaluating extracolonic findings and finally with low radiation exposure for patients," he stated.

However, adequate interpretation of the CTC results can be a concern, noted Lefere, as a high specificity was required with a minimum of false positives.

"In fact each false positive finding may prompt a superfluous optical colonoscopy, adding costs and risk to the screening procedure and also causing major inconvenience for the patient. Therefore knowledge of imaging pitfalls is an essential step in the interpretation of CTC," he said.

Most imaging pitfalls are related to the CTC technique used, the anatomy of colonic and pericolonic structures, and the 2D and 3D imaging features. Lefere thinks the best way to avoid these pitfalls is to adopt a state-of-the-art CTC technique, including good preparation with faecal tagging, optimal distension of the colon based on the use of carbon dioxide, and acquisition with a multislice CT scanner using a low-dose protocol. Ongoing training in the technique would help, he added.

Since 2004, the European Society of Gastrointestinal and Abdominal Radiology as well as the American College of Radiology have been specifically training radiologists by organising CTC courses worldwide. This is a crucial step in interpreting the images, and now is a good time to start disseminating the skills to prepare radiologists for the future, Iafrate concluded.

In March 2008, CTC became an official screening method endorsed in guidelines by the American Cancer Society, the U.S. Multi-Society Task Force on Colorectal Cancer, and the American College of Radiology. Since then, a number of dedicated centres offering the examination have sprung up, and Iafrate expects an increase in the number of such centres over the next two to three years.

Two recent advances have also helped increase the popularity of the technique. The first is the use of computed-aided detection (CAD) software, which can help in the homogenisation of results and interpretation of a high number of images, making the detection of small lesions and diagnosis easier than in the past. The second advance concerns bowel preparation. This is vital for effective CTC, and the bowel must be cleaned of residual stool, which might simulate colonic lesions. Usually the same preparation method is employed as in conventional colonoscopy or barium enema (i.e., polyethylene glycol 4000 electrolyte solution). However, patient discomfort has led to the future goal of avoiding any bowel preparation by using a faecal or fluid tagging technique.

Already CTC has certain advantages over colonoscopy, such as not having the requirement to drink four litres of water with cathartic drugs a day before the examination. Instead, with CTC, patients need only to take a mild over-the-counter motility stimulator and an oral contrast agent (approximately 80 ml) to tag the fluid or the faeces within the

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Refresher Course

Monday, March 8, 08:30-10:00, Room C

RC 1501 CT colonography: All the relevant aspects

Moderator: A.K. Dixon; Cambridge/UK

A. State-of-the-art technique

F. Iafrate; Rome/IT

B. Avoiding traps or pitfalls

P. Lefere; Roeselare/BE

C. Evidence based results?

S.A. Taylor; London/UK

Demand soars for qualified imaging specialists in Saudi Arabia

By Emily Hayes

Every year, the European Society of Radiology pulls back the curtain on imaging practice in other continents in its popular 'ESR meets' series. Today congress attendees will get a rare opportunity to take a glimpse into the working lives of radiologists in Saudi Arabia.

Aside from satisfying their curiosity about what practice is like in another part of the world, with its different cultural and occupational traditions, learning about diseases that are common in Saudi Arabia may be useful for delegates in their own practice, e.g., if they encounter in their home countries images of people who have moved from the Middle East. Presenters think the session will also appeal to those interested in providing teleradiology services or working directly in Saudi Arabia, where there is a shortage of imaging specialists.

In his introduction to today's session, Dr. Sattam Saud Lingawi, president of the Radiological Society of Saudi Arabia, plans to outline his country's terrain in broad terms. Of some 40,000 physicians practising in the country, only about 1,000 are radiologists, and, of these, many hail from North America, Europe, and other continents. Given the country's population of 16 million, radiologists are in short supply.

"The need is very high and the demand is great," he commented.

Saudi Arabia's healthcare system is a mix of public hospitals, military hospitals, educational institutions, and private-sector facilities. Each of these sectors has its own rules, regulations, and policies that guide the practice of health professionals. But in general, imaging departments follow the code of practice set by the American College of Radiology, said Lingawi, who is associate professor of radiology at King Abdulaziz University in Jeddah.

Most hospitals are well-stocked with high technology, including MRI, multi-detector CT, and digital radiography equipment, and larger facilities (with more than 300 beds) typically have PACS. The teleradiology business is still in its infancy in Saudi Arabia, but is expected to come into much wider use over the next few years.

Regardless of their country of origin, radiologists are likely to recognise the multi-vendor equipment used in Saudi Arabia, but the disease mix is likely to be unfamiliar. For example, due to the traditional practice of marrying first cousins and other blood relatives, genetic diseases – particularly neurological disorders – are common in the country. These conditions are either rare or unknown in the West, noted Prof. Ibrahim Alorainy, professor of neuroradiology at King Saud University in Riyadh.

Whereas in the past, the cause of a congenital abnormality might have gone undetected, imaging advances have enabled the discovery of genetic diseases directly caused by inter-mar-



Riyadh, the capital city of the kingdom of Saudi Arabia, extends for around 1600 sq. km. and has a population of more than 5.8 million. The name is derived from the Arabic word, 'rawdah', meaning a place of gardens and trees. (Photo provided by J. Gomez)



Dr. Nizar Al-Nakshabandi from Riyadh/SA will explain the role of MRI in the detection of brucellosis at today's 'ESR meets' session.

riage. Some are even named after radiologists, such as the Bosley-Salih-Alorainy syndrome, discovered by one of the 'ESR meets' presenters and his collaborators.

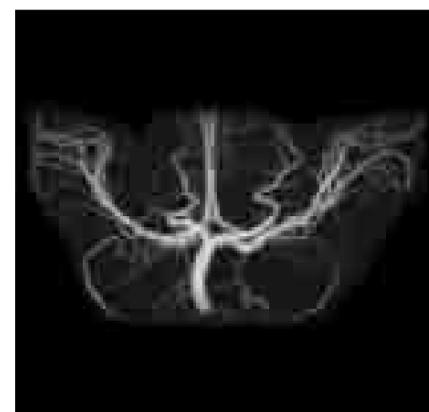
MRI and CT can now be used to make a diagnosis, including assessment of how well organs are working, thanks to functional imaging methods.

"There have been tremendous developments in techniques in the last decade. We are now better positioned to diagnose congenital malformations in different parts of the body structure," Alorainy said. "Without imaging, we would not be able to pick up abnormalities in affected persons."

Some people with genetic diseases may be asymptomatic, while others have unexplained symptoms. For example, in one case, imaging was used to detect the abnormal development of the



Coronal cropped STIR-weighted image shows a moderate left hip joint effusion with debris and early bone marrow oedema due to brucellosis septic arthritis and early osteomyelitis. (Provided by N. Al-Nakshabandi)



MR angiogram carried out on a patient with a homozygous HOXA1 mutation called the Bosley-Salih-Alorainy syndrome. Image shows congenital absence of both internal carotid arteries and large vertebral arteries. (Provided by I. Alorainy)

inner ear in a deaf child. Furthermore, imaging can help depict abnormalities that manifest in abnormal eye movement, lower IQ, and/or poor school performance.

A diagnosis provides patients and their families with a greater understanding of the nature of the condition and how to manage it. Also, a married couple who have one child with congenital deformities may seek genetic counselling to assess the chances of passing on a disease to another child.

Other presenters at the session will review diseases that are common but not genetic in origin. Dr. Nizar Al-Nakshabandi, chair of radiology at

King Saud University in Riyadh, will review imaging of brucellosis, which is an infectious disease transmitted by animals and animal products to humans, and is also called Mediterranean fever. Common in Middle Eastern as well as Mediterranean countries, brucellosis is commonly caused by consumption of unpasteurised dairy products made from infected animals. Those who work with animals are also at risk of getting exposed to this contagious condition. Many systems in the body are affected, but the musculoskeletal system is most affected and is best depicted on MRI.

"Brucellosis remains an important health problem. MRI is your best bet for picking it up," he said.



Radiology is evolving fast in Saudi Arabia, and the value of imaging services has taken hold with physicians. In this photo, a teaching session is taking place at the MR suite. (Provided by S. Lingawi)

ESR meets Saudi Arabia

Monday, March 8, 12:15–13:45, Room B

EM 4 Saudi radiology
Presiding: C.J. Herold; Vienna/AT
S.S. Lingawi; Jeddah/SA
M. Szczerbo-Trojanowska; Lublin/PL

- **Introduction**
S.S. Lingawi; Jeddah/SA
- **Peculiar musculoskeletal infections and infestations**
M.E. Abd El Bagi; Riyadh/SA
- **Brucellosis in Saudi Arabia from head to toe**
N.A. Al-Nakshabandi; Riyadh/SA
- **Role of imaging in discovery and characterisation of genetic diseases**
I.A. Alorainy; Riyadh/SA
- **Panel discussion**

Diffusion-weighted imaging offers window on histology and pathophysiology

State-of-the-art diffusion-weighted imaging (DWI) has already proved its value in MR imaging of stroke, but the technique is quickly gaining momentum for non-ischaemic lesions, as well as central nervous system (CNS) applications. In addition, diffusion tensor imaging (DTI) holds promise for better understanding brain and CNS pathology. While there are challenges to utilising these techniques, there are some potential benefits, including providing information about histology and pathophysiology.

The explosion of DWI and DTI applications is made possible by hardware and software developments, according to Prof. Mario Mascalchi, from the radiodiagnostic section of the department of clinical physiopathology at the University of Florence, Italy.

"Due to the sensitivity to extracellular oedema or microstructural changes both determining increased proton diffusion, DWI and DTI are the techniques of choice for assessment of the diffuse white matter involvement in inherited or acquired metabolic diseases and in age-related small vessel leukoencephalopathy," he explained.

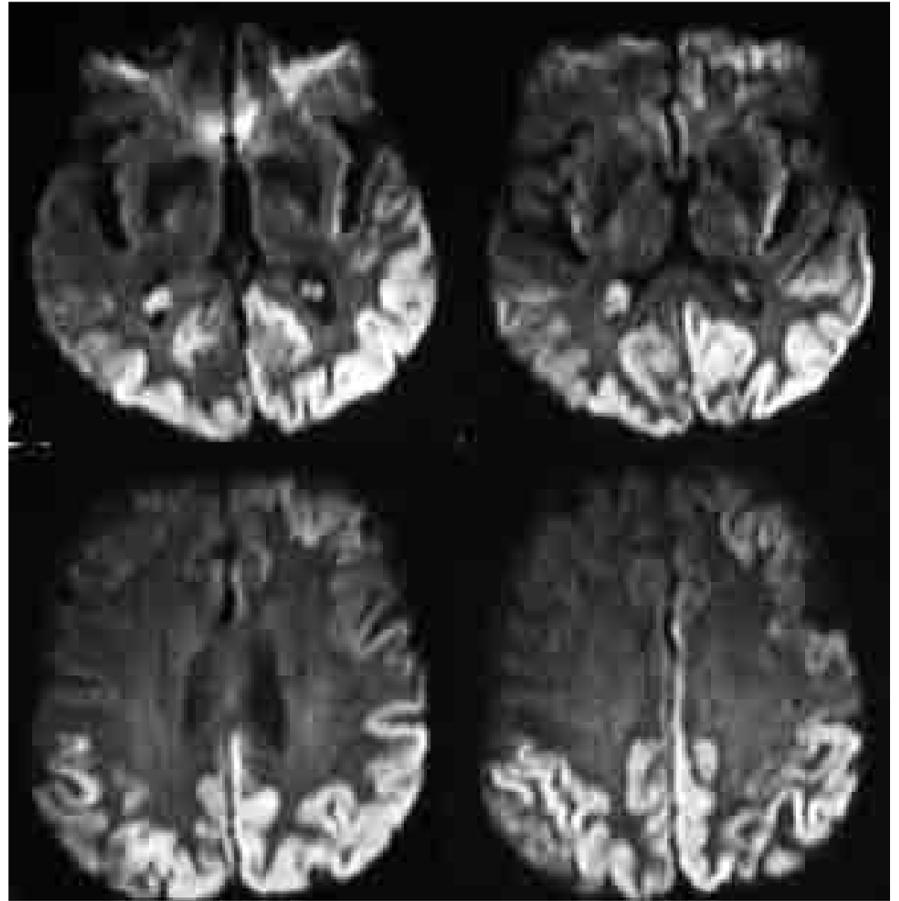
Restricted diffusion in the cortical grey matter shown on DWI is a sensitive diagnostic feature of herpes encephalitis and Creutzfeldt-Jakob disease. In addition, both DWI and DTI have been increasingly used to map white-matter tract damage in neurodegenerative diseases of the gray matter, such as movement disorders and dementias.



Prof. Mario Mascalchi, from the radiodiagnostic section of the department of clinical physiopathology at the University of Florence/IT.

Dr. Meng Law, a professor of radiology and neurological surgery at the Keck School of Medicine, University of Southern California, Los Angeles, told ECR Today that the key point of his presentation is that DWI and DTI have applications beyond stroke. Of particular interest to general radiologists will be the use of DWI to differentiate between tumoural and non-tumoural disease such as glioma, metastases, lymphoma, infection, and demyelinating disease, as well as differentiating recurrent tumour from necrosis. He added that DTI is especially of interest in the spinal cord.

Law and his colleagues use DWI in every patient as part of their routine protocol. Both DWI



Diffusion-weighted MR images provide high contrast for detection of the subcortical and cortical grey matter changes in a 75-year-old man associated with Creutzfeldt-Jacob disease/herpes encephalitis. (Provided by M. Mascalchi)

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and DTI can be done with a routine 1.5T scanner, and 3T is not necessary, he said.

DWI produces image contrast by the random microscopic motion of water molecules in different tissues. By acquiring at least six diffusion-weighted images in different spatial directions, a diffusion tensor can be estimated in every voxel, said Wim Van Hecke, Ph.D., from the department of physics, VisionLab, University of Antwerp, Belgium. This diffusion tensor describes the three-dimensional diffusion process in that voxel and can give an insight into the white-matter fibre architecture.

Recent DTI studies have demonstrated the potential to detect microstructural pathological alterations. Among the disease states that can benefit most from these advanced imaging techniques are neurologic disorders, such as multiple sclerosis, amyotrophic lateral sclerosis (ALS), and Huntington's disease, as well as brain tumours and psychiatric diseases such as schizophrenia, he said.

"Quantitative diffusion-weighted and diffusion tensor measures can give an insight into different non-infarct lesions of the brain, such as infectious, neoplastic and demyelinating diseases," Van Hecke said, adding that diffu-

sion tensor tractography is increasingly being used in the presurgical assessment of brain tumours.

He thinks that it is important for radiologists to know when it is best to use DWI compared with DTI.

"What is the extra information one can gain by obtaining DTI datasets compared to DWI? How can the structural DTI information be of interest for the diagnosis? These are important questions being explored," he said.

Law offers the following list of papers as resources for interested radiologists who are keen to learn more about this subject matter:

- Chenevert *Mol Imaging* 2002;1(4):336-43.
- Hesseltine et al, *Am J Neuroradiol* 2006;27(6):1189-1193.
- Lu et al, *Radiology* 2004;232(1):221-8.
- Mukherjee et al, *Neuroimaging Clin N Am* 2006;16(1):19-43, vii.
- Provenzale et al, *Radiology* 2006;239(3):632-649.
- Thurnher et al, *Magn Reson Imaging Clin N Am* 2009;17(2):225-44.
- Zimmerman et al, *Am J Neuroradiol* 2001;22(6):1013-4.

Special Focus Session

Monday, March 8, 08:30-10:00, Room F2

SF 15b Diffusion-weighted imaging of the CNS beyond stroke

- **Chairman's introduction**
S. Sunaert; Leuven/BE
- **DWI in focal non-ischemic brain lesions**
M. Law; Los Angeles, CA/US
- **DWI in diffuse non-ischemic brain and spine pathology**
M. Mascalchi; Florence/IT
- **DWI: Use of advanced diffusion markers in non-infarct lesions**
W. Van Hecke; Antwerp/BE
- **Panel discussion:**
DWI: A window on histology and physiopathology?

Effective use of CT can save lives in emergency abdominal imaging

By Frances Rylands-Monk

It is widely accepted that reducing time from admission to definitive care saves lives, but usually imaging is one of the major sources of delays. This means radiologists play a vital role in prioritising patients and selecting the correct modality.

Dr. Otto Chan, formerly head of emergency and trauma radiology at the Royal London Hospital in the U.K., believes that if a patient presents with abdominal pain, doctors should image early and not waste time observing or repeatedly examining patients.

"The danger is that hospitals constrained by the notion of cost will then perform the cheapest imaging possible, a plain abdominal x-ray, which is usually a complete waste of time and misleading in terms of diagnosing the patient," said Chan, who will speak about fast-track imaging at this afternoon's categorical course. "A normal scan is needed to rule out anything critical. In most emergency situations, abdominal plain film is at best not helpful, and at worst dangerous."

Abnormal abdominal plain film is notoriously difficult to interpret, while a normal abdominal x-ray is misleading because it misses various conditions. Chan recommends that radiologists move away from the logic of cost implications and order CT scans, which are quicker, more accurate and sensitive enough to exclude significant abnormalities.

"The cost of a CT scan is virtually zero. The scanner is there, the radiographer is there. The only extra cost is a bit more electricity and keeping the radiologist occupied a little longer. Otherwise the true cost is bed-stay, clinical observation and lots more 'cheap' imaging," he stated.

In countries with government-imposed waiting-time targets, such as the four-hour maximum wait for emergency departments in the U.K., radiologists must allow potential life-threatening conditions to take priority, even if these patients arrive after other less critical patients who may have been waiting for longer, he argued.

"If we as radiologists allow management to decide on priority, then we are not providing a sound service to patients. Nor can you have a functioning accident and emergency department without there being the appropriate modern equipment, and by that I mean plain x-ray, ultrasound and CT as a minimum," noted Chan. "The problem is that globally, emergency imaging has always been the 'poor relation' to cardiac and cancer."

In countries where health systems are under great strain, this can have a devastating effect. According to TARN (Trauma Audit and Research Network), an independent research group for England and Wales, the U.K. has the worst trauma statistics in the developed world and no U.K. hospital has improved its trauma statistics in the last eight years, he pointed out.

Currently involved in a legal battle with his own former employer due to clashes with management, Chan is no stranger to the concept of 'boat-rocking'.



Axial CT of a patient with blunt trauma to the liver shows regions of low attenuation that parallel the portal vein and its branches, which is called periportal low attenuation (white arrows). This feature, when seen in proximity to a hepatic laceration, may represent a haemorrhage dissecting into the periportal connective tissue. (Provided by J. Cazejust)

"Specialists need to take responsibility for their actions and treat every patient as though they were a member of their own family. They should demand and provide whatever service is necessary for each individual patient, ignore finance and concentrate on clinical indications," he said.

In other statistics, road traffic accidents (RTAs) across Europe have increased over the past decade. There are a reported 10,000 accidents in France per year, and the average RTA patient has been getting younger.

"CT allows rapid image acquisition, providing head-to-toe images in two minutes," said Dr. Julien Cazejust, a radiologist at Saint Antoine Hospital, Paris. "It provides an accurate diagnosis of solid organ rupture. My talk should appeal to any radiologist working in or with emergency surgery and emergency trauma surgery."

At Saint Antoine, all patients involved in RTAs are scanned with CT. Using modern 64-detector CT scanners, an image of the entire body can be taken quickly and the patient can be in and out of the unit in five minutes, he said.

Cases of arterial and venous bleeding require different management. Doctors must discover whether bleeding is outside or within an organ, and images must be obtained in both the arterial and portal venous phases, or one image should show both phases. This latter option is not difficult, but is a question of precise timing, noted Cazejust. So far, no definite conclusions can be reached about the best approach; with two images, doctors are sure to see the arterial and portal venous phases, while one image is not as simple to read but it imparts less radiation to patients.

"We haven't used 64-detector scanners for long enough to understand the impact of radiation from these scans," he commented. "Car accidents predominantly occur in the younger segment of society. If we can diminish dose but obtain the same diagnosis as with two scans, this must be a better option, especially as patients with serious spleen trauma must be followed every week. Four scans or only two scans could make a difference in radiation received and what it does."

It is vital to understand the severity of the rupture as it may require immediate surgery, and imaging can be life-saving, stressed Cazejust. If we don't diagnose well, the patient may die in hours, he added.



Axial CT of a patient with blunt trauma to the liver shows extravasation of contrast material locally into a parenchymal haematoma. This is a false aneurysm of the right hepatic artery. (Provided by J. Cazejust)

At today's session, Prof. Nevra Elmas, professor of radiology at Ege University Medical School, Izmir, Turkey, will be talking about gastrointestinal (GIT) bleeding. GIT bleeding accounts for 10% of all patients admitted to emergency departments. Mortality rates in patients with massive and occult bleeding are high at between 20% and 40%. The correct therapeutic approach depends on accurate diagnosis, and this life-saving decision in turn relies on selection of appropriate modality and imaging techniques.

In upper GI bleeding, endoscopic studies are usually preferred as an initial examination, but massive haemorrhage will often obscure the bleeding origin. In lower GI bleeds, more complex investigations are needed.

"Working with out-of-date machines, lack of equipment, and communication deficiencies between radiology and emergency departments are additional challenges beyond those of working under tight timelines or getting optimum acquisition times without the use of a power injector," Elmas said. "Detection of the site of bleeding may remain negative despite optimal techniques."

Refinements in CT and MR angio techniques have improved management of haemorrhagic patients due to their capacity to show vessels and soft tissue. Both modalities need optimal contrast injection with optimal acquisition time. Delegates attending Elmas' talk will hear about the correct management of contrast agents in order to manage flow volumes and rates and acquisition time, as well as avoid positive oral contrast material artefacts. They will also learn about different approaches and protocols used in massive and occult haemorrhage.

"Radiologists should obtain both arterial and portal phase whole body images, which should be carefully evaluated both in source form and as reformatted images," Elmas said.

Despite invasive angiography being accepted as the gold standard in GI bleeding, its non-availability in emergency departments has meant that CT has become the major diagnostic modality for both massive and occult bleeding.

"Even with the latest technologies, the success of diagnostic radiology still depends on collaboration between emergency staff and invasive radiology," Elmas concluded.

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Categorical Course: Radiology in Abdominal Emergencies

Monday, March 8, 16:00-17:30, Room A

CC 1817 When time matters

Moderator: R.A. Novelline; Boston, MA/US

A. Emergency room: When radiologists can save lives

O. Chan; London/UK

B. Rupture of solid organs

J. Cazejust; Paris/FR

C. Intestinal haemorrhage

N. Elmas; Izmir/TR

New ways to image lung diseases must be introduced in clinical routine

By Mélanie Rouger

Lung imaging has changed over the past few years as new techniques have been introduced, but not all thoracic radiologists are aware of this evolution, which could significantly improve patient's management. A dedicated categorical course at ECR 2010 is showcasing the latest developments in this field.

Divided into six chapters, the course first focused on chronic obstructive pulmonary disease (COPD) in smokers. COPD was long thought to affect only the bronchial tree and lungs, but it is now established that COPD also affects the cardiovascular system and particularly the heart. When performing a CT scan of a smoker's lungs, it is thus important for radiologists to consider whether they should image the heart as well, explained Prof. Martine Rémy-Jardin, who coordinated the sessions. New protocols in morphological and functional CT were presented, as well as recent research in MRI.

Other respiratory diseases may also have an effect on the heart, especially if they worsen. Acute pulmonary embolism and many other acute and chronic thoracic diseases may alter cardiac function. A cardiothoracic CT examination is now possible in only one acquisition, and radiologists need to know this to adapt their protocols.

New horizons are also visible in the management of pulmonary tumours. One new therapeutic approach consists of destroying neovessels that develop in a tumour to dry it out. Researchers have worked a lot on angiogenic treatments for

the past few years and radiologists should make themselves aware of these developments, said Rémy-Jardin, who is head of the Department of Radiology and Chairman of the Department of Thoracic Imaging at the Hôpital Calmette of the University Center of Lille, France.

Chemotherapy and radiotherapy have changed, and these new treatments change the way radiologists manage patients by creating new ways to perform examinations, she added.

For instance, one innovation developed by Rémy-Jardin's team enables depiction of the number of neovessels in a tumour using CT. Dr. Nunzia Tacelli, who worked for two years at the Hôpital Calmette, told participants how to do so with CT tumoural angiogenesis analysis in Saturday's session.

"We used to image the tumour to measure it and see if it had grown, but now our focus has changed. Imaging can offer very precise answers to these new, targeted treatments," Rémy-Jardin said.

Scintigraphy has long been regarded as the only way to perform lung perfusion imaging. However, CT and MRI have garnered researchers' attention over the past three years, as both techniques offer more precise results. CT's biggest advantage over MRI is that it enables perfusion and diagnosis to be done during the same examination. But research is also progressing in MRI, and the course emphasised this point through various clinical cases.

New technologies lead radiologists to use more and more volumetric CT, which allows one to scan the whole thorax but also exposes patients

to high doses of radiation. By comparison, imaging with sequential cuts is ten times less irradiating, and might be more pertinent in some cases. Alternatives to CT are particularly relevant in the follow-up of pulmonary diseases, since one can focus on a precise location instead of screening the whole thorax again.

Participants were invited to take part in discussions on how to optimise volumetric protocols. "We use a slightly provocative approach to start the debates by asking 'Is volumetric CT the only way of scanning lung diseases? If yes, in which cases? What are the alternatives to it, and when should we use them?' It is easy to put in place, but we need to reach a consensus, so this is why we need to discuss it," Rémy-Jardin explained.

Finally, today's course, moderated by Dr. Marianne Boijesen from Sahlgrenska University Hospital in Göteborg, Sweden, will focus on the interaction between endoscopists and radiologists, to inform the latter of new developments in endoscopy and improve cooperation between both disciplines.



Prof. Martine Rémy-Jardin from Lille/FR is the coordinator of the Categorical Course on imaging in lung diseases.

Presenting thoracic radiologists with new facets of their work and discussing them with all the actors involved – pneumologists, endoscopists, nuclear doctors, cardiologists, etc. – can only help to improve the radiologist's contribution to patient management.

Categorical Course: Imaging in Lung Diseases

Monday, March 8, 08:30-10:00, Room D

CC 1518 New interactions between radiologists and endoscopists

Moderator: M. Boijesen; Gothenburg/SE

A. Imaging of lymph nodes: We can do better

C. Mueller-Mang; Vienna/AT

B. Direct nodal sampling by echoendoscopy: The clinician's expectations

F.J.F. Herth; Heidelberg/DE

C. Image-guided endoscopy and biopsy of lung nodules

C.-H. Marquette; Nice/FR

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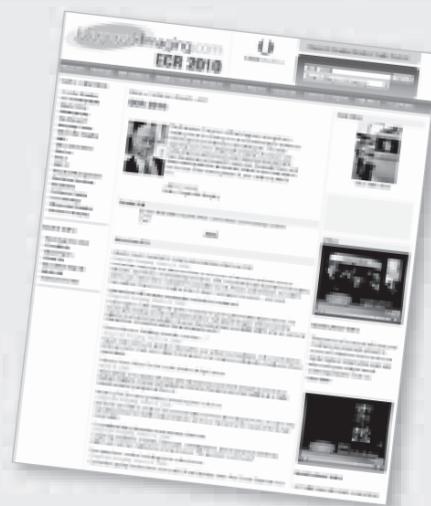


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Interventional radiology key to treatment of acute aortic syndrome

By Mélanie Rouger

Many factors can lead to acute aortic syndrome, a life-threatening disease in which patients present with symptoms mimicking myocardial infarction. Imaging modalities help to determine whether it is an intramural haematoma, a penetrating aortic ulcer, acute aortic dissection, or even the rupture of an aortic aneurysm that may be causing pain in the chest. However, diagnosis is not the only benefit that imaging offers when it comes to the aorta. Interventional radiology has an increasing role in the treatment of thoracic aortic rupture and certain aortic dissections. It is also a powerful tool in the follow-up of endovascular procedures. A dedicated session will demonstrate these points at ECR 2010.

Aortic dissection is the most serious disease of the aorta. It is also quite frequent, and may be caused by trauma, genetic pathologies, diseases of the elastic tissue such as Marfan disease, or atheroma, a swelling in artery walls.

Experts distinguish two types of dissection: type A, located at the aorta root, and type B, located near the left subclavian artery. Whereas surgery is most commonly used to fix type A dissections, drugs have long been regarded as the main method used to treat type B dissections. Only recently have endovascular stent grafts become the standard of care for complicated acute type B dissection.

"Ten years ago, surgery was only put in motion when things went wrong with drugs. Today endovascular management is the first therapeutic option when complications such as aortic rupture or visceral ischaemia occur," said Professor Hervé Rousseau from Toulouse University Hospital.

By placing an endograft in the descending aorta to close the tear in the artery wall, radiologists promote the thrombosis of the false lumen. The compressed graft is introduced through the femoral artery up into the descending aorta, where it is released.

Over the years, endovascular techniques have refined themselves and several are now offered to treat complicated type B dissections. Percutaneous fenestration consists of creating another wide orifice between the false and true lumens in order to reduce pressure in the false lumen. Prostheses can also be placed in branches, or digestive or renal arteries.

Encouraged by these advances, researchers have wondered if endografts could be used in preventive treatment in all uncomplicated type B dissections, in addition to drugs. The randomised study INSTEAD, which compared patients treated conventionally with drugs alone with patients treated with drugs and a thoracic endograft, could however not show the suspected superiority of preventive treatment by an endograft.

Endovascular management has proved a lot more efficient than surgery not only in type B



Figure 1a: The CT scan of a 29-year-old male post trauma from a motorbike accident. The distal aortic arch is irregular, suggesting a tear. (Provided by R. Morgan)

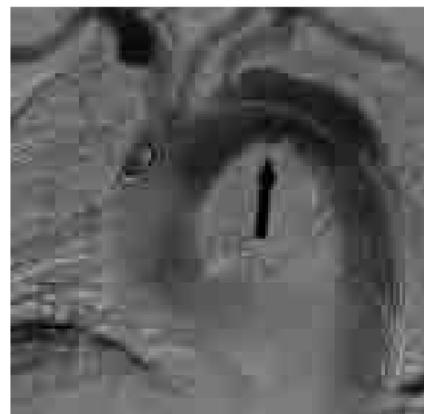


Figure 1b: The tear is confirmed at angiography. A Gore Thoracic endograft is advanced to the site of the aortic tear. (Provided by R. Morgan)



Figure 1c: Angiogram following deployment of the endograft showing satisfactory position in the aorta covering the tear. (Provided by R. Morgan)

dissection but also in thoracic aortic rupture, a catastrophic event that is usually caused by car accidents and leads to rapid death in many cases. For patients who survive the initial injury and who make it to the hospital, endovascular procedures offer a better chance of survival than surgery, explained Dr. Robert Morgan from St George's Hospital in London.

"Surgical mortality is around 30%, whereas the success of endovascular treatment is close to 100%, its mortality negligible and the associated risk of paraplegia almost inexistent," he said.

In the management of aortic rupture, the endograft is introduced into the body using the same route as for type B dissections and released at the site of the tear, to cover it and prevent the complete rupture of the aorta. The whole procedure is quick and may be performed in around 30–45 minutes.

"Complications of endografting particular to trauma mainly relate to poor conformability of endografts in the aortic arch," Morgan explained.

Young patients, who represent a large proportion of chest trauma victims, have a quite angulated aorta, and the endograft is expected to bend to conform to the curve. But current devices may not adequately conform to it. Moreover these patients may still grow, and as a result of this, their endograft may not be suitable in the long term. If this occurs, they may undergo later elective surgery to remove the device.

Patients with aortic trauma present in the emergency setting. Dr. Morgan recommends that physicians who practise endovascular treatment of thoracic aortic pathology keep a supply of devices of appropriate size in stock for use in these urgent cases.

Patients who undergo endovascular treatment for acute aortic syndrome require suitable imaging follow-up to check the continuing beneficial effects of therapy and the integrity of the devices. This starts before discharge from hospital and usually involves annual CT scans and plain radiography.



Prof. Hervé Rousseau from Toulouse University Hospital will speak on endovascular management of acute type B dissection.



Dr. Robert Morgan from St George's Hospital in London will speak on endovascular management of thoracic aortic rupture at today's session.

Special Focus Session

Monday, March 8, 08:30–10:00, Room B

SF 15a Acute aortic syndrome

- **Chairman's introduction**
J. Lammer; Vienna/AT
- **Technique, advantages and limitations of CTA and MRA**
V. Bérczi; Budapest/HU
- **Key imaging findings that allow distinction among the various aortic pathologies**
F. Fanelli; Rome/IT
- **Endovascular management of acute type B dissection**
H. Rousseau; Toulouse/FR
- **Endovascular management of thoracic aortic rupture**
R. Morgan; London/UK
- **Panel discussion:**
When is it time for the diagnostic radiologist to call the interventionalist or surgeon urgently?

Image-guided interventions resolve brain aneurysms and blood clots

By Paula Gould

A growing number of patients are benefiting from advances in interventional neuroradiology. Aneurysms, vascular malformations, and tumours of the brain, spine, and head and neck can now be treated endovascularly in centres with the appropriate expertise, sparing patients from open neurosurgery. Endovascular methods are also being used in some particularly difficult-to-treat cases of acute ischaemic stroke.

The field of interventional neuroradiology is evolving rapidly, and many new devices are continually becoming available and alternative methods suggested. Keeping up with the state-of-the-art can be tricky, particularly when the workload is relatively small and patient follow-up is at an early stage.

To address this, the latest tools and techniques used in image-guided neurointervention are to be explored in depth at this morning's refresher course, chaired by Prof. Michael Forsting, director of the Institute for Diagnostic and Interventional Radiology and Neuroradiology, Essen University Hospital, Germany. The three invited speakers will be offering a balanced view of endovascular management, setting out the pros and cons of a minimally invasive approach over surgery.

The session will begin with a discussion of the image-guided management of intracranial aneurysms, presented by Prof. Antonin Krajina, interventional radiologist at the Charles University Hospital, Hradec Králové, Czech Republic. Approximately 100 cases of intracranial aneurysm are treated at the Charles University Hospital each year, either surgically or via the endovascular placement of metallic coils. Both methods have advantages and disadvantages, although patients tend to prefer the less-invasive option when the risks are explained. The decision, however, has to be guided by the doctor's judgement and expertise.

One potential drawback of the endovascular approach is its long-term stability, he noted. Approximately 9% of patients whose cerebral aneurysms are treated with coils will need further treatment, according to the latest study data. At the Charles University Hospital, patients who are under the age of 40 and have suffered a ruptured aneurysm will typically be refer-



Prof. Michael Forsting will be chairing Monday morning's session on interventional neuroradiology.

red to neurosurgery. Coil placement is more likely to be recommended to the over-50s.

Patients consenting to endovascular treatment must be made aware of the two most likely complications. There is a 1% to 2% chance that the aneurysm will rupture during coil placement, in which case the patient has a 50% chance of dying. The risk of cerebral ischaemia is higher (7% to 9%), but this is easier to treat endovascularly than a major bleed.

"The patients should be informed fairly," Krajina said. "We should tell them all the advantages and disadvantages from both therapies."

Stent placement can be an important adjunct to coil placement in the treatment of some difficult-to-treat intracranial aneurysms, according to Dr. István Szikora from the National Institute of Neurosurgery in Budapest, Hungary. The role of stent-assisted coil packing and stent-based flow modification in the treatment of ruptured and unruptured aneurysms is currently being explored. Szikora will present mid-term study data and discuss the clinical potential of these techniques, whilst also highlighting the limitations and potential complications.

The use of stents to treat atherosclerotic disease is much more widespread. Procedural complications associated with intracranial angioplasty are less likely if self-expandable and balloon-expandable stents are used. These types of stent should also help to prevent restenosis.



A: Angiogram of a 69-year-old woman with subarachnoid haemorrhage from an aneurysm in the anterior communicating artery. B: Total occlusion of the haemorrhage is achieved using platinum coils. The procedure took 90 minutes and was performed under general anaesthesia. (Provided by A. Krajina)



Stents may also be used to treat a small proportion of patients who have suffered an ischaemic stroke. Intracranial angioplasty and stent placement is just one of several endovascular procedures that have been suggested for acute stroke patients who are unlikely to respond to intravenous treatment with a clot-busting drug. Candidates for endovascular treatment may have an occlusion in the basilar artery, or a particularly long thrombus, said Dr. Lucio Castellan from the department of neuroradiology at San Martino University Hospital in Genoa, Italy. Other options include intra-arterial delivery of thrombolytic drugs, mechanical clot disruption with guidewires, and endovascular thrombo-aspiration via a microcatheter.

Little is yet known about the long-term benefits of these various approaches. Direct comparisons are difficult, owing to the paucity of study data and the number of variables that may influence

outcome. The procedures can require a high level of technical skill and should only be attempted by interventionalists working in specialist centres that have a high throughput of patients, Castellan said.

One potential benefit of the endovascular management of stroke patients is that the time window for treatment is extended to six or eight hours. In comparison, intravenous thrombolysis is not recommended 4.5 hours after the initial onset of symptoms. For the best outcome, however, patients should be treated as quickly as possible, which means that the diagnosis of acute ischaemic stroke should be made without delay.

"We have to obtain a diagnostic examination of the patient with CT as quickly as possible. This is the main take-home message for radiologists," Castellan said.

Refresher Course

Monday, March 8, 08:30-10:00, Room G/H

RC 1511 Interventional neuroradiology

Moderator: M. Forsting; Essen/DE

A. Endovascular management of intracranial aneurysms

A. Krajina; Hradec Králové/CZ

B. Endovascular treatment of acute ischemic stroke

L. Castellan; Genoa/IT

C. Stent-based technologies in the treatment of intracranial aneurysms and atherosclerotic disease

I. Szikora; Budapest/HU

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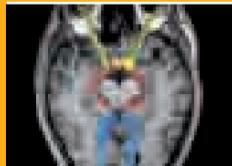
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**Medical image computing for personalised diagnosis**

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**New insights into computerised analysis of lymph nodes**

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Company Profile: Hitachi highlights ECR's role as major platform for the European market

Hitachi, one of the ESR's supporting members, will organise a satellite symposium at ECR 2010 on the future of ultrasound diagnosis. ECR Today introduces you to this partner.

ECR Today: What makes Hitachi unique in the healthcare business?

Hitachi Representative: Hitachi Medical Systems Europe, belonging to Hitachi Medical Corporation (HMC), Japan, is part of the industrial Hitachi Group that is celebrating its centenary in 2010. The Hitachi Group includes many business divisions, companies, technologies, products and solutions. There is hardly any other business group in the world that has such a broad range of diversity. And despite the economic crisis, Hitachi will continue to expand its businesses through global social innovation by focusing on the 'creation of environmental value'. At the core, this underscores Hitachi's founding philosophy of promoting business strongly and continuously in order to thrive at a steady pace toward the future. This is what differentiates Hitachi from all other competitors. Hitachi truly embodies our corporate statement 'Inspire the Next' (breathe new life into the next era) by combining the collective strengths of the wide range of businesses, technologies and expertise within the Hitachi Group to generate the optimal value for the diverse issues among customers and society at large.

ECRT: What are your latest innovations?

HR: The latest innovation in MRI systems is the powerful, patient-friendly OASIS™, a 1.2T superconductive open MRI, recently introduced in Germany and now being installed in several other EU countries. This system combines unparalleled patient comfort with superior imaging quality. High speed gradients and multi-channel RF technology allow exceptionally fast image reconstruction and ensure high diagnostic throughput – the strongest open MRI system ever brought to the medical field.

In ultrasound, there are the newly developed digital ultrasound systems HI VISION Preirus and HI VISION Avius, both fully software-orientated systems, featuring the latest broadband beam forming technology and ultra high-speed processing capability, together with single crystal transducer technology. Combined with advanced ergonomic design, the systems blend exceptional levels of user friendliness with superior image quality to guarantee maximum diagnostic confidence for sonographers and patients.

And last but not least, our innovative elastography tool HI-RTE (Hitachi Real-time Tissue Elastography). HI-RTE is an ultrasound imaging technology for assessment and real-time colour display of tissue elasticity. HI-RTE facilitates detection and visualisation of malignant disease and offers increased accuracy for tissue sampling. It complements conventional B-mode imaging and helps reduce the financial and emotional burden of further investigations for healthcare professionals and their patients. This technology is now available for a range of different applications.

ECRT: What imaging modalities will radiologists use in the future?



Dr. Marco Dolci is President & CEO, Hitachi Medical Systems Europe Holding AG.



Jürgen Hahn is the Chief Marketing Officer, Hitachi Medical Systems Europe Holding AG.



According to Hitachi, OASIS™ is the most powerful (1.2T) and patient-friendly whole body high field open MRI.

HR: Besides open MRI systems, to which Hitachi is especially dedicated, the full potential of CT modalities has still not been entirely explored. This is why we expect the growth of the CT market in the medium to long term. Also, interconnection of modalities, such as MRI, CT and Ultrasound, and expansion of telemedicine will foster further expansion of IT modalities for radiology and other applications.

ECRT: How does Hitachi help to ensure that technological development benefits all patients?

HR: Hitachi has always kept their technology affordable to the largest population. Every year a large amount of profit is reinvested in R&D to keep our products state-of-the-art without compromising cost of ownership. Last but not least, Hitachi R&D strategy is oriented towards the benefit of all human beings from the product: patients, technicians, professionals – following our claim 'Inspire the next'.

ECRT: Which products will Hitachi exhibit at ECR?

HR: We will focus on our key products in MRI, CT and Ultrasound. This means that in ultrasound, we will present our imaging solutions from the high to the low end. A highlight is our new generation ultrasound platform HI VISION Preirus that will now be extended by another attractive addition. In MR/CT, we

will showcase an impressive mock-up model of our patient-friendly OASIS™, 1.2T superconductive open MRI as well as scale-models of the product range.

ECRT: You have been an exhibitor at ECR since 2005. What major changes have you observed at the congress in this time?

HR: We observed that over time, the congress has gained such a reputation that the organisation has started to compete with major American congresses. We are impressed by the increased number of participants from all around the world as well as the valued scientific programme.

ECRT: How important is ECR to Hitachi?

HR: ECR has become the most important congress in European radiology. We strongly believe that this is the flagship organisation of the European radiology community. We experienced that ECR has developed a personality. It is more than just a scientific and industrial congress; it is ECR.

ECRT: In your opinion, what could be improved at ECR? Was the enlargement of the technical exhibition in 2008 a step in the right direction?

HR: For the industry partners, this means of course more competition but as we know, competition always has a positive and vital

aspect. On the other hand, this enlargement is attractive and valuable for the delegates. All in all, this was certainly positive.

ECRT: What benefits do you enjoy as a result of your cooperation with the European Society of Radiology (ESR)?

HR: One very nice benefit among many others is to give this interview. This is a great opportunity for us to let a large medical audience know more about our company, our innovations and future trends.

ECRT: What further collaborations do you foresee with ESR in the future?

HR: ESR offers a wide range of learning and training opportunities in accordance with its mission to promote diagnostic and interventional radiology and associated disciplines through pre and postgraduate education and research. This perfectly fits to our training and education structure we have set up at our European Technology Academy in Düsseldorf, Germany.

ECRT: Aside from providing the perfect opportunity to reach European customers, does exhibiting at ECR enable you to reach out to any other particular client bases? Which ones?

HR: ECR being the most important radiology congress in Europe, it always attracts a high level of professionals from Eastern and Western Europe, including CIS countries. As matter of fact, Hitachi is regularly visited by Russian radiologist delegations and, due to the present economical situation, some Ukrainian delegations. We also regularly have delegations from the Middle and Far East, who make their visits to check on the latest European technologies in medical devices and applications.

ECRT: What characterises the European market from Hitachi's point of view? Have you found that demands differ in Asia and the U.S., and if yes how?

HR: The EU market is somehow similar to the U.S. market. However, the EU professionals care more about details. In general, EU professionals allow more time for investigation of pathologies; furthermore, there is a large number of professionals willing to contribute to science and professional divulgations, with specific mention to European radiologists.

ECRT: How well do you think the technical exhibition and the scientific sessions of the ECR are connected? Should there be more integration between these two aspects of the congress?

HR: Yes, this could be an interesting aspect, e.g. by means of offering live streaming to certain areas in the technical exhibition or to offer the possibility of decent product and/or technology promotion in the scientific sessions (slides before and after sessions and/or product placement). Such an initiative would certainly be welcomed by supporting members.

The interview was conducted by Mélisande Rouger.

Fruitful cooperation between Russian and German radiology in St. Petersburg

An International Scientific-Practical Conference entitled 'Innovative technologies and visualisation methods in oncology' was organised by the Russian Association of Radiologists, the Russian Association of the Breast Physicians, the Principal Medical Department of the Presidential Property Management Department of the Russian Federation, the Academic-Research Medical Centre of the Presidential Property Management Department of the Russian Federation, the German Department of Radiology in Berlin ('Charité') and the company IPS. This conference took place in St. Petersburg in the state complex 'Palace of Congresses' of the Presidential Property Management Department of the Russian Federation.

More than 180 specialists in ultrasonic diagnosis, radiologists, and therapists specialising in computer diagnostics and magnetic resonance imaging, but also representatives of allied trades from Russia, Belorussia, Kazakhstan, Finland and Germany participated in the conference.

In the first report 'Molecular imaging: what we are talking about' Professor Bernd Hamm, Director of the Radiological Department of the Charité Clinic in Berlin, Germany, presented a new diagnostic branch; molecular visual diagnostics. Professor Hamm observed that now radiologists have wider opportunities to obtain diagnostic information on a cellular level. The report revealed not only the possibility of visualising tumour cells, but also of defining their

tolerance to therapy, control of treatment efficiency, and selection of the optimal medication.

Prof. Nadezda Rozhkova, Head of the Russian Federal Mammologic Centre in Moscow, presented a paper entitled 'Breast cancer as a challenge to a modern society' where basic achievements in the regulatory, technological and educational field of mammography were illustrated.

The report of Dr. Sergej Filimonov (Charité Clinic) entitled 'Application of Sonoelastography in the diagnostics of breast cancer and search for modified lymph nodes' gave information on the opportunities of using the new method of differential diagnosis for formations of categories 3 and 4 in the BI-RADS system, which should result in a reduction of numbers of unnecessary diagnostic biopsies. The evening session report of Dr. Filimonov, 'SonoVue from BRACCO in modern ultrasound diagnosis' highlighted the application of echo contrast media both in diagnostics and in the treatment of different diseases.

The report of the President of the Russian Association of Radiology, Prof. Alexander Zubarev from Moscow, entitled 'Technology of sonoelastography from Hitachi in the diagnosis of prostate carcinoma' represented a principally new, innovative approach in ultrasound diagnosis of prostate cancer, called elastography. According to the data presented, usage of this method allows estimation of the elasticity

of tissue, meaning one can both succeed in accurate identification of tumourous regions in the prostate gland and avoid unreasonable biopsies. According to Prof. Zubarev, the technology could represent a breakthrough in the modern diagnosis of prostate gland cancer.

Radiology residents from the Research Medical Centre of the Presidential Property Management Department of the Russian Federation, Svetlana Churkina and Elena Khokhlova, presented 'Elastography in differential diagnostics of gynaecological diseases' and 'The role of elastography in differential diagnostics of mastopathy', featuring new criteria for the assessment of the elasticity of different tissues and the appearance with elastography, providing the opportunity to make differential diagnoses of different gynecopathy and mastopathy.

Magnetic resonance tomography plays a leading part in the diagnostic algorithm for the exploration of oncologic patients. A number of reports were devoted to the application of MRI in diagnosis of tumours of different focalisation. Specialists from the children's Clinical Hospital №38 (Moscow), Dr. G. Shustova and Dr. L. Filippova, demonstrated the capabilities of MRT-diagnostics at low-field open systems in revealing growths of different focalisation in children. Doctors Natalia Marchenko (St. Petersburg) and A. Mitchenko (Military Medical Academy, St. Petersburg) presented the results of the magnetic resonance tomography with contrast enhancement. Doctor A. Karpenko (St. Petersburg), published

his report 'Magnetic resonance tomography with contrast enhancement in the diagnosis of pathology of joints'. Dr. Kazimierz Kukulski (Medical systems Hitachi, Germany), in his report summarised the experience of application of new ultrasonic technologies from Hitachi, which allow the acquisition of revolutionary new images.

The report 'Expertise of the production and delivery of medical equipment in Russia' from the member of the Executive Committee of the Russian Association of Radiology, Vladimir Uvarov, made an analysis of instrumentation of medical institutions. Uvarov called the leaders of the Ministry of Public Health and Social Development to take into account the opinions of representatives of professional medical associations when purchasing equipment.

To gain a more detailed acquaintance with the Hitachi equipment a master-class was held using Hitachi equipment. Specialists of the Chair of Radiodiagnosis of the Academic-Research Medical Centre of the Presidential Property Management Department of the Russian Federation and doctors from the Charité Clinic carried out a diagnostic ultrasound investigation using the innovative methods of elastography on real patients. Joint consultations with the participation of Russian and foreign doctors of medicine took place.

Further information on the Russian Association of Radiology can be found at www.russian-radiology.ru



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PACS vendors help to forge the tools for a distributed radiology service

By John Bonner

PACS vendors in the technical exhibition at ECR 2010 are demonstrating some of the hottest gadgets that will be filling the tool box of tomorrow's distributed radiology service.

Facing the intractable problem of stretching finite resources to meet an ever growing demand, healthcare providers are increasingly seeking regional, or even national, solutions. New technologies offer the hope of being able to 'square the circle' and maintain quality of service by sharing professional competencies across geographically distant sites. So the leading companies have developed new applications aimed at providing the same advanced diagnostic capabilities, wherever and whenever they may be needed.

Philips is showing a whole raft of applications available through its iSite PACS. These include Volume Vision, a tool that allows the radiologist to work with 3D images from multiple modalities, and a range of CT-specific applications, such as CT automated vessel analysis. These technologies are already available as plug-ins accessible on a main workstation, but by being integrated into the PACS, they will now be available throughout the enterprise.

"They are a set of clinically relevant and easy-to-use advanced visualisation tools that help radiologists and clinicians increase diagnostic confidence and improve treatment planning and follow up," explained Jaime Osborn-de Jong, marketing director for enterprise imaging informatics at Philips.

Furthermore, because the iSite system was developed with an open API (application programming interface), this provides interoperability with the clinical applications of other vendors' equipment found in other departments within the hospital network.

Carestream was a pioneer in integrating disparate processing and image analysis tools into its PACS workstations. It has now taken the process a step further with its latest version of PowerViewer, which offers advanced 3D capabilities such as multiplanar reconstructions and volumetric viewing. These features will allow radiologists to directly and dynamically view image data in different planes without having to switch to another application.

The system also allows automatic registration and direct volumetric matching of 3D studies created at different times and by different modalities. When one dataset is manipulated in any spatial plane, the other dataset automatically follows, explained Ulf Andersson, European marketing director with the company. He believes that these features will have a significant impact on productivity in the department and accelerate reporting times.

"That is because we can eliminate the time-consuming manual or semi-automatic processes currently used to set up comparison tools. Instead radiologists can immediately use reference lines, swivel, rotate, relate and other tools within both current and prior imaging studies," he noted.

Sectra is unveiling a new PACS to meet the particular demands of national breast screening services, including the long-term storage of multiple images of healthy tissue and being able to display and compare with the most recent images. The new system is based on the company's RapidConnect technology, designed to overcome the problems caused by reduced bandwidth and latency for radiologists and clinicians working at remote clinics or locations.

"What we have done here is to combine a proven mammography workflow – i.e., all its clinical and productivity features such as blind double rea-



The fully integrated approach in Centricity RIS/PACS-IW allows for a complete clinical and business management in one toolset, according to GE.



A change or upgrade of the PACS should not adversely affect add-on components, including handheld devices. (Provided by Philips)



The syngo.plaza from Siemens is designed to enhance clinical image reading and streamline workflow.

ding support, intelligent hangings of mammograms and strong reporting functionality – with the performance of RapidConnect," stated Claes Lundström, director of radiology IT solutions at Sectra. "This results in higher performance in mammography reading, a shorter turnaround time for mammography cases and strong clinical capabilities that will lead to improved diagnostic outcome."

With its new syngo.plaza PACS, **Siemens Healthcare** has set itself the ambitious goal of changing the way in which radiologists approach the task of reading multimodal images. The vendor claims that the new system provides fast and accurate multimodality reading at a single workplace, with one intuitive user interface.

When an image is obtained, syngo.plaza automatically identifies the type based on the scanner that was used and then, in line with the case complexity, calls up the corresponding 2D, 3D, or 4D applications in its syngo.via imaging software. Combined with a unified user-interface, this allows for a smooth transition between different applications and helps speed up the reading workflow. Because of its functionality, this new solution makes it possible to view the patient history at a glance, including previous examinations, written reports and DICOM files, the company states.

Agfa Healthcare is attempting to solve the technical problems in allowing referring physicians to access to the images stored within a PACS. Its

solution is achieved through the IMPAX Data Center, a facility for large-scale multimedia storage of any DICOM 3.0 files, which consolidates imaging data from disparate systems into a single point of storage and distribution via a regional electronic health record. Through enterprise-wide and vendor neutral image management services, this technology gives diagnosticians the freedom to select tools and offers clinicians comprehensive 24/7 access to images and results and enhances image-focused communications among interdisciplinary care teams, according to the company.

These images and associated documents can be accessed through the IMPAX data centre viewer. This is a zero-download medical image viewer designed to provide access for clinicians at any point-of-care, regardless of network constraints or the various platforms being used.

"There are a wide range of physical and technical barriers that can be problematic for many viewers. But with this technology, you enter the URL address, and provided that you have the right credentials, you can access images and reports using any browser – Internet Explorer, Firefox, Safari or any other," pointed out Eric Maurin-comme, chief strategy and marketing officer with Agfa.

GE Healthcare is expanding its range of imaging solutions with new developments in radiology, mammography and cardiology aimed at providing seamless integration to meet the challenges of the modern healthcare environment. Centricity RIS/PACS is its Web-based technology designed to connect radiologists, clinicians and referring physicians with ultra-fast streaming, advanced post processing and business intelligence tools, said Jürgen Reyinger, vice president and general manager at GE Healthcare IT EMEA. With its open standards-based architecture and portable Centricity Portal, it reportedly enables users to access the capabilities they need, regardless of time, location or institution.

"Our latest release of Centricity PACS supports more than 900 customer sites around the globe and offers information at their fingertips: patient data, clinical documents and images, streamlined workflows and improved communication among healthcare experts," he said.

But perhaps the sharpest implement in the radiologist's new tool box is the 'electronic scalpel' offered by **PACSGEAR**, a California-based company specialising in developing document and multimedia connectivity software.

"There can be a lot of bad data on a PACS included within the meta data. There are many possible mistakes – a patient's name may be spelled wrong, or be attached to another person's examination, or the exam may have right and left mixed up," explains managing director Michael Schmidt. "For very good reasons, it is often difficult to change these details once they are in the system, but our software allows radiologists or PACS administrators to override protective codes and fix quality control problems. Called GEARView QC, the software allows these responsible persons to alter errors in any DICOM field, to edit studies and to split or combine different exams. We can even overwrite pixelated data embedded on an image. And another good thing is that it works with any make of PACS."

Technical Exhibition

EXPO Halls
Monday, March 8, 10:00–14:00

EXPO Gallery, Publishers Row (1st Level):
Monday, March 8, 10:00–18:00

Medical image computing for personalised diagnosis and therapy

By Guido Prause

In January 2009, the former non-profit research centre MeVis Research GmbH, in Bremen, Germany, was incorporated into Fraunhofer Society and now goes by the name Fraunhofer MEVIS, Institute for Medical Image Computing. The Fraunhofer Society undertakes applied research of direct utility to private and public enterprise and of wide benefit to society. It is the largest organisation for applied research in Europe, with 59 Fraunhofer institutes and more than 17,000 staff. Fraunhofer MEVIS, directed by Prof. Heinz-Otto Peitgen, is strengthening its expertise in three fields of research: modelling and simulation, magnetic resonance imaging, and image registration.

Fraunhofer MEVIS

The development of clinically useful image-based computer assistance for patient-individual diagnosis and therapy has been the focus of Fraunhofer MEVIS, Institute for Medical Image Computing since its foundation as non-profit research centre at the University of Bremen in 1995. The R&D activities at Fraunhofer MEVIS are centred around the epidemiologically significant diseases of the cardiovascular system, the brain, breast, liver and lung, as well as oncological disorders. Based on the highly efficient software platform MeVisLab, more than 50 researchers from natural sciences and medicine are developing workflow-oriented software assistants at Fraunhofer MEVIS that allow for efficient analysis and visualisation of medical image data. Among the main diagnostic applications are reproducible and automated quantifications of anatomical structures and pathological processes. On the therapeutic field emphasis is put on planning, risk analysis, and image-guided support of complex interventional/surgical procedures, and image-based radiotherapy planning.

HAMAM

An example of the R&D activities of Fraunhofer MEVIS is the HAMAM project (Highly Accurate Breast Cancer Diagnosis through Integration of Biological Knowledge, Novel Imaging Modalities, and Modelling) funded by the European Commission within the seventh framework programme. The aim of HAMAM is the seamless integration of patient information and multi-modality image data in a clinical workstation for improved diagnostics of breast cancer via established (mammography, DCE-MRI) and newer (tomosynthesis, 3D-US, PEM) breast imaging modalities. Eight of the leading European research institutes and centres for breast cancer diagnosis are cooperating in the HAMAM project, which is coordinated by the European Institute for Biomedical Imaging Research (EIBIR) and supported by an international clinical advisory board consisting of recognised experts from Europe and the U.S.

Recent Developments

Medical images allow generalised models of biophysical and pathological processes, as well as diagnostic and therapeutic concepts to be optimised and adapted to the specific needs of an individual patient. Recent developments at Fraunhofer MEVIS are targeting three promising fields of medical imaging and image computing:

Modelling and simulation (Prof. Tobias Preusser): Mathematical modelling and numerical simulation of biophysical and pathological processes are essential for a reliable patient-specific diagnosis and therapy. An example is the planning and risk assessment of radiofrequency ablations (RFA) of liver tumours. Based on the knowledge of the individual anatomy of a patient's liver, RFA-

induced thermo lesions can be calculated in advance, taking into account the cooling effects of blood flow.

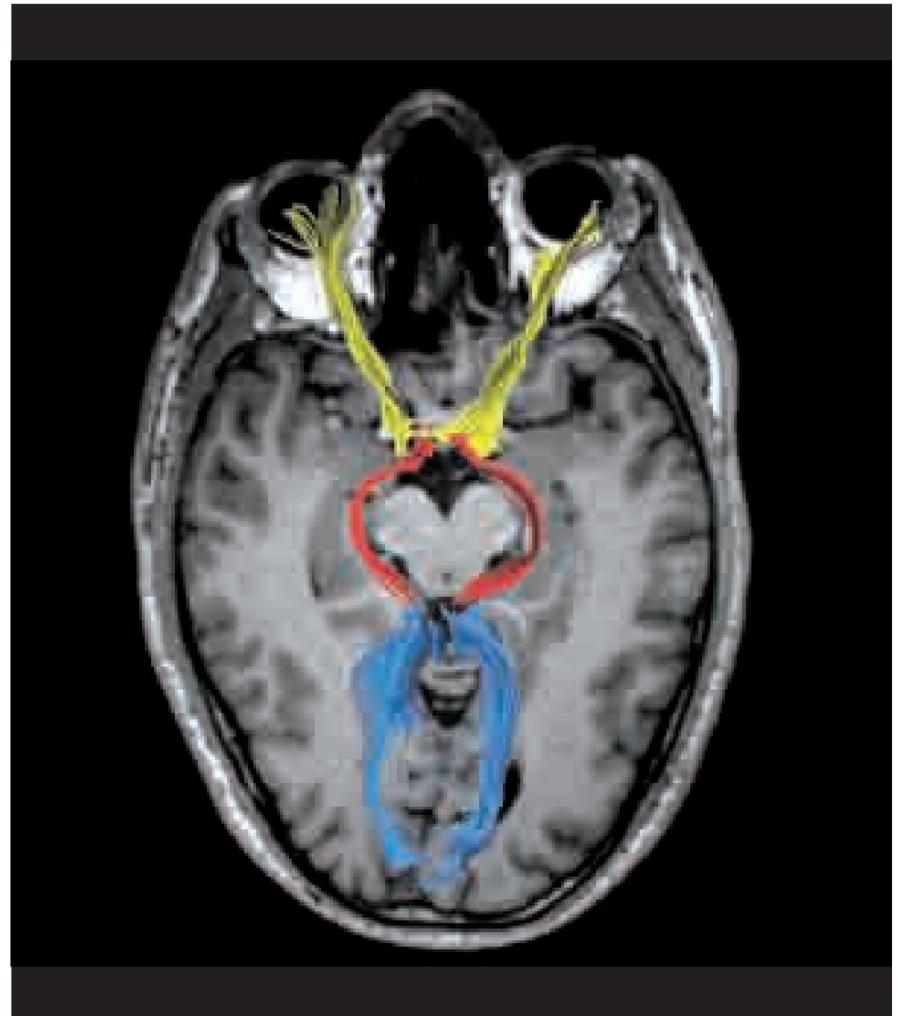
Magnetic resonance imaging (Prof. Matthias Guenther): Efficient medical image computing requires close interaction with image acquisition. This is especially true for MRI with its huge variety of imaging protocols and sequences. The co-optimisation of MR image acquisition and computation for various clinical applications is therefore a second recently developed field of research at Fraunhofer MEVIS. Like the working group for modelling and simulation, the group for magnetic resonance imaging is headed by a dedicated foundation professorship.

Image registration (Prof. Bernd Fischer):

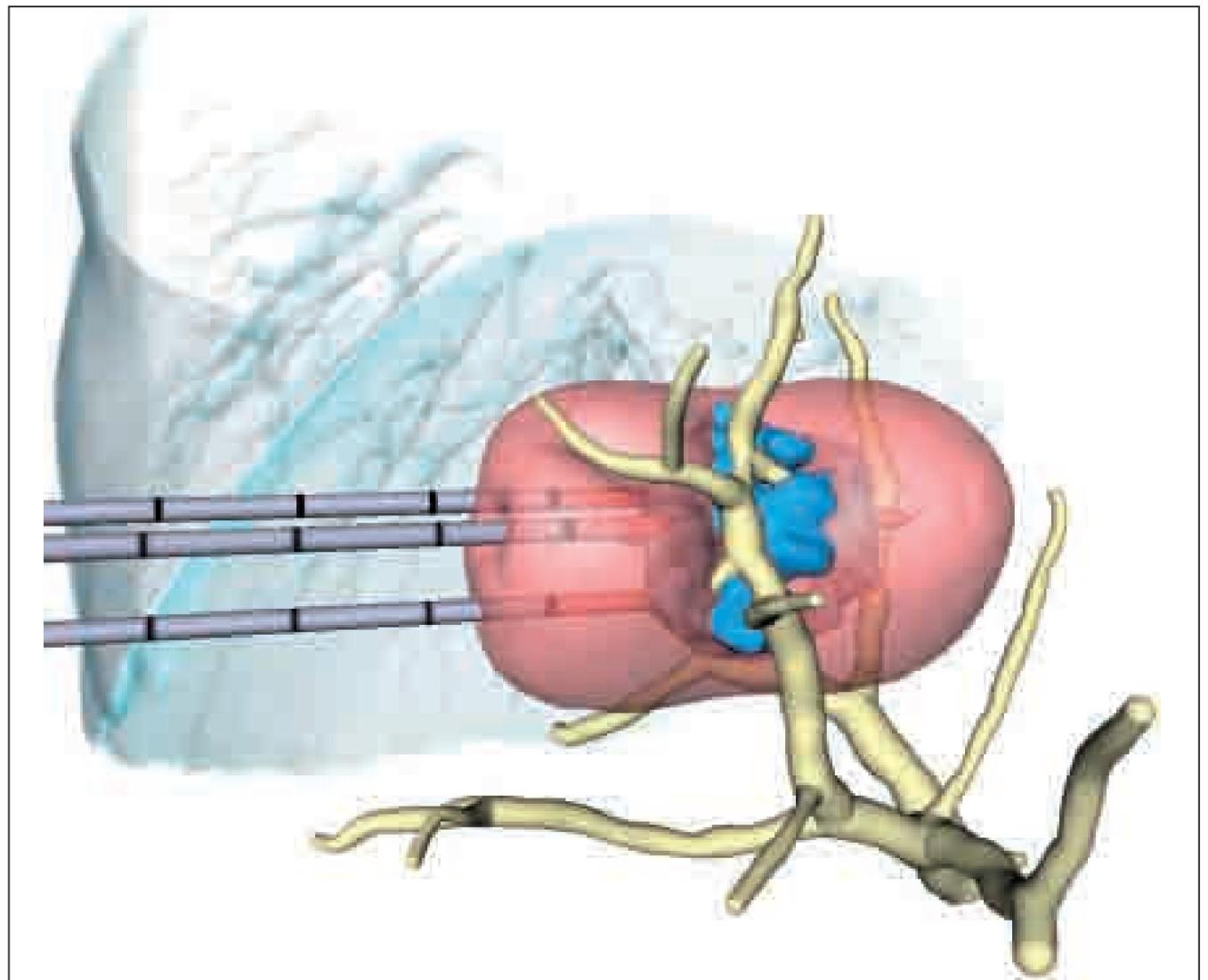
A third field of strategic importance is image registration. Accurate and efficient fusion of images from different modalities, time points, or patients is a ubiquitous task in medical image computing. It has strong relevance in many clinical applications such as multi-modality imaging, therapy planning, image guidance, and response monitoring. The work in this field is done in close cooperation with the newly established Fraunhofer MEVIS Project Group at the University of Luebeck, Germany.

Fraunhofer MEVIS maintains an international network of more than 150 clinical, scientific, and academic partners. In cooperation with its spin-off, MeVis Medical Solutions AG, and other globally operating industrial partners, Fraunhofer MEVIS has established a quality-assured innovation chain from basic research, to clinical prototypes, to certified medical products.

Information: www.mevis.fraunhofer.de



Axonal fibre bundles of the human brain can be reconstructed using diffusion-weighted MRI data. They can be used for neurosurgical intervention planning or for monitoring disease progression. The image shows the visual pathways which have been tracked using an optimised DTI sequence. The colours indicate the different anatomical sections: optic nerve (yellow), optic tract (red), and optic radiation (blue). (Provided by Prof. B. Terwey, MR- and PET/CT-Centre Bremen-Mitte)



Patient-individual numerical simulation of the radiofrequency ablation of a liver tumour (blue) with three applicators. The RFA-induced thermo lesion (red) is calculated based on the patient's CT or MR image data taking into account the cooling effect of nearby liver vessels. The tumour is not yet completely ablated. (Provided by Prof. M. Reiser, Dept. for Clinical Radiology, University Hospital Munich-Grosshadern)

Computerised analysis of lymph nodes increases agreement among investigators

By Ralf Bartolles, Markus Kietzmann, Johann Kim, Rene Korn, Definiens, Munich/DE; Peter Herzog, and Sonja Kirchhoff, University Hospital/Grosshadern, Munich/DE

Cancer represents a substantial burden – not only on the affected patients themselves, but also on our healthcare systems and the general population. The lymphatic system plays a central role in metastatic cancerous processes, as lymph nodes are often among the first regions of the human body to be affected by carcinoma.

The software application Definiens LymphExpert™ supports radiologists in the assessment of tumour progression and patients' response to treatment by determining changes in the size of lymph nodes. To validate the software against manual human measurements, a clinical study was conducted in cooperation with the University Hospital of Munich/Grosshadern. The study's objective was to assess whether semi-automated analysis could be comparable to a purely manual assessment by human readers. The study was supported by Peter Herzog, MD, and Sonja Kirchhoff, MD, University Hospital of Munich/Grosshadern.

The study

In order to cover a reasonable range of biological diversity, CT data (axial images of 3mm slice thickness and a reconstruction increment of 2mm) of 50 patients (37 males, 13 females) with an age-range between 20 and 87 years were selected for the study.

Nineteen subjects were lymphoma patients, while the remaining 31 patients' primary cancer sites were liver, lung, breast and others. A total of 294 lymph nodes from different areas were analysed, with the longest diameters ranging from 10mm to 110mm.

The clinical study was based on RECIST 1.0 criteria (Response Evaluation Criteria In Solid Tumors), which specifies that the longest diameter of a single lesion is to be measured in an axial slice. Two experienced radiologists measured the RECIST diameter of each lymph node twice: once manually, using a workstation certified for clinical use, and then using the software application, Definiens LymphExpert.

Results of the study

The clinical study's first objective was to check whether the segmentation results obtained by the software are acceptable for an experienced clinical user. In this study 86% of the results were found to be acceptable by both investigators.

The second aspect of the study compared the manual measurements to the results provided by Definiens LymphExpert. The outcome is depicted in the form of Bland-Altman diagrams (see Figures 1 and 2).

In Figure 1, each circle represents a lymph node. Its x-coordinate is given by the average of the corresponding manual diameter measurements of both radiologists. Its y-coordinate is given by the difference of these measurements.

Semi-automatic diameter quantifications are plotted analogously in Figure 2. The green lines indicate the \pm interval of the doubled standard deviation with respect to the mean (indicated by the black line).

Figures 1 and 2 show that the computer-aided quantification of the lymph nodes according to RECIST criteria is comparable to the manual measurements. When using Definiens LymphExpert, the agreement between both investigators even increased, shown by the decrease of the standard deviation of the mea-

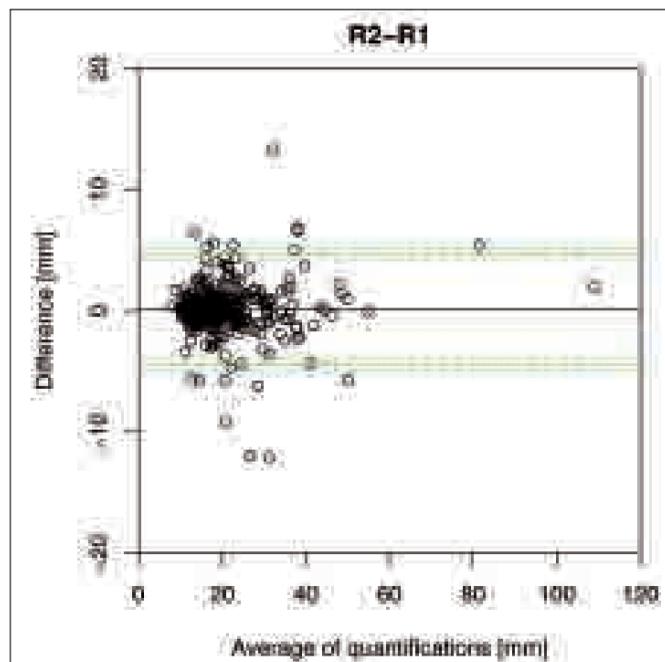


Fig 1: Bland-Altman diagram presenting the difference between the two readers' manual RECIST diameter measurements.

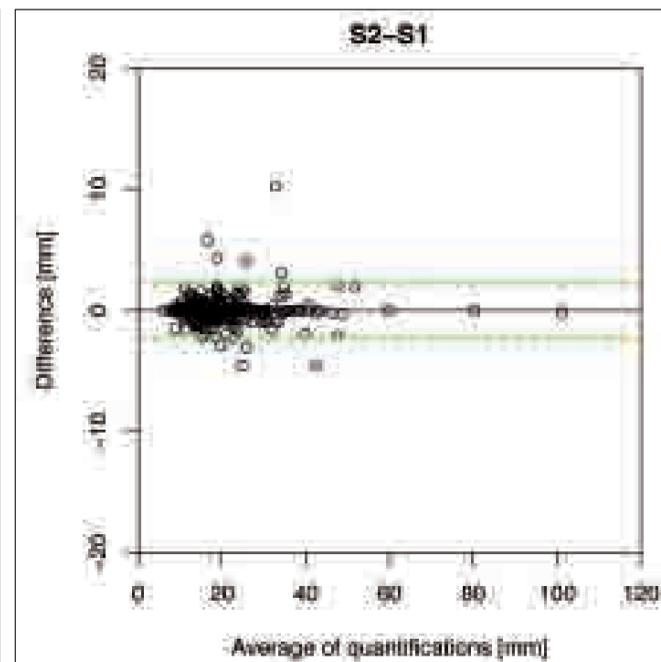
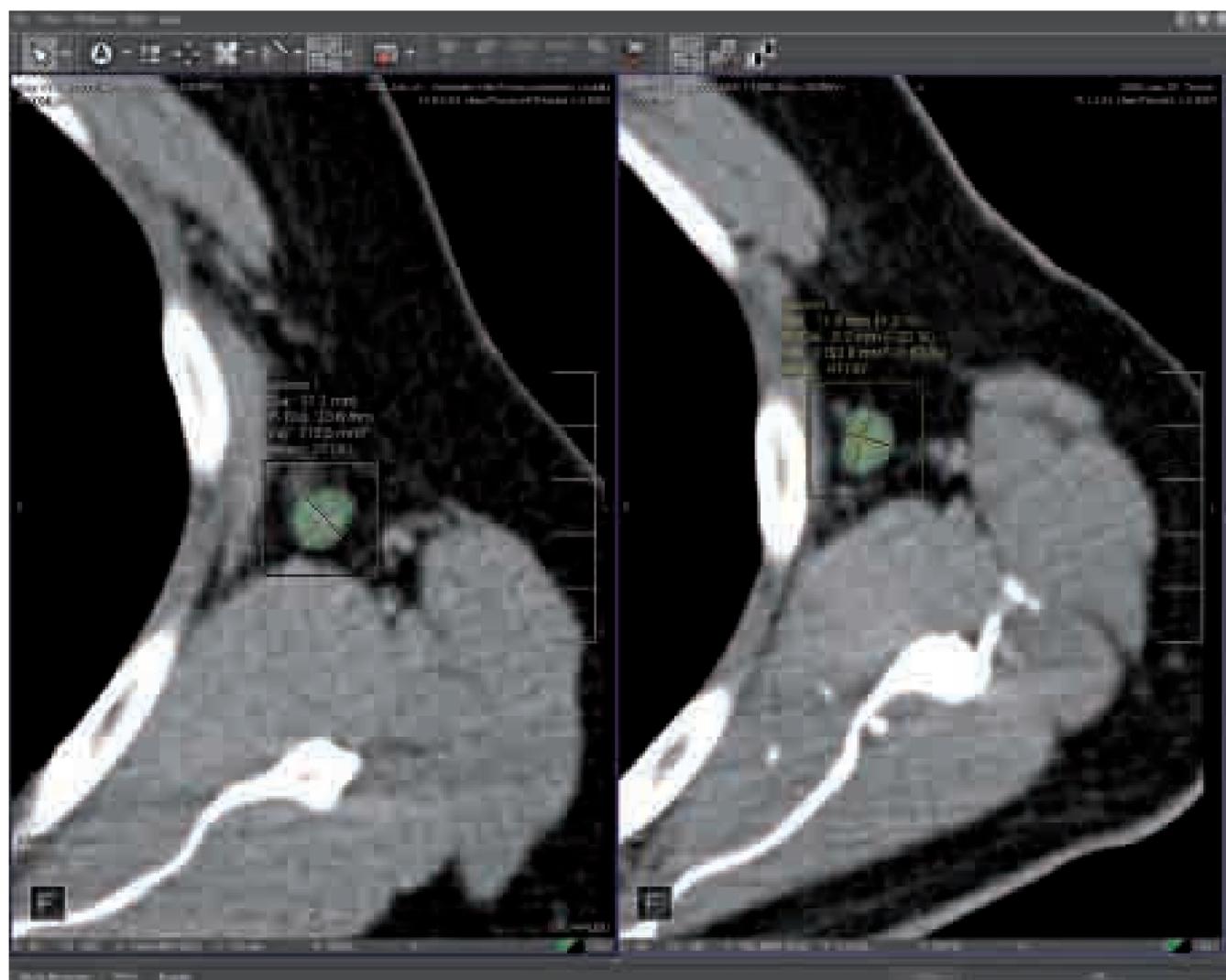


Fig 2: Bland-Altman diagram presenting the difference between the two readers' RECIST diameter assessments using Definiens LymphExpert.



Screenshot: Side-by-side comparison of analysed lymph nodes over time with Definiens LymphExpert.

surement differences from 2.34 mm to 1.15 mm (see Table 1).

Added value for clinicians

Determining how well and how fast patients respond to cancer therapy is essential for both patients and clinical physicians; the RECIST criteria were developed to help provide clinically-applicable information. Definiens LymphExpert demonstrated its efficiency in accurately quantifying RECIST criteria with acceptable results of 86% of the lymph nodes assessed. The accuracy achieved on the tested data was found to be comparable to manual diameter measurements.

The latest version of Definiens LymphExpert contains new features allowing for the users

to manually edit detected contours of lymph nodes and also to include lymph nodes that could not be automatically analysed. The new functions will help radiologists to reconsider segmentation results, such as the 14% of lymph nodes in the comparative study that dropped out of the acceptable range.

Definiens LymphExpert supports clinical physicians in making essential decisions on tumour progression and patient response to therapy.

Please visit Definiens at ECR 2010, booth 606 (EXPO Gallery first level).

	R2-R1 [mm]	S2-S1 [mm]
mean	0.13	- 0.01
stdev	2.34	1.15

Table 1: Mean and standard deviation of the differences between manual (R2-R1) and semi-automatic (S2-S1) quantification

R1, R2: manual measurements of investigators 1 and 2, respectively

S1, S2: semi-automatic assessment of investigators 1 and 2, respectively



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Submission of the Euro-Bioimaging preparatory phase proposal

A vital spark for the establishment of a Pan-European infrastructure for biomedical imaging

By Pamela Zolda

In December 2009, EIBIR and the European Molecular Biology Laboratory (EMBL) submitted a proposal to the call INFRA-2010-2.2.7 for the three-year preparatory phase of the new research infrastructure project Euro-BioImaging. The project 'Euro-BioImaging: European Biomedical Imaging Infrastructure – from molecule to patient' is one of ten projects in the field of biomedical sciences listed on the ESFRI European Roadmap for Research Infrastructures. It is headed by the scientific coordinators Gabriel Krestin (EIBIR) and Jan Ellenberg (EMBL).

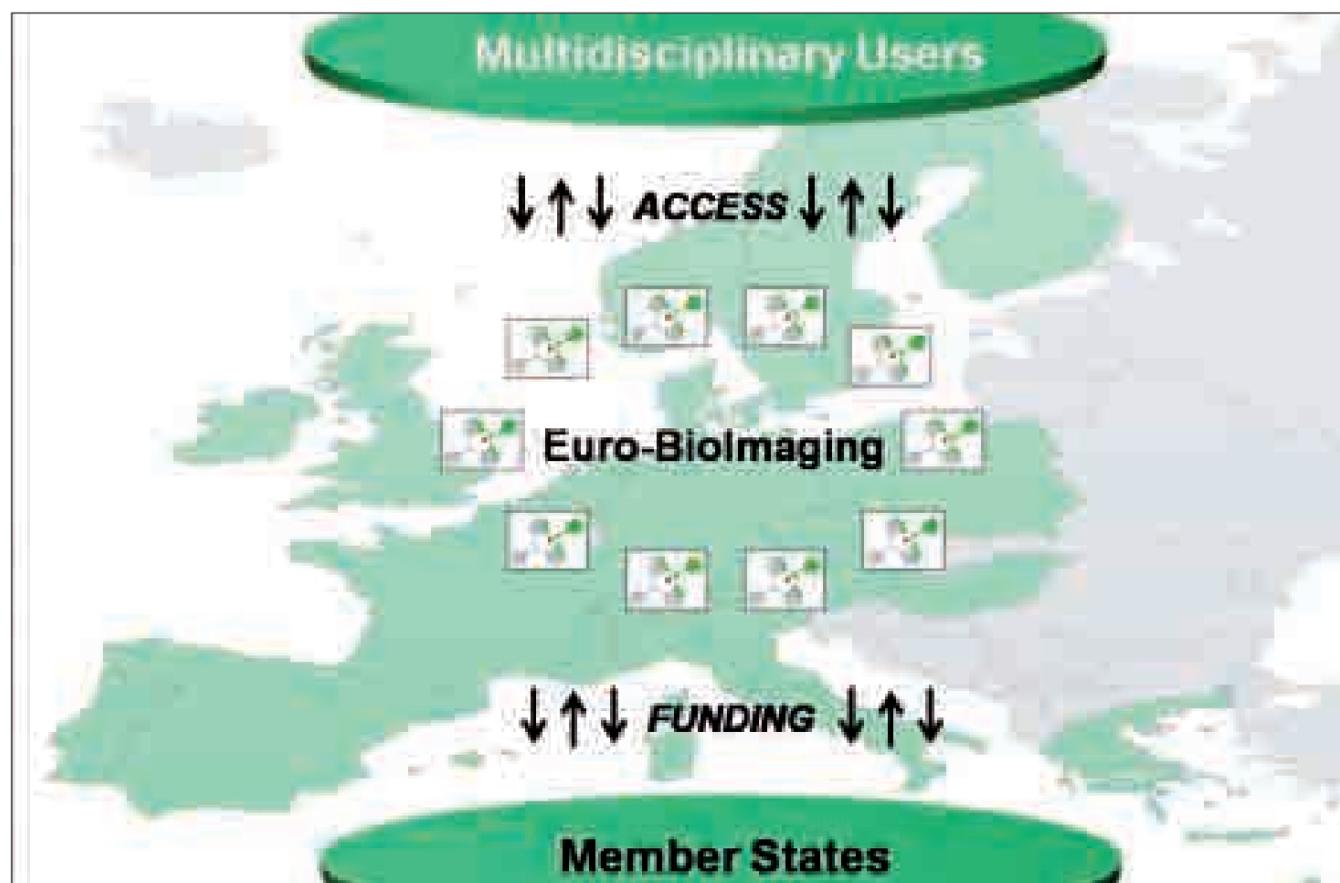
The ESFRI, the European Strategy Forum on Research Infrastructures, is a strategic instrument for developing the scientific integration of Europe and for strengthening its international outreach. The mission of the ESFRI is to support a coherent and strategy-led approach to policy-making on research infrastructures in Europe, and to facilitate multilateral initiatives leading to the better use and development of research infrastructures at EU and international level.

The ESFRI Roadmap identifies new research infrastructures of pan-European interest corresponding to the long term needs of the European research communities. By periodically updating and subsequently revising the ESFRI Roadmap, it will be considered by the different Member states as well as by the European Commission to better define priority projects to be supported at national and Community level. Potential new research infrastructures are likely to be realised in the next ten to twenty years and need to be supported by a relevant European partnership or governmental research organisations.

The Euro-BioImaging project (www.eurobioimaging.eu) brings together key research areas in imaging technologies, stretching from basic biological imaging with advanced light microscopy and in vivo molecular imaging of single cells and animal models, up to the clinical and epidemiological level of medical imaging of humans and populations. With this broad vision of imaging, Euro-BioImaging will address the imaging requirements of the biological and medical imaging research communities by creating a coordinated and harmonised plan for infrastructure deployment in Europe.

Euro-BioImaging will be planned to provide access to state-of-the-art equipment across the full spectrum of biological and medical applications, as well as to provide training and continue the development of imaging technologies to be able to offer them as new services.

Euro-BioImaging plans to establish a set of strongly interlinked nodes that will cover imaging technologies ranging from general advanced light microscopy, innovative ALM technologies, molecular imaging and innovative medical



imaging technologies to patient and population imaging. Nodes will be newly constructed or undergo major upgrades in order to devote a significant part of their capacity to external users. In this manner, the infrastructures will provide access to imaging technologies across the full scale of biological and medical applications in an integrated manner, allowing translation of new developments from laboratory to clinical use.

A key objective of all Euro-BioImaging infrastructure nodes will be coordination. They will create a coordination platform delivering knowledge and expertise, allowing exchange of methodologies and the joint use of acquired data. This coordination platform will serve European scientists by providing a clear path for access to advanced imaging technologies and will at the same time provide the possibility for many existing imaging research institutions or laboratories to contribute to knowledge development and training.

It is envisaged that strongly interlinked distributed infrastructure facilities will set the pan-European foundation for Euro-BioImaging nodes and will offer access to and training in

- ♦ a broad range of fluorescence microscopy methods
- ♦ innovative imaging technologies that are not easily accessible, still under development, or not yet commercially available

- ♦ optical tomography and related light microscopy methods, as well as multi-modal molecular imaging in animal models and the development and testing of new imaging probes
- ♦ standardised infrastructures for clinical trials in imaging, image-guided interventions and population-based imaging
- ♦ quantitative image processing methods, database models and data storage tools

In the initial phase of Euro-BioImaging, a plan to construct and operate this distributed set of complementary infrastructure nodes will be developed and supplementary topics will be evaluated, based on user needs. Thus, new and emerging areas that are becoming increasingly relevant for biomedical imaging may lead to the formation of additional nodes.

Euro-BioImaging will be considered a success once every research institution or research activity in Europe has access to, and training in, the imaging technologies they need through defined access models and training curricula, as well as effectively disseminated information concerning what imaging technologies and infrastructure exist where, and by so doing, improve European competitiveness in biomedical imaging.

Euro-BioImaging will run through three phases. Preparatory Phase (2010–2013, funded by the EC; €4–6m)

This initial phase aims to bring Euro-BioImaging to the level of strategic, legal and financial maturity necessary for implementation.

The specific objectives of the preparatory phase of Euro-BioImaging are

- ♦ to define the needs of the biomedical imaging user communities
- ♦ to develop a plan for harmonised/standardised access to imaging technologies
- ♦ to develop a plan for harmonised/standardised training curricula in imaging technologies
- ♦ to develop a plan for image data management, storage and processing
- ♦ to define the legal, governance and financial framework for the construction and operation
- ♦ to develop an overall business plan based on the legal framework and finance plan

Construction Phase (2013–2017, funded by Member States; €400–600m)
Euro-BioImaging nodes will be established and either newly constructed or set up through major upgrades of existing facilities.

Operation Phase (start: 2017, funded by Member States/EC; €250m/year)

Euro-BioImaging nodes will provide access and training to users. Technology will be kept state-of-the-art through continuous technology evaluation and development and through continuous upgrades of instrumentation at the nodes.

The Preparatory Phase Project

The planned Euro-BioImaging preparatory phase project comprises 13 strongly interrelated work packages. Work packages address the technical work required to optimise the nature and quality of the infrastructure as well as strategic work required to establish the framework for implementation phases.

The projected preparatory phase consortium consists of a set of 38 Beneficiaries representing partners from Austria (1), Belgium (1), Czech Republic (1), Denmark (1), Finland (1), France (4), Germany (9), Israel (1), Italy (3), Netherlands (4), Poland (1), Spain (4), Sweden (1), Switzerland (3), and the United Kingdom (3). These partners represent leading scientists in the different imaging technologies and infrastructures as well as key political and funding bodies. A total of 82 organisations representing 21 ESFRI member states have expressed their interest in actively participating in the Euro-BioImaging project as Associated Partners. So far Euro-BioImaging has received 125 letters of intent from universities, research councils, ministries, funding organisations and industry.

It is still possible to join the Euro-BioImaging preparatory phase as an Associated Partner. Additional partners, especially institutions with secure funding and support of national funding organisations, may be identified during the preparatory phase.

For more information please visit eurobioimaging.eu or eibir.org

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Views and perspectives on radiology in Bosnia and Herzegovina

By Serif Beslic, Sarajevo/BA,
Head of Association of Radiologists in
Bosnia and Herzegovina

The activities of the Radiology Clinic at Clinical Center of Sarajevo University, as one of the Founders of Association of Radiologists in Bosnia and Herzegovina, are at the core of current developments in imaging in Bosnia and Herzegovina.

About the Radiology Clinic

The first x-ray scanner in Bosnia and Herzegovina was acquired in 1899 (Bosniche Post number 39 – February 12, 1900). The Clinic for Radiology as it is today was founded in 1945, when the Central Roentgen Institute in Sarajevo was established. From 1962 until the present day, the Radiology Clinic has been organised in more or less the same way and has made constant progress. Today, the clinic employs one professor, one docent, one MD, and seven MSc. When considering equipment, you might say that the Radiology Clinic at Clinical Center of Sarajevo University is the leading Radiology Institution in Bosnia and Herzegovina, and is comparable to other leading Radiology Institutions in Europe and abroad. Besides conventional radiography equipment, the clinic possesses seven US machines with colour doppler and 3D functions, five MSCT scanners (one of which has 64 detector rows), three MR scanners, two 1.5 T, one 3T, and three angiography scanners with 2D and 3D options.

Structure of the Radiology Clinic

The Clinic for Radiology is divided into seven departments: neuro, thoracic, abdominal, musculoskeletal diagnostics, paediatric, interventional and vascular diagnostics, ultrasound diagnostics, as well as an Office of Radiology Diagnostics at the Paediatric Clinic, at the Clinic for Emergency Medicine, Orthopaedic Clinic, and at the General Surgery Clinic.

The head of the clinic is the Chief of Clinics, who is head of the management board, which consists of him and the Chiefs of Departments. The number of staff currently employed is 110.

Activities, planning of future activities and scientific issues of special importance to the Clinic and the Association

The clinic undertakes various activities relating to health, education and science (publishing scientific papers and books, and realisation of various scientific projects in cooperation with



The Academy of Fine Arts in Sarajevo, capital city of Bosnia & Herzegovina.

similar institutions in the country and abroad). The clinic also represents the scientific and educational basis of the Medical and Stomatology Faculties, and the Faculty of Health Studies for classes in radiology and similar classes taught by the lecturers from the clinic.

At the clinic, practically all conventional (plain and contrast-enhanced) radiological diagnostic methods are performed, as well as digital methods (including computerised tomography, magnetic resonance, angiographic procedures with 3D DSA, colour doppler and densitometry) and a certain number of radiological interventional procedures. The clinic has developed the latest diagnostic procedures such as CT and MR colonography, CT coronarography, MRI of the heart and whole body MRI staging of malignant diseases. Regarding interventional procedures, stenting of the aorta has started (EVAR; TEVAR), as well as stenting of peripheral blood

vessels, sclerotisation of gigantic echinococcus and other types of cysts etc. so that the focus is on the development of the latest diagnostic and interventional procedures being performed in the world.

Future activities are intended to build stronger relations with other radiology institutions throughout Bosnia and Herzegovina, and to maintain a leading role in accepting, developing, and promoting new diagnostic and interventional methods in our country.

Since the Radiology Clinic of Sarajevo University acts as the core of the Association of Radiologists of Bosnia and Herzegovina, at the same time we are trying to build the closest possible connections with other radiological societies in the Balkan region, where our cooperation is visible through a series of highly successful Balkan Congresses of Radiology, as well as organising

the Radiology Congress of Bosnia and Herzegovina with international participants every four years.

Of course, the ESR and ECR are of the utmost importance to our clinic and society, which is obvious from our regular yearly presence with the association booth during the ECR.

I would also like to mention that besides the *Medical Archive*, the *Medical Journal of Bosnia and Herzegovina*, and the *Radiology Bulletin*, which are the most important scientific journals for radiologists in our country, we are presenting our latest achievements in *Radiology Oncology*, and are preparing to submit papers to *European Radiology* as well.

Further information on the society can be found at www.radiologija.ba.

ESR Residents & Students Lounge

Introduced at last year's congress, ECR 2010 will again feature a **Residents & Students Lounge** located on the 2nd level. Free water and apples will be distributed. Meet and greet your peers and enjoy the **relaxing atmosphere**.

INSIDE TODAY**New competence-based curriculum for Dutch radiologists**

See page 27

**More international cooperation for Hungarian radiologists**

See page 28

**Find what's on today in Vienna**

See page 30

ECR 2011 Congress President encourages every delegate to return to Vienna

By **Mélanie Rouger**

As ECR organisers are already gearing up for the next congress, *ECR Today* met with ECR 2011 President, Professor Yves Menu from Paris, to learn about his plans and ambitions. From changing session formats to extending deadlines, he has prepared a programme that is up to date with clinical realities, to let every radiologist benefit from the latest innovations in their field. Here he discloses some of next year's congress's highlights.

ECRT: What are your ambitions and plans for ECR 2011?

YM: In 2011, we will introduce a number of innovations, starting with two categorical courses that will address more than pathology. The first course will focus on musculoskeletal MRI and place report writing at the centre of the sessions. There is still a great disparity between the reports written by radiologists, so we decided to follow the existing guidelines to teach participants what is important to clinicians. Each of the course's eight sessions will have the same format, with three lectures: the optimal protocol, the imaging signs, and the report. This course will be called Keep It Simple and Straightforward, using the acronym KISS; a little reference to ECR 2011's French presidency.

The second course, Clinical Lessons in Imaging Core Knowledge (CLICK), will be symptom rather than disease-oriented. It will present the main symptoms the clinician is faced with, and how the radiologist can help treat them. This approach seems more appropriate to the reality of clinical practice. Each of the sessions will feature three presentations. In the first, a radiologist will focus on the clinical background that the radiologist should know; in the second, diagnostic strategies and imaging tools will be compared; the third will deal with imaging signs. This order better fits the role of the radiologist, which is to understand clinical questions based on patients symptoms and advise the clinician on the procedures to implement.

A third point, which is also particularly important to me, will focus on the functional imaging of tumours. We could even use a James Bond inspired subtitle, namely 'The tumoural cell: live and let die', because this is how we increasingly treat tumours today, by using targeted therapies which attack the metabolism of the tumoural cell rather than trying to kill the tumour with cytotoxic chemotherapy or drugs. Perfusion CT, MR or US, tumour spectroscopy and PET/CT enable assessment of the efficiency of the targeted therapy by depicting tissue structure alterations, perfusion and metabolism. Every radiologist knows about these techniques, but they are only very rarely put into practice because they are presented in such a complicated way that they are hard to understand! In this mini course, we will explain how to implement functional imaging in clinical routine so that most radiologists will finally be able to benefit from it.

ECRT: What will be the scientific highlights regarding new technologies?

YM: Actually, we will concentrate quite heavily on old techniques! Basic radiology is more and more neglected in favour of new tools such as CT. But even if thoracic CT is increasingly used, thoracic radiography remains one of the most widespread examinations worldwide. If we do



Prof. Yves Menu, incoming ECR Congress President, will introduce a new course format on 'the beauty of basic knowledge' at ECR 2011.

not pay attention now, radiologists might soon become unable to read conventional x-ray images. Three years ago, we had a course on thoracic radiography, and were pleasantly surprised by the extremely high number of participants – over 600. So in 2011, there will be a course of one hour every day dedicated to thoracic radiology and accessible to 50 participants. This new course format, 'The beauty of basic knowledge', will hopefully become a series at ECR.

ECR 2011 will also innovate in the composition of the sessions. All the Special Focus and State of the Art Sessions, as well as some Refresher Courses, will have a different format, whereby more importance will be given to the chairman. We have shortened the lectures, and the last 15 to 30 minutes will be dedicated to a discussion in which the speakers will debate clinical cases. The chairman will either organise the discussion or he or she will present a synthesis, sometimes relevant clinical cases. The aim is to heighten interactivity between the chairman and the speakers.

Last but not least, we will have a new session in the series of New Horizon Sessions, which will focus on how a particular specialty will evolve over the next 15 years. Radiologists who are now choosing a specialty will be fully working with it by 2025, so it could be interesting for them to picture their future. The topic will be breast imaging.

ECRT: What do you think of the initiative 'ESR meets partner disciplines'? Will there be another discipline invited to ECR 2011?

YM: Of course this feature will be continued for 2011! This is a very interesting session, in which specialists can exchange knowledge in a truly friendly atmosphere. In 2011, gastroenterologists will be our guests, led by the United European Gastroenterological Federation.

ECRT: As former Chairman of the Scientific Exhibition Subcommittee of the ECR Programme Planning Committee you of course have a special interest in EPOS™, the Electronic Presentation Online System. EPOS™ has already undergone some major changes for ECR 2010 with a second submission period last October and an additional campaign in January. What are your plans in regard to EPOS™ for ECR 2011?

YM: In 2011, we will differentiate oral and electronic presentations even more, since there is no

reason, other than tradition, to keep the same submission system and deadlines. Unlike oral presentations, electronic posters can be reviewed fast and independently because the selection is made on quality only, and not on availability of rooms and time slots, as is the case for oral presentations. With the re-opening of the posters submission in October, we noticed that the quality of the submissions was equal to the ones submitted before the original deadline in September. Extending deadlines does not impair quality and it enables the latest scientific results to be made available. We need to be able to provide an immediate answer and take full advantage of the electronics; six-month deadlines belong in the past. We must be able to do better and ECR will once again be a pioneer in this field.

Also, to help visitors make the most of the exhibition, we will offer several specialty tracks to participants, tailored to their specialty and the time they have available.

ECRT: ECR 2009 saw a new initiative for students from the Congress President's home country, inviting 25 future radiologists to the congress and providing them with free accommodation and flight tickets. In 2010 this feature was repeated and will be again for 2011. What do you think of this initiative?

YM: It is a very good initiative and it certainly helps residents to decide upon a career in radiology. Young people are our future and we want to help them make the right decision. We will try to come up with other initiatives of this kind in 2011.

ECRT: What may delegates expect in terms of the social programme – a French theme?

YM: There will not be a special French theme as such, but we will bring something cultural to the 'ESR meets' programme. The French delegation will present an extra chapter on wine and champagne radiology, by explaining how we can enjoy the qualities of wine thanks to imaging, for instance how spectroscopy analysis enables the prediction of wine quality without having to open the bottle. Not only the French will present an additional session; the Brazilian delegation will also focus on Samba!

ECRT: Do you think your presidency will translate into a rise in French radiologists' attendance at ECR?

YM: I certainly hope so! We are working very hard on it with the President of the Société Française de Radiologie (Prof. Pruvo) and the President of Academic Radiologists in France (Prof. Claudon), and our ambitious objective is to double the number of French delegates at ECR 2011. On average about 350 French radiologists come to ECR. This would be a first in the history of the congress. I hope such a rise in attendance would translate into a sustainable higher participation of French delegates over the years.

ECRT: You are Professor of Radiology at Pierre et Marie Curie – Paris VI University, Chairman of the department of radiology at the Hospital Saint Antoine, and President of the European Society for Gastrointestinal and Abdominal Radiology (ESGAR). Do you have any time left for hobbies, and if yes which ones?

YM: Yes of course, I am currently taking my motorbike driving test licence and I am very fond of cycling. I also try to spend as much time as possible with my five children, especially my youngest, who is two and a half years old.

ECRT: How did you decide to become a radiologist?

YM: I decided upon this career because of its very nice environment. In my experience, being a radiologist is also a great way to meet many patients, even more so when you work in a hospital. Finally, it leads one to work with all the other medical specialties. Radiology is a crossroad between doctors, patients and specialties, and I love this. In 30 years of practice, I haven't come to regret it!

ECR Today: When was your first ECR? What has improved since then?

Yves Menu: I have been coming to ECR regularly since 1995. I have noticed a real, growing improvement in the quality of the scientific sessions. It has also experienced a dramatic improvement in its educational contribution, namely in the assessment of courses and lectures. Last but not least, ECR presents a new innovation each year, which contributes to increasing the quality of the congress.

ECRT: How does ECR compare to other radiological congresses?

YM: ECR is clearly the best general scientific and educational congress worldwide. It offers a very wide range within its programme, and has one of the highest average room attendances. There is no difference between the number of delegates attending scientific sessions and those taking part in educational courses. It is quite relevant to point this out because, while many congresses give more and more space to continuing education, ECR manages to promote both education and science. Finally, ECR is also ahead regarding its technical exhibition.

ECRT: What do you think of the programme for ECR 2010?

YM: The programme this year is both innovative and in line with tradition. It promotes interactivity and is very balanced, not only concerning the representation of subspecialties, but also between diagnostic and interventional radiology. Every session has been carefully prepared, and I think the result will be remarkable. One important innovation is the extension of deadlines for the submission of electronic publications, which proves that we are starting to enjoy the full benefits brought by electronic communication.

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ECR
2011

European Congress
of Radiology



The annual meeting of **ESRF** **myESR.org**
European Society of Radiology

Radiological Society of the Netherlands produces and implements exciting new competency-based curriculum

By Johan S. Laméris,
Amsterdam/NL, NVR President,
Erik Jippes, Groningen/NL,
Matthijs Oudkerk, Groningen/NL

The Netherlands is the first country to fully implement the 2005 European Training Charter for Clinical Radiology. Under the chairmanship of Prof. Oudkerk (University Medical Center Groningen) and Vice-Chairman Dr. de Haan (Maastricht University Medical Center), a committee (HORA) with several radiologists from academic and general hospitals, residents and educationalists (Wenckebach Instituut UMCG) started in 2006 to design a new curriculum¹. The challenge was to incorporate all relevant national and international developments and involve all relevant stakeholders. The curriculum is new in several ways; it is organ systems-based, it has a uniform national three-year common trunk, followed by a two-year subspecialisation, it is competency-based with appropriate assessment tools and techniques, and it is based upon regional collaboration among radiology departments with exchange of residents between departments.

All relevant radiological techniques (conventional, ultrasound, computed tomography, magnetic resonance imaging, biopsies, intervention and nuclear diagnostics) are integrated within the organ system-based modules. The subspecialisation programme (divided into chest, neuro & head and neck, musculoskeletal, cardiac, abdominal, breast, paediatric and interventional) allows individual radiologists to become experts in and keep up to date with a specific subspecialisation, whilst the aggregated individual competencies in the team of radiologists comprise the total knowledge base needed.

The so-called CanMEDS competencies are incorporated into the curriculum and adjusted to the unique profile of radiology. These competencies are medical expert, communicator, collaborator, scholar, manager, health advocate, and professional. The main assessment instruments are the Mini-clinical evaluation exercise (mini-CEX), Multi Source Feedback, Objec-



The famous of canals, the Dutch capital.

tive Structure Assessment of Technical Skills (OSATS), annual progression tests, and the portfolio. The goal is to train not only radiologists who are experts in the medical domain, but who are also very good in communication, collaboration, management and professional behaviour. Furthermore, the new curriculum encourages residents to pursue scientific training. This consists of one day each week devoted to science, equalling 20% of total training time. This training option is open to residents who have already conducted or are about to finish PhD research.

The curriculum was approved by the Radiological Society of the Netherlands, the Royal Dutch

Medical Association and the Dutch Minister of Health Care. In 2008 a new committee started to coordinate the implementation process of the new curriculum. From every region of education in the Netherlands a radiologist was asked to join the committee (HORA 2) as an implementation coordinator in their region. Implementation activities include; the construction of appropriate training schedules for the common trunk and subspecialisation in every region, didactic training of supervisors and residents in the use of the new assessment instruments (Teach-the-Teacher), the construction of cursory conferences for the common trunk, and implementation of a national electronic portfolio system. The implementation is

due in 2010. The new curriculum will lead to a significant quality improvement in radiological service and provides radiology with a significant competitive edge to other diagnostic and clinical medical specialities.

Further information can be found on the society's website www.radiologen.nl

¹ For a full description of the design process of the new curriculum, please see Jippes E, van Engelen JML, Brand PLP, Oudkerk M (2009) Competency-based (CanMEDS) residency training programme in radiology: systematic design procedure, curriculum and success factors. *Eur Radiol*, published online Oct 3, 2009. DOI: 10.1007/s00330-009-1623-z

European Commission performs SWOT analysis of Clinical Trials Directive

By Monika Hierath

The EU Clinical Trials Directive (Directive 2001/20/EC) was implemented in 2004, with the aim of simplifying and harmonising the administrative requirements for clinical trials across the EU, while ensuring

- ♦ safety of clinical trial participants
- ♦ ethical soundness of trials
- ♦ reliability and robustness of data generated.

It is widely accepted that the Directive has improved the safety and ethical soundness of trials across the EU, but a number of issues have emerged which have contributed to making the EU a much less attractive location to carry out clinical trials.

Through the consultation, the European Commission was seeking evidence of the strengths and weaknesses of the current legal framework, as well as views on the issues highlighted and ideas on how to address them.

The consultation considered a number of specific issues, including:

- ♦ measures to streamline procedures for multinational trials
- ♦ mechanisms to address weaknesses with regard the reporting of serious adverse events
- ♦ how to develop a more risk-based approach to clinical trials.

The ESR has carried out an internal consultation using a questionnaire of multiple choice questions and free text answers. Based on the feedback received, the ESR submitted a response to the European Commission in January 2010.

Please find below a summary of the main action points that the ESR considers essential to achieve a better European legal framework for clinical trials.

1. Eliminate the differences in views and requirements between Ethics Committees;

2. Counteract the high costs of increased labour-intensive administrative procedures;
3. Allow for a unique clinical trial authorisation from each country involved in a multinational trial;
4. Make the EMEA responsible for performing assessments and awarding multinational clinical trial authorisations that are valid across the whole EU;
5. Amend the Clinical Trials EU Directive in order to reduce/eliminate the possibility of inconsistent application;
6. Make lower-risk trials easier to authorise and perform (typically when a diagnostic procedure or a contrast agent at usual dose is proposed in a trial for an off-label indication);
7. Make the borderline between interventional trials (under the Clinical Trials EU Directive legal framework) and non-interventional (outside the Clinical Trials EU Directive legal framework) more defined and precise;

8. Facilitate non-commercial organisations in being sponsors of clinical trials;
9. Provide specific rules for performing clinical trials on incapacitated/vulnerable patients in order not to negate the advantages of clinical research to those categories of patients;
10. Support third countries where regulation of clinical trials is currently weak (e.g. partnership projects).

The European Commission is currently studying the responses that were handed in to the public consultation in early January and is expected to publish a summary as well as information on the next steps at the clinical trials website of the European Commission.

<http://ec.europa.eu/enterprise/>

The Hungarian Society of Radiologists in 2010

By István Battyány, Pecs/HU,
President of HSR

The Hungarian Society of Radiologists was founded in 1922 for the purpose of forming a collective forum for radiologists developing scientific standards in the field of radiology, and to exchange experiences, introduce novel technology, and share information about education and patient care. The HSR consists of 8 different subsections and is governed by the elected President of the Executive Board, and the General Assembly.

The official journal of the HSR is *Hungarian Radiology*, published in Hungarian in quarterly issues. It provides scientific information for all registered members of the society about the clinical and technical aspects of diagnostic imaging. Our website also plays an important role in communication among HSR members, as a capital source of up-to-date news about the HSR, educational courses, and Hungarian and international scientific meetings and congresses. Both the journal and the website also provide important guidelines and educational material. The HSR's aim is to initiate publication of an English language journal and website in order to cooperate with international radiological societies. Our objective is to apply the 2.0 standards for our webpage as well, to develop quality and to facilitate more interactive operation.

Our Society has already taken steps to cooperate with other international radiological societies, particularly the Croatian and the Slovenian radiological societies. The Croatian-Hungarian-Slovenian Radiological Congress takes place in one of the organising countries every second year. To avoid the language barrier, the official language of the congress is English. The French-Hungarian Radiological Symposium is an annual scientific meeting to enhance the scientific connection between French and Hungarian radiologists, and is held in the French Institute in Budapest.

The HSR national scientific congress is held every two years. The 25th Congress of the Hungarian Society of Radiologists will take place in Kaposvár, July 1–3, 2010. The organiser of the



Pecs was chosen as one of the European Capitals of Culture for 2010 and is the hometown of the current HSR President.

congress expects about 500 to 700 participants from all over Hungary and abroad. The participants will get the chance to increase their knowledge in all fields of radiology and related sciences, through lectures, workshops and refresher courses. The industrial exhibition will present the latest developments in medical technology. To facilitate the participation of foreign radiologists, highly acknowledged lecturers are invited from all over Europe.

The scientific programme is focused on the following mainstream topics:

- Imaging in Emergency Radiology
- Imaging in Neurology, Non-Vascular Neurological Interventions

- Musculoskeletal Imaging in the View of Sport Medicine
- Special MRI Methods in the Radiology Practice
- Imaging in Oncology

Cooperation in the organisation of international scientific events is being emphasised more and more by our society. The Annual Meeting of the European Society for Magnetic Resonance in Medicine and Biology took place in Budapest, July 25–27, 2009. The ESOR Galen Foundation Course on Chest and Cardiovascular Radiology was also held in Budapest, in October 2008. The 2nd ESGAR Liver Imaging Workshop was held in Szeged and the 11th Congress of the European Academy of

Dento-Maxillo-Facial Radiology in Budapest, in 2008.

Representatives of the Hungarian Society of Radiologists regularly present lectures at major international scientific meetings and congresses such as the European Congress of Radiology. This year Professors András Palkó from Szeged, Victor Bérczi from Budapest, Gabor Pavlikovics from Miskolc and Istvan Szikora from Budapest are our invited lecturers from Hungary at ECR.

For more information about the Hungarian Society of Radiology, all ECR participants are kindly invited to visit our stand, and encouraged to see our website at www.socrad.hu.

ESMRMB looks forward to an exciting Joint Annual Meeting with the ISMRM in Stockholm

By Isabelle Berry, Toulouse/FR,
ESMRMB President

The European Society for Magnetic Resonance in Medicine and Biology (ESMRMB), which had more than 1,100 active members in 2009, continues to attract more and more participants to its Annual Scientific Meetings.

The ESMRMB was founded in 1984 as a platform for clinicians, physicists and basic scientists with an interest in the field of MR. The society has continuously favoured multidisciplinary interactions and has tried to be attractive to the largest number of students and young researchers, who have been quite numerous from the beginning, to attend ESMRMB congresses. These events offer a much appreciated forum for integrated European research activities in basic and clinical MR applications, and the missions to support educational activities and research in MR encompass an even larger scope, with the new Strategic Plan, expanding to other imaging modalities related or comparable to MR.

Every 4–5 years the ESMRMB and ISMRM join together to organise a scientific meeting of excellence. It is our great pleasure to invite you to our ISMRM-ESMRMB Joint Annual Meeting in Stockholm, Sweden, in early May 2010.

This year's meeting, themed 'Clinical Needs & Technological Solutions' will integrate ESMRMB Meeting components such as the Hot Topic Debate into the scientific programme. The organisation of ESMRMB activities is led by Christoph Segebarth (Scientific Programme Committee Chair 2011) together with European members of the current Annual Meeting Program Committee of the ISMRM.

The congress, to be held May 1–7, 2010, will take place at the Stockholm International Fairs and is organised by ISMRM. Members of both societies will obtain identical membership privileges for the meeting.

The next ESMRMB Annual Scientific Meeting will then be held October 6–7, 2011, in Leipzig/DE.

Besides its annual meetings, the ESMRMB offers a variety of educational activities, such as its successful School of MRI programme, providing advanced MR education for physicians as well as technicians, or the Lectures on MR programme dedicated to physicists and other basic scientists working in clinical or research environments.

The School of MRI offers education for physicians and technicians at an advanced level. Between 10 and 14 courses have been offered in

recent years, with new courses being introduced regularly. In 2009 the course on Advanced MR Imaging of the Chest joined the School of MRI programme. In 2010, twelve courses will be held, including a course in French on Cardiac MRI, in Paris, as well as another ten advanced clinical courses and one advanced course on applied MR techniques.

The Lectures on MR, introduced in 2004, are educational courses, exercises, and practical demonstrations on MR physics, spectroscopy and engineering. In 2009, five courses took place and one of the newly introduced courses 'RF coil design – design and build your own' was fully booked, with some delegates rejected due to limited places. This course will once again take place in 2010 as well as the successful courses on diffusion imaging, rapid imaging, MR spectroscopy, functional neuro-imaging and small animal imaging.

In 2009, the ESMRMB introduced the new Hands-On MRI course programme, which focuses on the education of MRI technologists, filling a gap in radiological training across Europe. The ESMRMB has been able to set up a programme with three different topics using equipment provided by three different vendors: MRA on Siemens equipment, Cardiac MRI

on Philips equipment and fMRI & DTI on GE Healthcare equipment. As negotiations are still ongoing, the decision on potential Hands-On MRI courses will be made in early 2010.

NEW in 2010:
European MRI Academy – Middle East

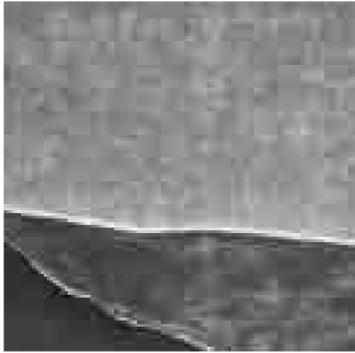
After the great success of the ESMRMB School of MRI course on Advanced MR Imaging of the Abdomen, in Dubai, in March 2009, the ESMRMB and the local organisers have decided to enhance this idea and develop a new course programme. Thanks to the kind support of Philips, the European MRI Academy – Middle East will start in 2010 by offering two clinical courses on Advanced MRI Imaging of the Musculoskeletal System and Advanced Breast & Pelvis MR Imaging.

The ESMRMB looks forward to welcoming Europe's MR community to its Annual Scientific Meetings and to its numerous teaching activities!

Find out more at www.esmrmb.org

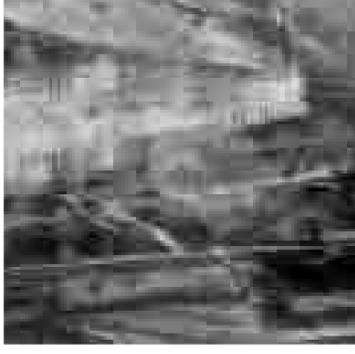


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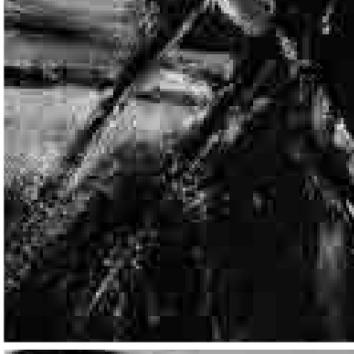


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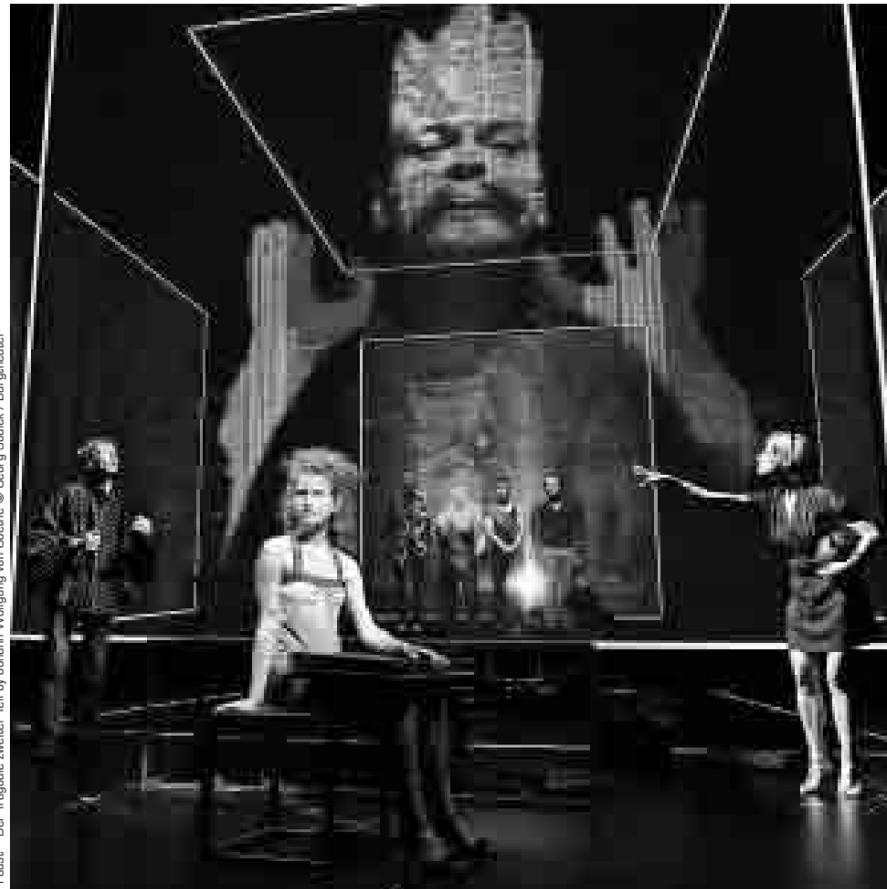
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What's on today in Vienna?



Faust – Der Tragödie zweiter Teil by Johann Wolfgang von Goethe © Georg Soulek / Burgtheater

Theatre

Please note that all performances are in German!

Akademietheater 19:30 **Väter**
1030 Vienna, Lisztstraße 1
phone: +43 1 51444 4145
www.burgtheater.at
by Alvis Hermanis

Burgtheater 20:00 **Faust – Der Tragödie zweiter Teil**
1010 Vienna, Dr. Karl-Lueger-Ring 2
phone: +43 1 51444 4145
www.burgtheater.at
by Johann Wolfgang von Goethe

Theater in der Josefstadt 19:30 **Ein Monat auf dem Lande**
1080 Vienna, Josefstädter Straße 26
phone: +43 1 42 700 300
www.josefstadt.org
by Iwan Turgenjew

Volkstheater 19:30 **Liliom**
1070 Vienna, Neustiftgasse 1
phone: 43 1 52111 400
www.volkstheater.at
by Franz Molnár



John Watts © John Watts

Concerts & Sounds

Konzerthaus (Classical Music) 19:30 **Wiener Philharmoniker,**
1030 Vienna, Lothringerstraße 20
www.konzerthaus.at
conductor Lorin Maazel
A. Bruckner, I. Stravinsky

Musikverein (Classical Music) 19:30 **Wagner Society Orchestra of**
1010 Vienna, Bösendorferstraße 12
www.musikverein.at
Keio University Tokyo,
conductor Taijiro Iimori
R. Wagner, G. Mahler

Porgy & Bess (Jazz) 20:30 **M. Nichols / I. Schweizer / J. Léandre**
1010 Vienna, Riemergasse 11
www.porgy.at
'Les Diabolique'

Arena (Alternative Music) 20:00 **La Roux**
1030 Vienna, Baumgasse 80
www.arena.co.at

Szene Wien (Alternative Music) 20:00 **John Watts**
1110 Vienna, Hauffgasse 26
www.szenewien.com



Tiefland by Eugen d'Albert © Dimo Dimov / Volksoper Wien

Opera & Musical Theatre

Volksoper 19:00 **Tiefland**
1090 Vienna, Währingerstraße 78
www.volksoper.at
Opera by Eugen d'Albert

Wiener Staatsoper – Vienna State Opera 19:30 **Die Fledermaus** by Johann Strauß,
1010 Vienna, Opernring 2
www.wiener-staatsoper.at
conducted by Michael Halász
Ballet choreographed by Roland Petit

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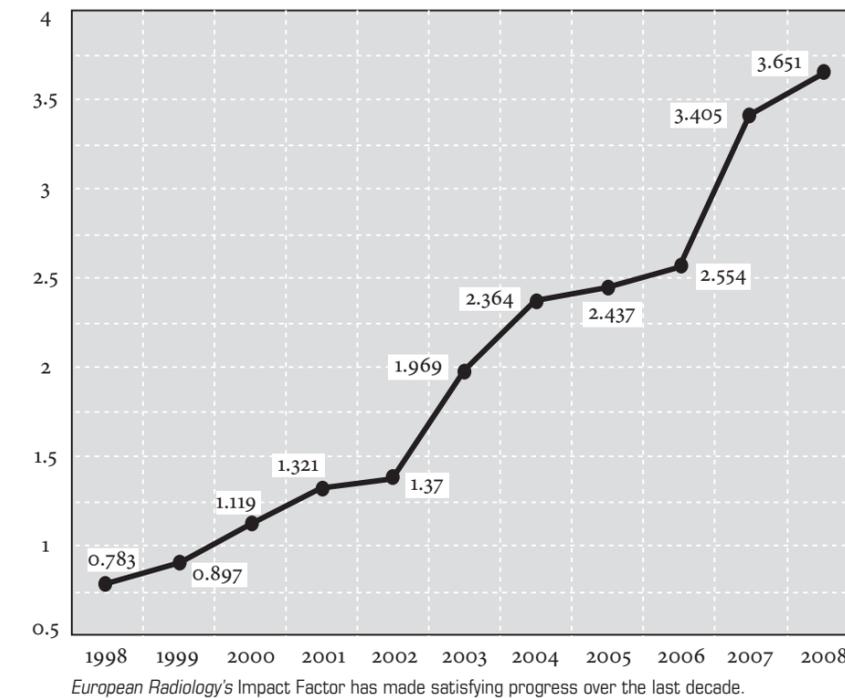
European Radiology in numbers

By Stefanie Muzik

European Radiology, the flagship publication of the European Society of Radiology, has come a long way since its foundation by Prof. Josef Lissner in 1991. Now in its 20th year, the journal is published twice as frequently, its content is accessible from any point on the globe, and it maintains a proud position as the leading European general radiological journal. As the official journal of the ESR and official organ of various subspecialty organisations, *European Radiology* is a major focus for the publication of original and review papers in the radiological field. Thanks to the enormous commitment of the previous Editor-in-Chief, Prof. Albert L. Baert from Leuven/BE, and the hard work of the editorial team, editors, Editorial Board members and reviewers, under the guidance of current Editor-in-Chief Prof. Adrian K. Dixon from Cambridge/UK, *European Radiology* is now a highly regarded journal in the imaging field, with an impact factor of 3.651 making it the second highest ranked general radiological journal in the world.

The ISI Impact Factor is a clear indicator of a journal's scientific significance, and the impact factor for 2008, announced in June 2009, saw a fantastic rise from an already impressive 3.405 up to a spectacular 3.651, highlighting the journal's steady development towards the very top of radiological publishing. Now ranked 14th of all radiological journals (90 in total), *European Radiology* is currently the no. 1 general radiology journal in Europe.

The journal's rise also shows in the tremendous increase in submissions coming into the Editorial Office: during 2009 a total of 1,752 original submissions were processed, which equals an increase of 12% compared to 2008. Counting all



revised versions and re-submissions, an incredible 2,060 papers reflects the immense workload of 170 manuscripts per month. A total of 367 accepted articles represent an acceptance rate of 21%, which underlines the pressure on publication space.

One of the aims of the editorial team for 2009 was to further reduce the time a manuscript spends in review. The average turnaround time between submission and the editor's final decision is crucial for serving the authors' need for critical but timely feedback, and for fast publication of their

latest results and achievements. Compared to the previous year, this decision time was again reduced, from 38 days to an overall average of 35 days, which is particularly impressive considering the steady rise in workload (resulting in more than 5.6 decisions per day, without any holidays). This improvement could not have been achieved without the help of 1,869 voluntary referees, who performed an outstanding 3,560 reviews in this time. All of them are warmly thanked and their work is much appreciated (a list of names is printed in the March issue of *European Radiology* as acknowledgement to their efforts).

Another change has been the international spread of submissions and acceptances – an increasing amount of excellent scientific work from non-Western countries and the Far East is reaching international medical journals worldwide. Among the top 15 countries we can again find China, Japan, and the Republic of Korea representing Asia, as well as the United States. Within the European competition, Germany again is the strongest country, represented by 63 published articles in 2009. Challenging the Germans are the Netherlands (43 contributions) and France (36), ranked second and third respectively, followed by the U.K. (28) and Switzerland (24).

All of these facts and figures give the editorial team something to be proud of, and of course fresh targets to aim at as they attempt to maintain the high level of quality that *European Radiology* is renowned for. This will surely be facilitated by the growing readership contributing an even higher volume of submissions. All ESR members (almost 45,000 and rising!) can now gain electronic access to *European Radiology* as part of their basic membership fee and a full subscription to the paper copy can also be included in the ESR membership package for a modest additional sum.

All of these issues and others surrounding *European Radiology* were covered in depth yesterday during the annual Editorial Board Meeting, where Prof. Dixon and Dr. Ute Heilmann, representing publisher Springer, discussed the progress over the last year and outlined their thoughts on the journal's future direction. With steady headway already made under the ESR umbrella, a rapidly growing readership, and an increasing source of top quality content, it seems that for *European Radiology*, the only way is up!



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