Polytrauma demands expertly trained emergency radiologists

By Paula Gould

European radiologists require specialist training in emergency radiology, just as happens in the U.S., ECR delegates were told yesterday.

The thorny issue of subspecialty training came up during a packed special focus session on imaging the polytrauma patient. In a straw poll conducted by the moderator, Dr. András Palkó, approximately two-thirds of audience members indicated that radiologists were included in their hospital’s trauma team. However, just a few delegates raised their hands when asked if they had access to training in emergency imaging.

“My generation trained along modalities. This then shifted to training in an organ-based manner and now we speak about abdominal radiologists and chest radiologists. But in the last few years we have recognised that we may want to have a third approach, the diagnosis-or the patient-based approach, and I am speaking here of oncologic imaging and emergency imaging,” said Palkó, radiologist at the University of Szeged, Hungary. “This may require a kind of subspecialty training not only in the training period for residents, but also in the postgraduate specialisation phase.”

The need for dedicated training in emergency imaging was reinforced by Dr. Gerd Schueller, radiologist at the Medical University of Vienna. When quizzed directly by the moderator if this type of subspecialty education should be introduced in European hospitals, his answer was an unequivocal “Yes.”

“Of course emergency radiology is a subspecialty, of course there are specific findings of trauma. A hae-morrhage of the liver does not look like a haematoma of the liver. We have to learn the differences,” he said. “It is a very important point. Just as we have special training for the lung, in radiology, we should have trauma training. This is not taught well in Europe.”

Schueller examined how radiologists can play a central role when patients present with multiple, severe injuries. The polytrauma patient’s condition will be assessed in the first 60 seconds by an anaesthesiologist and surgeon, he said. The radiologist on the trauma team then has four minutes to seek out any life-threatening conditions from plain film x-rays and a FAST (focused assessment with sonography in trauma) scan.

If the patient can be more or less stabilised, then he or she may be moved to an adjacent CT unit for whole-body imaging. This can reveal key configurations, but not easily for individual patients, Schueller said. Effective dose combines the absorbed dose and a weighting factor related to the radiosensitivity of each organ exposed. Effective dose can be calculated for standard body configurations, but not easily for individual patients, and it allows for comparison of various sources.

“The risk to patients of radiation dose is evaluated in terms of effective dose, as defined by the International Commission on Radiological Protection,” he said.

Radiation injury is either deterministic, which occurs only above a threshold dose, or stochastic, which occurs with an increased probability as the dose increases with dose. Radiation-induced hair loss can result from perfusion CT and a prolonged neurological examination. Effective dose can be calculated for standard body configurations, but not easily for individual patients, and it allows for comparison of various sources.

Hypothesis and fact get mixed up in radiation debate

By Philip Ward

When it comes to the sizzling hot topic of carcinogenesis and diagnostic radiation, it is crucial to differentiate hypothesis from scientific fact, maintain a sober mind, and separate science from politics and economics.

The view of Dr. Michael Brant-Zawadzki, medical director for neurosciences at Hoag Memorial Hospital in Newport Beach, California, during Friday’s W.C. Roentgen Honorary Lecture, he urged ECR attendees to assure the appropriateness of studies, standardise safe dose levels, use the lowest acceptable dose, and introduce a quality assurance process, including recording cumulative doses in a patient’s file.

“Someone who comes in with a stroke could die today, but if they are worried about a cancer 30 years from now they may refuse a life-saving scan,” noted Brant-Zawadzki, repeating the statement made this week by Dr. James Thrall, chief radiologist at Massachusetts General Hospital in Boston, in Tuesday’s edition of The Washington Post.

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He gave some ball-park figures for the effective dose of selected examinations: head CT 1-2 mSv, chest CT 5-7 mSv, abdominal and pelvic CT 8-11 mSv, diagnostic coronary angiogram 3-30 mSv.

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Answers for life.
Interactivity and personal touch can bring success in the classroom

By Philip Wood

Teaching came under the microscope during Friday’s professional challenges session, at which speakers gave practical tips on how to engage radiology trainees and prepare them for the future.

The essential skills are to practise, use a variety of methods, be engaged and enthusiastic, get involved, seek feedback, and make a life-long commitment, noted Prof. Robert Greif, director of medical education at Bern University Hospital in Switzerland.

"There is a lot of science behind the art of teaching," he said. "And you should always remember that teaching is not as well paid, and usually students don’t say thanks!"

Teachers should avoid conventional lectures of more than 10 to 12 minutes because people’s minds wander, and they should use interactive discussions, practical exercises, and anything else that forces students to engage their brains, he advised. They should also be aware of several myths in medical education: if you know your topic, you can teach; a brilliant researcher is a good teacher, a failing student is either lazy or lacks intelligence, who knows, practices it; and who does not know, teaches it; and good teachers are born, not made.

The time spent with an experienced senior doctor who inspires a trance is still the greatest and most valuable experience, according to Dr. Christine Nyhusen, consultant radiologist at the Sunderland Royal Hospital, U.K., and immediate past chair of the Radiology Trainees Forum. Whether it’s a one-to-one discussion of a CT case or small group teaching, there is no substitute for such interaction, she said.

To find out about their perceptions of radiology, Nyhusen and her colleagues in Sunderland have just conducted a survey of 90 newly qualified doctors who had not started their specialist training. The response rate was an impressive 98% because the patients can be brought directly to the CT table. This is the preferred solution at LMU.

Dr. Ulrich Linnemann, radiologist at Ludwig Maximilians University (LMU), Munich, set out the different ways in which CT can be made available in the polytrauma setting. Options include installing a CT scanner adjacent to the ER room or fitting a specialist, moving gantry so that the patient need not be lifted. Alternatively, the patients can be brought directly to the imaging room when they are first admitted and all work-up is carried out on the CT table. This is the preferred solution at LMU.

The outcome for polytrauma patients is much better than if they automatically undergo CT, he said. The examination is rapid, cheap, easy to perform, and training should become more productive and cost-effective.

59% were female, 85% were between 22 and 27 years old, and 10% were aged over 31.

Interactive case-based discussions were by far the most popular, followed by interactive system-based discussions and then PowerPoint lectures. Dedicated, self-directed e-learning was rated least highly, probably due to the quality of the modules, and they were very unlikely to read textbooks and journal articles. New technology offers new opportunities, but a computer can never replace an inspiring teacher, she said.

During the current academic year, 7% of respondents said they received radiology training on a daily basis, while 40% had weekly radiology training, 29% had a monthly radiology session, and 11% had none. Two thirds of the sample wanted more radiology teaching, particularly for MRI, CT and ultrasound.

"Maybe we are losing the reputation for being miserable creatures sitting in a dark room and not being very accessible. Hopefully we are becoming more friendly, and with the advent of e-LEARNING is a web-based learning episode or experience, and I prefer the word ‘experience’ because it should be something that they’re involved in," he said. "It should be part of a wider educational design and it must have structure. To have structure, it must be curricular mapped, otherwise it’s like saying: ‘Here’s a lovely, large library, go and enjoy it’. That’s hopeless.”

Two important questions still need to be addressed, according to session moderator, Dr. Joachim Wildberger, a radiologist from Maastricht University Medical Center in The Netherlands. Because no one practices the entire field, why do we insist that radiologists become at least minimally competent in the entire field?

How can we realize that our radiological work is not just technically accurate, but that it is appropriate to the clinical setting?

Support grows fast for Alliance for MRI’s petition

By Milisenda Rouger

The online petition of the Alliance for MRI has seen a significant rise since the start of ECR 2010.

Signatures have grown from about 4,500 on Thursday morning to 6,150 on Friday afternoon. The Alliance, which was initiated by the European Society of Radiology (ESR) and brings together European parliamentarians, patient groups and leading scientists, is concerned that the EU Physical Agents 2004/40/EC (EMF) Directive could impair the use of clinical MRI in Europe.

The European Union’s Physical Agents (Electromagnetic Field) Directive was originally set to take effect in April 2008, but as that deadline approached, information about the legislation’s likely impact on routine clinical work and MRI research was widely distributed. The Alliance for MRI was formed to raise awareness of the potential problems, and the European Commission (EC) announced in late October 2007 that implementation of the EMF directive would be put on hold.

Many radiologists thought the threat had passed, but the EC only granted a postponement until April 2012. This was to allow time for a major amendment to be adopted.

The EC has been at a standstill due to the inaugural session of the new commissioners. It was due to publish the draft of the revised directive in early 2010, but the draft will not be available before June. This stagnation has caused the Alliance for MRI to urge everybody involved with MRI to sign its petition and lobby the EC again.

The Alliance for MRI has sent briefing papers and instructions to national radiological societies, whose support is deemed essential. Its officers are also in regular contact with patient groups, and they are now as good as they can to discuss the matter with the new commissioner, as well as those in charge of the dossier within the EC and key members of the European Parliament sitting on the relevant committees. It is also conducting an information campaign on ECR 2010.

At Thursday evening’s opening ceremony, ESR President Christian Hyltén-Cavallius stated that the society is investing heavily in the awareness campaign, underlining the importance of the issue for ESR members.

Sign the petition and find more information on the ESR’s website http://petition.myESR.org
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Poland’s rising stars address acute paradigms

By Paula Gould

Poland took centre stage in the ‘ESR meets’ programme yesterday, making it the second time that the country has been showcased at ECR. The lectures were presented by some of Poland’s emerging talents in radiology, and each of them focused on a subject relevant to emergency radiology.

Polish radiologists first participated in the ‘ESR meets’ programme six years ago at the invitation of the 2004 ECR President, Prof. Helen Carty. They have returned this year to represent the host nation of ECR 2010, which is being presided over by Prof. Małgorzata Szczerbo-Trojanowska, chair of radiology at the Medical University in Lübeck, Poland.

Poland has a long tradition of radiology, as Prof. Marek Sasiadek, chair of radiology at Wroclaw University, explained in the introductory presentation. The first x-ray examination in Poland was performed in 1896, just a few months after Wilhelm Conrad Roentgen’s discovery of x-rays. Intriguingly, the subject of this pioneering Polish scan was a lizard.

The decision to focus on emergency radiology reflects the growth of this field, Sasiadek said. Radiology departments in Poland, as elsewhere in Europe, are now performing many more imaging studies and procedures on acutely ill patients.

One particularly common emergency where radiologists can play a key role is stroke, according to Dr. Katarzyna Sklinda, radiologist at the Medical Centre of Postgraduate Education in Warsaw. The centre is one of three major trauma units in Poland’s capital city and admits 500 acute stroke patients each year. Imaging is important for excluding haemorrhage, or other contraindications to thrombolysis, detecting the presence and size of irreversibly infarcted tissue, and identifying any areas of hyperperfused tissue at risk.

Numerous patients are brought to our hospital every day with a clinical suspicion of stroke. All of them are directed to the department of radiology,” she said. “We are aware of the fact that prompt recognition and treatment are necessary to return blood flow in order to restore neurological function, therefore we are doing our best to provide a radiological assessment within 25 minutes of patient arrival, directly after a neurological consultation.”

Radiologists at her hospital use a variety of imaging techniques – both CT and MRI – in the work-up of acute stroke patients. Perfusion CT and angiographic studies are not used routinely at the moment, but this may change in the future.

“I am sure that perfusion CT will soon become the method of choice. It enables the most accurate assessment of ischaemic changes and selection of the most appropriate patients for thrombolysis,” she said.

HIGHLIGHTS

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The 2010 Exhibit Europe Award has gone to the French-based contrast agent manufacturer, Guerbet. Each year the ESR bestows this award on one of the companies exhibiting at the congress, in recognition of its special innovative strengths in science and technology as well as its commitment to patient care and research. The ESR also recognises the recipient’s commitment to the goals and advancement of ECR. On Friday, ECR President Prof. Małgorzata Szczerbo-Trojanowska presented the award to Emmanuel Caillaud, Vice President, Corporate Marketing and BD&L.

The Mozart group thrilled the thousands of ECR attendees during Thursday evening’s opening ceremony. Among the highlights were a four-handed string quartet, a classical interpretation of Michael Jackson’s Moon Dance, and a mock Oscar ceremony won by the movie, Titanic. See www.mozartgroup.org
ESIR 2010
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June 25-26, London
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July 9-10, Strasbourg
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September 3-4, Tbilisi
Basic Vascular
November 12-13, Zagreb
Acute IR
November 26-27, Amsterdam

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ECIO 2010
Second European Conference on Interventional Oncology
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
PET/CT has done more than draw together two stand-alone imaging modalities. This technological union has also highlighted the importance of collaboration between different medical disciplines.

Without doubt radiologists and nuclear medicine physicians are the key stakeholders when it comes to PET/CT. These two groups must work together to make the most out of hybrid imaging. Good communication with other medical professionals, including oncologists and cardiologists, is also vital if PET/CT is going to realise its potential.

This afternoon’s professional challenges session will illustrate how knowledge about PET/CT from both sides of the fence - radiology and nuclear medicine - is being applied to clinical problems in oncology. Underlining the ethos of cooperation, the session has been organised jointly by the European Society of Radiology and the European Association of Nuclear Medicine. Two of the presentations will be made by radiologists and two by nuclear medicine physicians.

“We think hybrid imaging, and in particular PET/CT, can have the best of both worlds because you can have functional imaging and morphological imaging,” said Dr. Arturo Chiti, director of nuclear medicine at the Humanitas Clinical Institute in Milan, Italy, and the session’s co-chair. “Our two societies are trying to collaborate so that we can have a common approach to hybrid imaging, and see how we can combine our two visions.”

Two of the four presentations will focus on the emerging role of radiotracers other than fluorine-18 fluorodeoxyglucose (F-18 FDG) in the PET part of the examination. The potential for PET beyond ‘sugar PET’ is an important message, Chiti said.

One molecule already being used in clinical PET is choline, which can be labelled with either carbon-11 or F-18. Choline uptake is typically elevated in tumours owing to increased activity by the enzyme choline kinase and cell membrane synthesis. Choline-PET is expected to be especially useful in prostate cancer, bladder cancer, and brain tumours.

Another molecule generating considerable interest is F-18 fluorothymidine (FLT), which can act as a marker of cell proliferation. FLT uptake in tumours is typically lower than that of FDG, so it is usually a useful FDG dual agent. Researchers are hopeful, however, that FLT-PET can play a role in treatment monitoring.

“If the tumour is dying, it will be using less glucose, so imaging with FDG is an indirect marker of treatment response. With FLT, you can actually directly measure the rate at which tumour cells are growing, doubling, and you can see relatively rapidly whether the tumour is responding,” said Dr. Heiko Schoder, director of PET imaging at the Memorial Sloan-Kettering Cancer Center in New York.

Clinical trials into receptor imaging are also underway. For instance, PET radiotracers that home-in on oestrogen or HER2/neu receptors in breast cancer may help predict and/or monitor patients’ response to hormone therapy or the monoclonal antibody trastuzumab (Herceptin).

There are advantages and disadvantages to having a raft of radionuclides to choose from, he explained. FDG may not be perfect in every instance, but the logistics of PET imaging are much simpler if everyone is getting the same agent. There may also be financial penalties if departments have to order smaller quantities of multiple radiotracers instead of one large batch of FDG.

Although many potential new agents are being developed by chemists and biologists, a bottleneck is developing in translational research. Molecules with the most clinical promise must be addressed by Dr. Clare Smith, radiologist at the Mater Misericordiae University Hospital in Dublin. Although the fusion of metabolic and morphological data should help to improve diagnostic accuracy, mistakes can still occur. Some malignancies that have a low affinity to FDG may be missed if the corresponding CT scan is not scrutinised carefully. Changes induced by radiation treatment and/or chemotherapy can also lead to re-staging PET/CT scans being misinterpreted.

Reporting physicians and radiologists can avoid diagnostic pitfalls if they know the patient’s history and have a good knowledge of the disease that they are looking at, Chiti said.

“Nuclear medicine physicians have to collaborate with radiologists and vice versa, but we also have to collaborate with oncologists,” he said. “When reporting images, it has to be a clinical reading.”
Chest radiography is the most frequently performed imaging examination in the emergency room (ER), but it is not always straightforward and problem-free. There are pitfalls to plain film in the ER, according to Dr. Katerina Malagari, associate professor of radiology at the University of Athens in Greece.

“The negative predictive value of a normal chest radiograph on admission at the ER is high,” she said. “Its value is great in emergencies associated with extrathoracic conditions, while it is lower in chest-related conditions.”

Positive intrathoracic findings include pleural effusion, diffuse or focused alveolar opacities, and signs of extra-alveolar air. Fractures and dislocations are also faible to recognize on the chest radiograph, but further evaluation is only possible with CT.

“Chest x-ray will hold a strong position in the management of the acutely ill with the exception of the trauma victim for which CT should be the first choice routinely,” Malagari told ECR Today.

The most common causes of local alveolar opacities include pneumonia, aspiration, and hemothorax. Signs of pleural effusion in the supine position include apical cap and diffuse increased density of one hemithorax, while the signs of extra-alveolar air in the supine position include the double diaphragm sign and deep nuchal sign.

Infectious disease should be imaged with chest x-ray, and CT should be reserved for specific conditions, she explained. Chest involvement in extrathoracic emergencies is sufficiently covered by chest x-ray, and CT should be reserved for specific conditions.


The triple rule-out carries some controversy with it. It is a single CT exam that images the coronary arteries, chest, and aorta. The most immediate problem with the exam is the high radiation exposure associated with it. The second problem is whether it is efficacious or not.

Dr. Giancarlo Scirèo, from the department of radiology at Catholic University “Sacro Cuore” in Rome, said that a variety of pathologies may present with the same clinical condition: chest pain. They include pneumonia, pneumothorax, pericarditis, or more life-threatening conditions such as acute coronary syndrome, acute aortic syndrome, or pulmonary embolism.

In the United States alone, approximately five million patients present to the ER with acute chest pain each year and more than 1.5 million are admitted after the standard diagnostic work-up. For most of these patients, no cardiac pathology is detected.

The problem lies in the fact that many of these patients will require hospitalization because their findings on conventional enzyme and SPECT imaging work-up are indeterminate. Consequently, this would cost billions. That's where multidetector CT comes in, he noted.

Initial studies have found value in using CT to rule out coronary artery disease, aortic dissection, and pulmonary embolism. The rates at which dissection or pulmonary embolism are found in the triple rule-out procedure are low. However, advancing technology enables this exam to be conducted with a low dose of radiation, less than 15 mSv which is about the dose for a SPECT scan. While the triple rule-out exam is not for all patients, it does serve a function in the ER when used judiciously, stated Savino.

ERs are besieged with cases of thoracic injury, particularly penetrating thoracic injury. Dr. Anastasia Oikonomou, from the department of radiology at University Hospital of Alexandroupoli, Greece, pointed out that thoracic injury overall is the third most common cause of trauma following injury to the head and extremities, and penetrating thoracic injury is the cause of 4% to 11% of all trauma centres.

Radiologists must be fully aware of thoracic anatomy to help ER physicians quickly diagnose and treat trauma patients. Time is of the essence with this patient population because both blunt and penetrating thoracic trauma accounts for nearly 25% of trauma-related deaths, Oikonomou said.

In addition, blunt thoracic trauma is on the rise, as two-thirds of all cases are due to motor vehicle collisions. The remaining cases come from falls or blows from blunt objects.

Radiologists must become proficient in reading films of penetrating injury caused by knives and bullets, which remain the major cause of these injuries.

“The spectrum of abnormalities and radiologic findings encountered in blunt and penetrating thoracic trauma are categorized in injuries of pleural space (pneumothorax, hemithorax), lungs (pulmonary contusion, laceration, hemorrhage), airways (traheobronchial lacerations, Macklin effect), esophagus, heart, aorta and great vessels (injury to thoracic, internal mammary artery and aortic arch branches), diaphragm and chest wall (ribs, scapulae, sternum fractures and sternal-circolaric dislocations),” Oikonomou said.

“I cut patients will have multiple injuries, and therefore systematic exclusion after thorough investigation of all types of injury is warranted. Oikonomou stressed the superiority of CT over chest radiograph in diagnosing chest trauma, and also emphasised the importance of multiplanar and volumetric reformatted CT images that enable improved detection of injury and enhance the understanding of mechanisms of trauma related abnormalities.

Chest radiography in the emergency room
Moderator: A.P. Parkar; Bergen/NO
T. riiple rule-out CT in atypical chest pain: Must or luxury?
A. Can chest radiography tell you the whole truth?
B. Triple rule-out CT in atypical chest pain: Must or luxury?
C. Imaging of chest trauma

Example of global cardiac assessment in 59-year-old man with known diffuse ischemic disease and acute chest pain, taken on a 64-slice CT scanner (Siemens Sensation 64, Siemens). Performations were performed on a dedicated workstation (Vinci 2, Vital Images). With only one completion of the entire thorax, it was possible to diagnose a sub-occlusion of proximal left anterior descending artery with calcified (blue arrow) in A and non-calcified (white arrow) lesion in B, and an acute infero-posterior area in the apex (arrow in B). It was also possible to exclude aortic dissection and coronary embolism (as shown in volume rendering image, C, and evaluate ejection fraction (31%) and end diastolic volume (133 ml), which are very important additional independent prognostic factors. D. Finally, lung parenchyma window demonstrates pulmonary edema and bilateral pleural effusion, indicating heart failure. (Provided by G. Savino)

29-year-old woman presenting to the emergency department with acute chest pain. Axial post-contrast CT image at the level above the diaphragm shows traumatic laceration of the liver (white arrow) and free fluid in the peritoneal cavity (black arrow), excluding acute liver laceration and aortic haemorrhage. (Provided by G. Savino)

Seventeen-year-old male polytrauma patient who had a motorcycle accident. Axial CT image at bone windowing (A) and axial CT image at lung windowing (B) show flail chest, right tension haemothorax, left pneumothorax, pneumomediastinum and herniation of the right pleura to the right hemithorax. (Provided by A. Oikonomou)

Thirty-seven-year-old female polytrauma patient who had a motor vehicle accident. Axial post-contrast CT image at the level below the diaphragm shows traumatic laceration of the liver, right side (white arrow) which is compatible with a stab injury, and free fluid in the peritoneal cavity (black arrow) excluding acute liver laceration and aortic haemorrhage. (Provided by A. Oikonomou)

Overall, the triple rule-out of extremities is sufficiently covered by a SPECT scan. While the triple rule-out exam is not for all patients, it does serve a function in the ER when used judiciously, stated Savino.

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Example of global cardiac assessment in 59-year-old man with known diffuse ischemic disease and acute chest pain, taken on a 64-slice CT scanner (Siemens Sensation 64, Siemens). Performations were performed on a dedicated workstation (Vinci 2, Vital Images). With only one completion of the entire thorax, it was possible to diagnose a sub-occlusion of proximal left anterior descending artery with calcified (blue arrow) in A and non-calcified (white arrow) lesion in B, and an acute infero-posterior area in the apex (arrow in B). It was also possible to exclude aortic dissection and coronary embolism (as shown in volume rendering image, C, and evaluate ejection fraction (31%) and end diastolic volume (133 ml), which are very important additional independent prognostic factors. D. Finally, lung parenchyma window demonstrates pulmonary edema and bilateral pleural effusion, indicating heart failure. (Provided by G. Savino)

29-year-old woman presenting to the emergency department with acute chest pain. Axial post-contrast CT image at the level above the diaphragm shows traumatic laceration of the liver (white arrow) and free fluid in the peritoneal cavity (black arrow), excluding acute liver laceration and aortic haemorrhage. (Provided by G. Savino)

Seventeen-year-old male polytrauma patient who had a motorcycle accident. Axial CT image at bone windowing (A) and axial CT image at lung windowing (B) show flail chest, right tension haemothorax, left pneumothorax, pneumomediastinum and herniation of the right pleura to the right hemithorax. (Provided by A. Oikonomou)
New tools to diagnose and monitor breast cancer

By Melisande Rouger

Breast cancer is the leading cause of death among women worldwide, and imaging plays a crucial role both in the detection and treatment follow-up. Constant technological developments change the way practitioners deal with their patients, and breast radiologists need access to the latest information in order to improve chances of survival. They will have this opportunity today at the ECR, by taking part in two complementary sessions on this topic.

Conventional mammography is still the most widely used and easily available method to detect breast cancer. Ultrasound (US) and, over the last decade, MRI have made their way into clinical routine, though the latter is generally reserved for selected women. In US, the most recent developments have focused on elastography, which has the potential to enhance the specificity of US cancer detection.

Along with the refinement of these techniques, significant progress has been made by the recent promising introduction of tomosynthesis. The principle of this method is to take multiple images of the breast to form a 3D volume, which is then reconstructed into a series of 2D views. This has increased sensitivity and specificity, which is encouraging. However, all these improvements are built on top of already existing methods, but MR specificity, as shown in a study with Professor Michael Hricak from the Austrian Breast and Colorectal Cancer Study Group (ABCSG) during the sessions.

Each of these modalities presents an advantage compared to the previous one. Smaller, cheaper and potentially faster than MRI, US has the potential to enhance the specificity of US cancer detection.

“With mammography, we can usually see the tip of the iceberg. With US and even better with MR, we can see what is underneath the iceberg and what is the tumour,” said Professor Edward Azavedo from Stockholm, who will chair one of the two sessions.

DIT is still an experimental stage. Azavedo’s team led a study including 150 patients along with a few other centres, but radiologists globally have very limited experience of it.

Another idea that had been sleeping for years, has been introduced recently: DBT. This technique has been called ‘digitally tomosynthesis’ (DBT).

“Digital tomosynthesis allows us to get additional information to increase our level of confidence,” said Professor Edward Azavedo from Stockholm, who will chair one of the two sessions.

DBT consists of doing a mammography in slices. The machine works like a CT scan, using an x-ray tube that rotates around the breast. Anything located in the middle of the patient that mammography could have missed because of the surrounding tissue can now be brought to one’s attention thanks to one particular slice.

“It is a good complement to mammography since it allows us to get additional information to increase our level of confidence,” said Professor Edward Azavedo from Stockholm, who will chair one of the two sessions.

DIT is still in an experimental stage. Azavedo’s team led a study including 150 patients along with a few other centres, but radiologists globally have very limited experience of it. At the ECR, by taking part in two complementary sessions on this topic.

With the increased lethality of breast cancer, it is vital to assess the impact of non-invasive breast treatment as early as possible, in order to change it if necessary.

“Mammography and US are precious tools for measuring the effect of a given therapy on a tumour. Many treatments make the tumour shrink, and these modalities make size changes visible. But if mammography enables visualization of the lesion, US and MRI really enable assessment of its size,” Azavedo said.

“With mammography, we can usually see the tip of the iceberg. With US and even better with MR, we can see what is underneath the iceberg and what is the tumour,” said Professor Edward Azavedo from Stockholm, who will chair one of the two sessions.

A tumour, which can reveal whether it is benign or malignant, highly aggressive or not, etc. Being able to track and analyse the tumour’s cells to predict how it will start to grow is the next step forward.

“We will therefore introduce molecular imaging for a better understanding of breast tumours. The main field of this research interest is clinical and experimental investigations on a cellular and sub-cellular level to diagnose a given disease non-invasively and to monitor responsiveness to treatment. The focus is on a more accurate disease characterisation through the synthesis of anatomical, functional, and molecular imaging information derived by different biomedical imaging methods,” Helbich said.

Most of the research in this sense is done with MR diffusion-weighted imaging, spectroscopy and dynamic contrast-enhanced MRI, as well as hybrid modalities like PET/CT and PET/ MRI. Developments are all in the experimental phase, but they look promising, with significant progress having been made by the recent promising introduction of tomosynthesis.

“MR has shown a higher sensitivity than the already-existing methods, but MR specificity, as far as breast cancer is concerned, is something that should be and is getting better. This gamma camera has shown high sensitivity and specificity, which is encouraging. However, all these techniques are complementary, and I wouldn’t advise one more than another,” Azavedo said.

Just as complementarily is needed in the detection of breast cancer, it is also required in the evaluation of the response to treatment. Given the increased lethality of breast cancer, it is vital to assess the impact of non-invasive breast treatment as early as possible, in order to change it if necessary.

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ECR 2010
Radiologists seek age-appropriate reasons for hip pain

By Paula Gould

Calling all time travellers: speakers at this afternoon’s refresher course about imaging the hip are promising ECR delegates a whirlwind journey from infancy to old age in just 90 minutes.

Although hip problems are common at any age, the precise nature of the injury or disease is highly age-dependent. An eight-year-old child, a 25-year-old professional soccer player, and a 60-year-old woman may all present with hip pain. The cause of that discomfort and the imaging strategies used to confirm the diagnosis will, however, undoubtedly be very different.

The topic of the paediatric hip will be tackled by Dr. David Wilson, musculoskeletal radiologist at the Sheffield Orthopaedic Centre NHS Trust and the University of Oxford. Even within this patient group, age plays an important role in directing the line of diagnostic enquiry. For example, developmental dysplasias and infections should be considered when infants present with hip pain, whereas children older than the age of four who exhibit similar symptoms could be suffering from transient synovitis. Ultrasound is regarded as a good first-line test in most cases, whilst MRI is recommended for follow-up if symptoms remain unexplained.

Prof. Christian Pfirrmann, chief radiologist at University Hospital Balgrist in Zurich, will discuss hip complaints that may be studied in more detail. These examinations may also identify anatomical variants that could otherwise be confused with pathology.

Hip pain experienced by young athletes is not always caused by damage within the joint, according to Pfirrmann. The patient may have incurred attachments to the adductor tendons or, less frequently, the abductor tendons. These possibilities need to be ruled out in the differential diagnosis.

The final stop forward in time will be taken by Prof. Apostolos Karantanas, department of radiology, University of Crete, Iraklion, who will focus on the radiological management of the ageing hip. Yet again, this is a topic that affects a spectrum of patients; although osteoarthritis is commonly regarded as a disease affecting the elderly, ex-athletes can also present with early degeneration of their joints.

It is important to remember that not all degenerative changes observed on imaging in this patient group will be pathological. The question for radiologists to determine is whether the signs they see on imaging are due to normal wear-and-tear or hip disease.

One has to be familiar with the spectrum of pathology, he commented. "If not, the various diagnostic techniques and imaging methods will be used at random and not in a structured way."

As before, radiography is usually the first-line tool in this patient group. Karantanas plans to outline the importance of this initial examination, including the role of the weight-bearing radiograph. This approach to x-ray imaging is recommended when looking for signs of joint space narrowing that would indicate the progression of osteoarthritis.

The ‘red flags’ that might indicate the need for follow-up imaging will also be highlighted. For example, patients with bone marrow abnormalities or soft tissue disorders around the hip joint may be referred for an MR examination, whilst MR arthrography may be required to examine labral pathology. CT arthrography may be a better option when examining patients with loose bodies in the hip joint, and when evaluating articular cartilage degeneration. CT-based techniques are also preferred in post-surgical patients who have been left with metallic implants.

“If the examination is performed correctly, metallic artefacts can be reduced and the images can still be diagnostic,” he concluded.

BAR supports new developments in radiology

By Elissaveta Valcheva, Sofia/BG

The Society of Radiology was founded in 1957. It was re-named the Bulgarian Association of Radiology (BAR) in 2000 and comprises the society of radiology, the society of nuclear medicine, the society of radiology and the society of radiology physics.

The BAR is a scientific association, the membership of which consists of the majority of Bulgarian radiologists. 46% of the members are in the 45-54 age range, 22% are in the 35-44 age range, 14% are 25-34 years old, 14% are 55-65 years and 17% are over 65 years old. The biggest issue in Bulgaria is mainly the rising average age of employed radiologists on one hand, and the brain drain of young specialists on the other.

The BAR’s mission is to encourage the progress of diagnostic imaging by promoting studies and research regarding its physical, biological, radiation-protective and clinical aspects and stimulating members through developing educational and research projects and supporting scientific meetings and seminars. The BAR initiates projects intended to improve the efficacy of radiology within the health system.

The BAR is composed of scientific sections, including vascular and interventional radiology, and urogenital radiology. At the end of 2009 several new scientific sections were founded: cardiovascular chest radiology and neuroradiology. The BAR stimulates the development of interactive teaching, such as quizzes, and panel discussions. The main purposes are to spread scientific knowledge concerning diagnostic imaging and awareness of regional groups, which mainly participate in professional activities.

The BAR organises a biennial national congress as well as annual courses and scientific meetings.

The BAR’s official journal is Roentgenopeca Radiologa. The Editor-in-Chief is Vasil Hadjidekov, M.D. The journal is recorded in the bibliographic databases EMBASE/Excerpta Medica, INS and the Bulgarian Citation Index. More information can be found on the society’s official website at www.radiolog.bg.

In Bulgaria, radiology training comprises a four-year radiology training programme developed by universities. The students receive training in physical and technical principles, clinical radiology, subdivided into chest radiology, gastrointestinal radiology, urogenital radiology, vascular radiology, and Interventional radiology, breast imaging, neuroradiology, ultrasound, computed tomography, and magnetic resonance imaging. At the end of each section students take an oral examination and at the end of the training programme the students take a final examination, which consists of three parts: a practical examination, a film reading session, and an oral examination.

The BAR advocates better organisation and processes, as well as more investment in infrastructure, products and people.

Further information on the society can be found at www.medicalnet-bg.org.
Knowledge of anatomy can ensure mastery of musculoskeletal minefield

By Katrina Megget

Radiologists are increasingly being asked tough questions related to body joints, including the foot, ankle, knee, and hip. But with a minefield of possible variants and pitfalls, an MR examination of the joints is no walk in the park.

The fact is these joints are very complex, explains Dr. Maryam Shahabpour, radiologist at Universitair Ziekenhuis in Brussels (UZ Brussel – Vrije Universiteit Brussel VUB), who will be moderating this afternoon’s session about the lower extremities, which opens the mini-course about extremity joint MRI. Detailed knowledge of this anatomy is paramount for the general radiologist, who will have to satisfy the often difficult diagnostic requests of orthopaedic surgeons.

“Normal joint anatomy is very complex and the surgeons need a complete analysis of all the intra-articular and surrounding structures. MRI is able to depict not only the intra-articular lesions but also the extra-articular capsular, ligamentous and tendinous structures, muscles and bursa,” she said. “The presentations at this course will focus on helpful diagnostic clues to distinguish pitfalls – from an anatomical or technical origin – from actual pathological findings.”

Dr. Eva Llopois, from the department of radiology at Hospital de la Ribera, Valencia, Spain, agrees this is a particularly hot topic because arthroscopic management of intra-articular lesions is starting to change. Meanwhile, there are still many areas that have question-marks regarding the exact role of the structures, and whether they are normal variants.

“The overlap between normal asymptomatic findings and those that are the reason of patients’ symptoms sometimes make diagnosis difficult, especially because there are some concepts such as femoroacetabular impingement – a condition where there is too much friction in the hip joint – whose real role is still under controversy,” noted Llopois.

These sorts of considerations are just the tip of the iceberg, though, and the amount of pitfalls and the possibility of false positives can still be immense, noted Shahabpour. Knowledge and understanding of the anatomy can prevent not only inaccurate interpretations but also unnecessary diagnostic work-up and treatment.

“In the hip joint, there are normal variations concerning the attachment of the labrum on MR arthrographic (sublabral sulcus, posterosuperior and anterosuperior sublabral recess, paralabral recess). These normal recesses should not be mistaken for labral tears, which can occur after hip dislocations,” she explained.

“A normal sublabral recess shows only a partial separation of the acetabulum, and is linear in shape and never accompanied by peripheral acetabular abnormalities. The location of the lesion can help in the differentiation. Tears in the anterior position are rare and when present material extends at this level, it is usually related to a recession, while in the anterosuperior position, it rather represents a labral tear,” added Shahabpour.

In the knee joint, a normal attachment of the median segment of the lateral meniscus can simulate a tear, but in significant lateral meniscal tears, the posterior horn often has an increased volume, she said.

However, developments in MRI are helping overcome some of these limitations and add value to the diagnosis, said Dr. Nadja Saupe, from Baltic University Hospital, Zurich, Switzerland. For example, there is movement towards a more precise assessment of ligaments in different planes and the assessment of the thin cartilage layers within the ankle joint.

“One of these developments is isotropic 3D fast-spin echo (FSE) sequences, which combine high-resolution isotropic voxels, for reconstruction of imaging planes through targeted structures, such as ankle ligaments. For instance, the talonavicular ligament or fibrocartilagenous ligament, and FSE type contrast. These are currently evaluated through different joints, however clinical benefit has to be shown further in terms of workflow and improved diagnosis,” Saupe said.

For assessment of cartilage structure in the ankle joint, biochemical imaging techniques using quantification of T1 relaxation after contrast administration (GRE/PERC, or delayed gadolinium-enhanced MRI of cartilage) have been introduced for follow-up of reparative therapy on 3T systems. As more high-field machines become available and improvements in sequence post-processing occur, these sequences can be applied and evaluated. Besides these developments, improved dedicated multi-channel coils for the ankle joint increase signal-to-noise ratio and enables increased resolution, she commented.

This course will also highlight the best ways to perform an MR examination of the lower extremity joints, including special imaging planes, like oblique or radial planes, use of intravenous or intra-articular contrast, choice of sequences, and slice thickness. It also aims to describe the normal anatomy of the hip, knee, ankle, and foot joints, learning about normal variants and comparing the MR characteristics of the anatomic variants to their radiological appearance to make a diagnosis.

“Many general radiologists report musculoskeletal MRI. They have fewer skills for usual joints, but their diagnosis might change a patient’s prognosis,” said Llopois. “This general review on anatomy, biomechanics and pitfalls could be useful for further reports on their daily practice.”

Tomorrow’s session, MC 1325, will focus on the upper extremities. It will take place from 14:00–15:30.

Mini Course Extremity Joint MRI
Saturday, March 6, 16:00–17:30, Room E2
MC 1025 Lower extremity: Anatomy, variants and pitfalls
Moderators: M. Shahabpour; Brussels/BE
A. Hip
E. Llopois; Valencia/ES
B. Knee
V. Vande Berg; Brussels/BE
C. Foot and ankle
N. Saupe, Zurich/CH

MC 1325 Upper extremity: Anatomy, variants and pitfalls
Moderators: M. Shahabpour; Maribor/SI
A. Shoulder
K. Medin; Munich/DE
B. Elbow
M. Zaretti; Zurich/CH
C. Wrist
A.H. Karantanas; Iraklion/GR
Early diagnosis improves patient awareness of diabetes-related cardiovascular risk factors

By Edna Aubury-Neal

An epidemic of type 2 diabetes mellitus (DM) is occurring across the world, and the number of patients affected may increase from 100 to 200 million over the next 15 years. As rates of childhood obesity escalate, type 2 DM is increasingly diagnosed in children and adolescents, according to Dr. Athanasios Raptis, associate professor of radiology from Athens University Hospital in Athens.

The serious complications, such as cardiovascular disease, neuropathy and nephropathy associated with DM make it essential for physicians to be aware of the risk factors and the screening guidelines that allow for earlier patient diagnosis and treatment. Attendance at this morning’s refresher course is recommended for those who wish to learn more about how different imaging modalities can benefit patient awareness and increase the likelihood of effective early interventions.

Although the overall effectiveness, especially cost effectiveness, of indiscriminate screening is questionable, he suggests that if vascular imaging was used at an earlier stage of diagnosis, such as when peripheral arterial disease (PAD), including peripheral Doppler, conventional angiography, colour duplex scanning, ankle-brachial pressure index (ABI), plasmathygraphy, transcutaneous oxygenmetry and MBI, because an ABI of more than 0.9 is used as a criterion for diagnosis in most studies involving PAD, he is particularly enthusiastic about the use of peripheral Doppler in an outpatient setting because of its simplicity and the ease with which it can be used.

Raptis adds a cautionary note regarding difficulties with vascular imaging where patients have coexisting medical conditions and drug therapy may decrease long-term cardiovascular complications.

"Patients need to be aware that it is necessary for physicians to check the state of their peripheral vessels, because it is well known that macroangiopathy is usually present at the time of diagnosis," noted Raptis.

A wide range of non-invasive tests can be used to make an early diagnosis in diabetic patients with peripheral arterial disease (PAD), including peripheral Doppler, conventional angiography, colour duplex scanning, ankle-brachial pressure index (ABI), plethysmography, transcutaneous oxymetry, and MBI. Because an ABI of more than 0.9 is used as a criterion for diagnosis in most studies involving PAD, he is particularly enthusiastic about the use of peripheral Doppler in an outpatient setting because of its simplicity and the ease with which it can be used.

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"Because macroangiopathy is very common in patients with DM and increases the risk of cardiovascular morbidity and mortality, it is especially important to inform patients of the benefits of examination of carotid and peripheral arteries as this may reveal whether they are at high risk for cardiovascular disease in the future. Depending on the results, we can determine the therapeutic approach which is best for them," he explained.

Diabetes is a systemic disease with potential multi-organ dysfunction, so it is important that the particular challenges and limits to imaging diabetic vascular disease are addressed. Dr. Leo Lawler, consultant radiologist from Mater Misericordiae University Hospital in Dublin, will discuss these challenges at the refresher course. In particular he will describe how vessels and territories may be optimally imaged, assessed, and interpreted using current non-invasive and invasive imaging modalities.

Key elements of image acquisition and processing will be covered for 3D CTA, PET-CTA, MRA, and DSA.

The session will provide delegates with information about imaging of the major arterial vascular territories, including carotid-cerebral, coronary, aortic, mesenteric, renal, and peripheral systems. Lawler considers this to be important because diabetic pathophysiology is linked to vasculopathy that can have distinctive features and patterns. The future of imaging in diabetic vascular disease looks promising, and novel developments such as disease biomarkers, plaque imaging, and stem cell research will be just a few of the topics that Lawler will cover during this morning’s session.

He thinks it is important for radiologists to be able to provide a comprehensive clinical assessment and to develop their problem-solving skills, in combination with an understanding of the research potential that exists when imaging the diabetic patient and associated vasculopathy.

Special Focus Session

Saturday, March 6; 08:30–10:00; Room I

RC 715 Vascular imaging: The diabetic patient

Moderator: J.H. Peregrin; Prague/CZ

A. What the radiologist needs to know about the diabetic patient

R. Ouwendijk; Rotterdam/NL

B. Imaging of the diabetic patient

L.P. Lawler; Dublin/IE

C. Cost-effective selection of the appropriate imaging technique

R. Oosterhuis, Rotterdam/NL

Foot complications associated with diabetes are a common cause of non-traumatic lower-extremity amputations. Preoperative imaging must provide a sufficiently detailed depiction of the pedal arteries. A pedal outline in pedal arch, as seen on digital subtraction angiography. B. Contrast-enhanced MR angiography displays outflow better. (Provided by K.-F. Kreitner, Johannes Gutenberg-University, Mainz, Germany)

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Cardiac CT: Imaging beyond the coronaries

By Konstantin Nikolaou, Munich/DE, Thorsten B. Johnson, Munich/DE, Sebastian Leschka, Zurich/CH, Jean-Francois Paul, Le Plessis Robinson/Fr

While multislice CT (MSCT) has so far mainly been tested to detect obstructive coronary artery disease (CAD), ongoing developments of scanner technology open up new diagnostic options and indications. With the improvement of temporal resolution, an accurate assessment of regional and global ventricular function, as well as of the cardiac valves, is becoming feasible.

Regarding the assessment of the myocardium, new techniques such as myocardial perfusion imaging with CT or dual-multi-energy imaging open up new horizons, depicting areas of ischaemia and non-viable tissue. Finally, the ease and speed of CT – in conjunction with improved radiation protection – have increased the number of CT acquisitions in cases of congenital heart disease, even in younger patients. While the evaluation of coronary artery stenoses will for now most probably remain the primary clinical indication for cardiac CT, these new clinical applications are steadily under development and widening the options for cardiac CT imaging.

Myocardial and valvular function

The strength of cardiac CT in comparison to other cardiac imaging modalities is the depiction of morphology with very high spatial and temporal resolution, which makes it possible to evaluate the coronary arteries, their wall changes and patent lumen in diagnostic quality. Additionally, retrospective data acquisition or generous prospective data sampling can provide dynamic information. In this respect, the motion of the myocardial wall and of the valves is diagnostic relevance and interest. However, one has to observe, that dynamic CT with a multiphase coverage of the heart throughout the cardiac cycle requires restrictions in tube current modulation and can imply a comparatively high radiation exposure. Thus, the indication is typically restricted to elderly patients or individuals in whom echocardiography and MRI are not available as alternatives.

Practically, it is easiest to perform a multiphase reconstruction of the entire data volume, e.g. in non-overlapping thin axial slices at 10% steps over the cardiac cycle. The evaluation of cardiac motion is best visualized in standard planes known from MRI and echocardiography, i.e. in long and short axis slices aligned parallel and perpendicular to the interventricular septum. New software tools also provide the option to automatically quantify parameters of global and regional wall motion, wall motion and ejection. Wall motion abnormalities can indicate myocardial ischaemia or infarction, so that the evidence of pathologies can help to estimate the haemodynamic relevance of stenoses in pertinent coronary arteries.

Regarding heart valves, calculations can be a hint to stenoses in the morphological assessment, but a fixed position in a dynamic reconstruction presents a stenosis. Then, it is possible to quantify the residual opening area at systole in order to estimate the severity. In contrast, it can be quite difficult to identify valvular insufficiency, because of the results between the closed leaflets can result in relevant overestimation. While the dynamic evaluation of regional perfusion very rarely represents a primary indication for CT, it is important to fully exploit the dataset and to recognize relevant additional diagnostic information. Figure 1 gives an example of a functional analysis of a cardiac CT dataset, including the myocardial as well as the valvular function.

Congenital heart disease

Various imaging modalities contribute diagnostic information in patients with congenital heart disease (CHD). Although echocardiography is the diagnostic method of choice, the development of MSCT has increased its clinical applications in evaluating patients with CHD. Because of increased scan speed, high spatial resolution, and simultaneous evaluation of cardiocirculatory structures and lung parenchyma, CT has become a helpful complementary imaging modality in pre and post-surgical evaluation of patients with CHD. Expertise in morphology and terminology, profound knowledge in a wide spectrum of surgical procedures, and dedicated imaging protocols for CT are required to comply with the altered flow conditions in patients with CHD. A temporal, segmental approach is required for a systematic and accurate morphologic interpretation of several CHD conditions. Imaging findings of the normal anatomy have to be known as well as the various common and rare forms of congenital cardiac defects. Also, adaptations of the CT examination protocols are required to adequately image CHD patients with CT. Finally, the correct terminology has to be used for reporting and interaction with the clinical colleagues of various specialties involved in the treatment of CHD patients.

Myocardial viability and perfusion

As mentioned before, CT today is mainly used for morphologic and especially for coronary imaging. The potential of CT for perfusion or myocardial viability imaging is promising, but not well established yet. At first pass, using the same data set as for coronary imaging, perfusion defects can be visible in case of myocardial infarction or severe stenoses. On these first pass images, myocardial ischaemia is seen as a subendocardial hypodensity, more or less transmural and more or less persistent over time after injection of contrast medium. However, first pass imaging of cardiac muscle may not be accurate enough to assess ischaemia. Additional delayed enhanced images may also be very useful to assess inflammatory changes within the cardiac muscle, either in case of myocardial infarction or myocarditis. Late enhancement imaging is feasible for detection of myocardial non-viability, since isodine and gadolinium are both extra cellular agents with similar kinetics within the damaged myocardium.

A potential application is to detect myocardial viability at a very early stage, just after revascularisation of acute myocardial infarction. Low kilovolt settings then improve late enhancement detection at lower radiation dose. Finally, when each minute counts, a combined analysis of perfusion defect and late enhancement may be very useful in emergency settings, making analysis of the coronary tree sometimes unnecessary for quick diagnosis of acute myocardial infarction. Recently, preliminary studies have shown promising results of pharmacological stress-induced CT perfusion defects. Figures 2 and 3 show CT scans performed just after revascularisation after myocardial infarction.

CLINICAL CORNER

Residents & Students Lounge

Introduction to 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.

www.myESR.org
Therapy decisions now rely more heavily on imaging in renal tumour management

By Frances Rylands-Monk

It is very challenging to give a definitive diagnosis of renal tumours with existing imaging modalities, and pathology is often required to characterize, grade, and stage tumours through histopathology. But as the number of incidental findings grows, imaging can provide increasing numbers of clues about the type and severity of a malignancy. Evidence is growing about dynamic contrast enhancement with CT or MRI, for example, and the impact on diagnosis. Research about the grading of renal cell carcinoma through contrast enhancement has shown a high correlation between enhancement patterns due to vessel density and faster enhancement in line with tumour malignancy.

“The speed of enhancement will eventually allow doctors to grade tumours, meanwhile diffusion-weighted information provides differentiation clues for renal masses,” said Prof. Peter Hallisch-cz, section chief of urogynecology imagist, and head of radiology in internal medicine, University Hospital of Heidelberg. “This information is important because the more malignant the tumour, the greater the chance of nephrectomy, while resection is more possible for less malignant tumours.”

Incidental findings have increased over the past 15 to 20 years because of more routine use of cross-sectional modalities. Currently 60%-70% of findings of all tumours are incidental and without symptoms.

“Earlier detection obviously improves outcome, especially before symptoms appear. If tumours are stage 1A in renal cell carcinoma, the five-year survival rate is very good,” noted Hallisch-icz, adding that for the most effective and patient-tailored treatment, the radiologist should systematically give information about tumour extension and type to the surgeon.

At today’s refresher course, he will discuss what should be included in a pre-operative imaging report and what impact this has on therapeutic options. In addition to morphology, functional data are pivotal in treatment choice.

Diffusion-weighted and perfusion imaging provide additional information about the subtypes of the tumour and may in the future allow radiologists to improve accuracy of preoperative tumour differentiation. Although percutaneous diagnostic biopsy in renal cell carcinoma is rarely done because most suspicious solid tumours are resected, some unclear cases are still investigated with open biopsy. Improved characterization through functional imaging techniques may reduce the need for preoperative biopsy, and the rate of unnecessary resections.

“Over the next ten years, radiology will come close to yielding the results obtained by pathologists, especially in terms of subtype characterization,” Hallisch-icz predicted. “Avoiding open biopsy cuts costs and reduces risk for patients, especially in cases when we can, through imaging, say for sure that a tumour is benign. At present 15–30% of all resected renal tumours are benign!”

The figures are startling and suggest that a substantial amount of money currently spent in tumour management may be saved in the coming years. One resection in Germany costs between €5,000 and €12,000, which compares negatively to the cost of a potentially definitive diagnosis with MRI or CT. Up to 4,000 resections are undertaken annually in Germany, around 200 of which take place at Heidelberg University Hospital.

“General radiologists should come to the ECR session because 50% of patients who are 50 years of age or over have benign renal cysts. A percentage of these have more solid renal lesions, which might look malignant but be benign,” he said.

At the course, Hallisch-icz will also talk about differentiation and management of these more solid lesions, as well as differentiation and treatment of other renal tumours.

“Diagnosing a benign or malignant tumour has drastic consequences for the patient. New techniques could improve management,” he stated. Angiomyolipoma (AML) is the most frequent type of benign kidney tumours. They are usually easy to diagnose due to their fat content, but when fat content is low, diagnosis is more difficult. At present, biopsy allows pathologists to confidently characterize these atypical AMLs using immunostaining. In the near future, new MRI techniques may give more information for such cases, but so far results are inconclusive and hotly debated.

“Detection and quantification of the lipid content by chemical shift MRI is controversial because both AMLs and renal cell carcinoma may contain lipids. There is an overlap of values and no clear threshold separating the two entities,” said Prof. Nicolas Grenier, head of radiology at Hospital Pellegrin, Bordeaux, France. “Research into characterisation is plentiful with MRI, but to date specific criteria are not yet established.”

Besides renal cell carcinomas, oncologists, the rarest and most frequent type of benign kidney tumour, may also contain fat.

“Fortunately, in such cases, tumours show some associated features that are never encountered in AMLs, such as calcifications (bone meta-

The differential diagnosis with epithelial AML – a rare malignant tumour that doesn’t contain any fat, despite being an AML – presents another potential pitfall. This diagnosis is based on pathology and these tumours must be treated like a cancer.

Evolution of AMLs in the context of tuberous sclerosis is more rapid than in patients with the sporadic form, and therefore follow-up has to be stricter. In women, cystic lung disease (lymphangioleiomyomatosis, LAM) may also be associated with AML due to a migration of cells from the AML into the lung.

“Women with LAM should be imaged with ultrasound or CT to detect tuberous sclerosis with multiple and fast-growing AML or large upgrade AMLs of more than 4–5 cm, and follow-up will include imaging of the lung and functional exploration,” Grenier said.

AMLs are benign and will remain benign. If the diagnosis of a regular AML is accurate, there is no risk of cancer development. However, vascular content in large tumours increases the risk related to vascular rupture and haemorrhage if patients are not treated. Interventional radiology, rather than surgery, should be the first-line treatment, if possible, he advocated.

All AMLs over 4 cm should be treated, while smaller AMLs should be followed. Although the classical treatment remains surgery, some surgeons believe that embolisation has obviated the need for surgery in the treatment of many AMLs.

“Surgeons don’t like to operate on larger AMLs, if this would mean the renal parenchyma would be sacrificed. Partial or total nephrectomy is harsh for what might turn out to be a benign tumour,” Grenier said. “Selective embolisation is more beneficial for patients, as it usually preserves the renal vessels and therefore the kidney retains its normal function.”

More experience of radiofrequency (RF) ablation and cryosurgery is needed across the radiological community to compare these interventions in AMLs with embolisation, he concluded.

At today’s session, co-speaker Prof. Jean-Michel Correas, from the Hôpital Necker, Paris, will discuss the techniques and results of RF ablation, cryotheraphy, microwave ablation, and high-intensity focused ultrasound (HIFU) of renal tumours.
Company Profile: Siemens CEO introduces the company’s latest innovations

BM: Our mission is to make healthcare better and more affordable. In order to achieve this, we are focusing on two main aspects: for one thing, we concentrate our efforts on improving productivity of our high end imaging solutions. Today’s healthcare environment is increasingly faced with less staff, less reimbursement and a tight turnaround time. Take MRI as an example: our primary focus is on productivity across the entire MRI workflow, and we recently developed the Day optimising throughout (DoE) engine. DoE makes it easy to get the best possible results for virtually any type of patient, providing uniquely tailored, optimised scans configurable to patient condition or clinical question. Another example is syngo.via on which our customers report a strong productivity improvement: syngo.via helps to double the diagnosing speed and improves findings navigation by up to 98%.

Secondly, we are investigating in-us-called SMART Value products, taking a rigorous design-to-cost approach. SMART stands for five – simple to use & reliable, B – brain-inspired, A – affordable, R – reliable & robust, T – timely. This allows our customers in emerging countries with smaller budgets to invest in new medical technology so they can offer state-of-the-art healthcare to their patients. Our SMART systems benefit from the know-how and technological expertise that we have built into our most advanced imaging systems.

BM: Visitors to ECR will be able to view our entire spectrum of latest modality and software innovations, providing answers to the most challenging questions in imaging. Besides our latest innovations, which I mentioned before, we will also present a molecular imaging solution with our PET-CT, the world’s first molecular CT, which we have therefore called mCT. Furthermore, you will see new enhancements to our ultrasound systems with regards to Tissue Strain Analytics and new functions to our digital radiography solution Visio which now includes options for Ortho acquisition or the management of rejected images with reject analysis.

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Advanced e-learning at ECR 2010 with ePACS

By Alexander Hirsch and Ricarda Hofmeister

ePACS is a radiological e-learning project developed at the Medical University of Vienna (MUV) with the support of the European Society of Radiology. It combines an electronic patient record with collaborative design (Unified Patient) with a Java™-based Dicom viewer (by Tiani-Spirit) for a browser-based learning environment.

For the fourth time in a row, ePACS is encouraging the ECR’s participants to expand and deepen their radiological knowledge, using an established concept challenging both novices and experts. During recent years, the e-learning applications sector has experienced constant growth, and this is certainly the case in medicine. In medicine however, the knowledge of experienced physicians and interaction with colleagues and mentors in daily routine is an essential aspect of everyone's medical training. Radiology is especially well suited for e-learning, since nowadays a large proportion of a radiologist’s work is accomplished in front of the computer screen.

ePACS implements the essential factor of the user-interaction mentioned above, by allowing participants to discuss online in a forum under each clinical case, demonstrating one of the most essential differences between learning from books and modern e-learning solutions.

A new integration of ePACS into selected lectures will give lecturers the opportunity to combine physical and virtual teaching. This will give visitors the opportunity to train their reporting skills and deepen their knowledge at the ePACS area after the lecture. Starting in 2007, the ePACS project has grown constantly. Future plans include the goal of establishing a DICOM-based ESR case collection for case-based e-learning with a regular annual exhibition at the ECR in DICOM quality.

Furthermore a home-viewing solution for ePACS is a desired goal of the ePACS team. For image transport over the world wide web the technical developers of ePACS integrated the option of using the Medical Imaging Resource Center (MIRC) developed by the Radiological Society of North America (RSNA), in addition to media formats like jpg, QuickTime (mov) and Windows Media Video (wmv), which have been built in to ePACS from the beginning. Ongoing e-education has been a recent topic within the ESR and the ePACS team is honoured to be included in the ESR’s efforts to develop new features for its members and all other radiologists around the world – the future will get even more exciting.

Visit ePACS next to the EPOS® Lounge on the 2nd level.

In 2010 ePACS is presenting four case collections contributed by international case authors, each of whom is a first-class expert in their respective field:

- Lung CT
  C. Herold, ESR President, and C. Müller-Mang; Vienna/AT
- Acute abdomen CT
  H. Ringl and T. Moritz; Vienna/AT
- Cardiac-CT
  C. Loewe, A. Stadler and F. Wolf; Vienna/AT
- Musculoskeletal-MRI
  M. Breitenseher; Horn/AT and M. Zanetti; Zurich/SUI

The ePACS area has provided e-learning at the ECR since 2007.

Comparison of standard MR and MRE (magnetic resonance elastography) images in patients with low, medium and high level hepatic fibrosis. (Provided by GE)
Physicians have used palpation regularly as a diagnostic technique since the days of the Ancient Greeks. Up to now, the potential value of this method has only been explored in the imaging field by ultrasound research teams, but at this year’s ECR technical exhibition, delegates can see for themselves how the same principles may be combined with MRI to improve diagnosis in patients with liver disease.

GE Healthcare is demonstrating a new application developed for the Optima MR450w wide bore scanner. Called MR-Touch, it uses elastography, or low frequency sound waves, to identify differences in the stiffness of healthy and diseased tissues. The results are superimposed on a conventional MR image to identity areas of fibrotic tissue.

“This fibrosis will normally be caused by hepatitis or alcohol abuse, but can be a consequence of many different disease processes,” explained Guillermo Zanolli, MR modality manager with GE Healthcare. 

“The normal method for identifying fibrosis in the liver is a biopsy, but that is painful, expensive and can lead to other morbidities,” he noted. “Another problem is that the tissue may be taken from the wrong site and doesn’t give any useful information. This option will both reduce the need for biopsies and make sure that those taken produce more reliable results.”

The combined MR elastography method was developed by Dr Richard Ehman, professor of radiology at the Mayo Clinic in Rochester, Minnesota. Research staff at GE helped improve the processing software and organise the clinical trials. The method has been fully validated in detecting liver fibrosis and is now being investigated in mammography and a range of other clinical applications by the company and its academic partners.

The Optima MR450w system was unveiled in late 2009, and the first machines with the new technology will be installed from the end of March in Europe and the US. The vendor will also be developing the product for use with other MR units in its range.

One of Toshiba Medical Systems’ main priorities is patient comfort, and it has released the 3T version of its Titan wide-bore scanner. Like the 1.5T version introduced last year, the new machine has a 71 cm diameter tunnel, compared with the industry standard of 60 cm, and so it is particularly useful in dealing with claustrophobic or bariatric patients.

The company believes that it has overcome many of the common problems with image quality that occurred in earlier generations of wide-bore and 3T scanners. To maintain radiofrequency (RF) homogeneity, it has reconfigured the arrangement of magnets around the enlarged tunnel space, and multiple RF coils optimise the field to avoid motion and susceptibility artefacts in deep body scans, according to Alain Bertinatti, senior manager in the company’s MR business unit.

Those features should encourage the application of 3T machines beyond musculoskeletal and neurological imaging into the areas of cardiovascular and abdominal radiology. The larger bore should increase throughput by making nervous patients more willing to enter the machine and reducing movements once they are inside.

“We cannot say that we will eliminate those sorts of problems completely but be assured they are significantly reduced,” he explained.

Another technology designed to enhance the patient’s experience is the Pianissimo proprietary noise reduction system. In a conventional 1.5T machine, noise levels can reach 100 dB and up to 120 dB in a 3T unit. By putting the gradient coils inside a vacuum chamber, the level can be reduced by 30 dB.

Improving workflow is a priority for Siemens, which has introduced the first MR system that incorporates both the advanced coil technology, Tim (total imaging matrix), and its Dot (day optimising throughput) engine. The latest versions of these established technologies are available on the new Magnetom Aera 1.5T and Magnetom Skyra 3T units, which both offer a patient-friendly 70 cm open-bore design.

“The company will also be demonstrating further innovations, including the ‘Tim switchable table’, for easy patient preparation outside the MR suite, and an all-new coil architecture incorporating DirectConnect coil design, providing cableless coils for fast and easy set up and higher signal-to-noise ratio. The combination of new features will help radiology departments cope with an increasingly hectic work schedule, according to Walter Mrozendorfer, chief executive of the MR business unit.

“Tim and Dot are a direct response to today’s demanding world of healthcare economics,” he said. “Together they deliver faster, more efficient throughput for up to 30% more productivity per day.”

Making adjustments for dealing with patients with very different morphologies is one significant cause of delays in the MR suite, but Philips hopes to minimise this problem with its latest offering, the Achieva 3.0T TX. The system’s MultiTransmit RF technology enables users to achieve high-quality results across a wide range of applications, including optimizing body and breast imaging. The multi-channel RF transmission facility automatically adjusts its signal to the patient being examined, according to the company.

Using this equipment can deliver enhanced image uniformity and consistency and up to 40% faster imaging, helping to bring 3T units into the mainstream of radiological practice, claims Philips. The technology is available with specific applications in breast, liver, pelvic and spinal imaging, providing greater throughput due to faster scans and fewer retakes.

In the open MR sector, the Aperto Eterra from Hitachi has a single-pillar design and a field strength of 1.5T, which is fundamental to its performance. The product is designed to cover the entire MRI spectrum of scanning applications.
Speech recognition in radiology

Born in Australia, Kaye Bonython qualified as a radiographer and was immediately appointed superintendent of CT at the Royal Adelaide Hospital. A year on, Bonython shifted to private healthcare, developing her role into Practice Management in rural and then city private practices.

After running her own business as a freelance Applications & Support Specialist and Medical Conference Coordinator, Bonython relocated to the UK in 1998 to take a corporate role in the private hospital group HCA, where she assisted the hospitals in achieving King’s Fund Accreditation.

In 1999, Bonython re-entered radiology management to re-develop the department at HCA’s Portland Hospital for Women and Children, and to introduce digital imaging technology. Seven years later, she returned to HCA Corporate to lead a PACS implementation project across the ten-site organisation (now expanded to 14 sites).

In all of her roles, her interest and involvement in the implementation of new, state-of-the-art technologies has been keen. She has driven a series of PACS-related enhancements, including group-wide speech recognition reporting, and won the 2009 Lang & Busson Healthcare Award for Best Use of Technology in the Private Sector. Kaye is also actively involved in the Oncology Service Line Development to integrate clinical systems fully, as well as the HCA NHS joint ventures projects.

Asked what the key driver was to implement speech recognition for radiologists, Bonython said: “In 2005–2006, when I implemented PACS across the organisation, it was always clear that this was just the first step in terms of improving radiology service delivery. We knew we’d need other tools that would be of advantage to our users. So, the key driver was to fully implement such systems and were uncomfortable using such systems and were uncomfortable with it and did not use it in many cases, the integration of getting reports in the right place was not as good as it should be. We thought the only way to offer something to our users was by trial and error.”

However, the decision to offer speech recognition considerably received negative responses. “We only heard horror stories from sites already using similar systems were uncomfortable with it and did not use it in many cases, the integration of getting reports in the right place was not as good as it should be. We thought the only way to offer something to our users was by trial and error.”

The key to implementing PACS installations networked to multiple hospitals is to fully establish in advance exactly what clinical scenarios need to be satisfied. There are several possibilities, and the requirement and challenges of each will be considered.

“At one end of the spectrum the multiple hospitals all need to function as a single seamless ‘virtual hospital’,” explained Dr. Nicola Strickland of Imperial.

“The key to implementing PACS installations networked to multiple hospitals is to fully establish in advance exactly what clinical scenarios need to be satisfied. There are several possibilities, and the requirement and challenges of each will be considered.”

**Research followed and several firms were invited to join in a pilot project to assess the most appropriate speech recognition offering a private group, even before this we had quite a good turnaround time for radiology systems pilots. We worked with the advanced PACS offered, the radiologists wanted to be even quicker, and so did the referring physicians; they always appreciated our good, quick service, but as soon as we started providing them with images within minutes and a CD kit with all relevant information, they immediately said: ‘Oh great, but where is the report?’”

“So in terms of making a decision to take a step forward, I guess this was the idea of creating an implementation team who were involved in the PACS implementation, but also our task is the ongoing support across the organisation. We have over 3,000 PACS doctors users, and, together with the nursing staff there are 5,000 users. So, we are supporting quite a large user base.”

They have 167 radiologists working for our organisation and our team has only five people. So, it’s very important that we have a solution that is easy to teach to the users and produces as few problems as possible.”

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**Dr. Nicola Strickland, Consultant Radiologist at the Hammersmith Imperial College Healthcare NHS Trust, in London, U.K., will speak on IT and Networking at the ‘Information Technology and Radiology’ session at today’s symposium.**

**PACS installations in a networked environment – combining multiple hospitals**

Hospital Management Symposium
Saturday, March 6, 10:00-11:30, Room K

**Dr. Nicola Strickland, Consultant Radiologist at the Hammersmith Imperial College Healthcare NHS Trust, in London, U.K., will speak on IT and Networking at the ‘Information Technology and Radiology’ session at today’s symposium.**

Dr. Strickland trained in natural science and medicine at the University of Oxford in the U.K., and in Radiology at Hammersmith Hospital, London. She is now a consultant radiologist at Imperial College Healthcare NHS Trust, where she has been in charge of the clinical aspects of imaging information technology (including one of the world’s first clinical PACS installations) for the last 16 years.

Last year she was elected registrar of the Royal College of Radiologists in the U.K. She is the chairman of IMR (Management in Radiology), a subcommittee of the ESR, and past president of EuroPACS, the radiological section of the Royal Society of Medicine in the U.K., and of the Anglo-French Medical Society. She has lectured and published widely on issues relating to imaging IT and PACS.

The key to implementing PACS installations networked to multiple hospitals is to fully establish in advance exactly what clinical scenarios need to be satisfied. There are several possibilities, and the requirement and challenges of each will be considered.

“At one end of the spectrum the multiple hospitals all need to function as a single seamless ‘virtual hospital’,” explained Dr. Nicola Strickland of Imperial College Healthcare NHS Trust, in London, U.K., will speak on IT and Networking at the ‘Information Technology and Radiology’ session at today’s symposium.

The percentage of patients acquired by speech recognition is around 98%, which is a great success. ‘That’s the result after nearly two years!’

The radiologists are strongly encouraged to work with speech recognition. “MagicSpeech offers them three choices,” Bonython pointed out. “They can choose completely digital records, which we do not encourage, a radiograph mode where they finalise the report themselves – which is our preferred option, or they can use speech recognition and then send it to the secretary who makes the corrections.”

Cost efficiency is one point that should never be underestimated or misunderstood, she said. “Qualified secretaries who can do this specific kind of writing are quite hard to find. On the other hand, speech recognition is much more cost-effective by doing things other than typing. So speech recognition does save money that is actually a job killer.”

“Does being a private rather than public hospital affect such implementations?” Private hospitals are generally driven by efficacy, so quick image reporting is very important. In the U.K., speech recognition uptake is quite good in public as well as private hospitals. Maybe our institution gave some kind of help for this development, because our radiologists partly work in the hospitals and work for the National Health Service at the same time. Because their time with us is very limited, we made ours available 24 hours a day so that the radiologists could choose their times.”

As a result the radiologists strongly supported the new system, she said.

“‘So the key driver from my perspective was to speed up the turnaround but support for radiology was not as good as it should be. We thought the only way to offer something to our users was by trial and error.’”

“Every secretaries who can do this specific kind of writing are quite hard to find. On the other hand, speech recognition is much more cost-effective by doing things other than typing. So speech recognition does save money that is actually a job killer.”

“In a nutshell, we’re all very satisfied and happy with the way radiological reporting works today, thanks to speech recognition. ‘Our dream for the near future is that this support should not be limited to radiology, which is a fantastic place for any organisation to start with speech recognition. If the proves successful then my suggestion is ‘go ahead!’ If we can manage the implementation of speech recognition in other areas then we will be able to improve the patient record as a whole. That should be our next target!’”

Kaye Bonython, Programme Manager at Imaging Informatics & OSI, Portland Hospital for Women and Children, HCA, in London, U.K., will speak on IT and Workflow at the ‘Information Technology and Radiology’ session at today’s symposium.

**Kaye Bonython, Programme Manager at Imaging Informatics & OSI, Portland Hospital for Women and Children, HCA, in London, U.K., will speak on IT and Workflow at the ‘Information Technology and Radiology’ session at today’s symposium.**
Radiologists as IT experts – necessity or excessive demands?

Dr. Davide Caramella is highly active in the Italian Society of Radiology (ISR), where he has served as President, Secretary and member of the board of the information study section. He was also the national delegate for the society’s IT activities for four years and has been a member of the ISR board for the last three years.

Dr. Caramella introduced the IHE in Italy eight years ago, and he is currently organizing the European IHE Conferences to be held in Pisa in 2010.

Internationally, he has served on the Informatics committee of the French Society of Radiology and on the EuroPACS Society Board, serving as its President from 1996–2008. Among his most rewarding international obligations has been the involvement in the promotion of IT-related activities of the European Congress of Radiology (ECR). Since 1995 he has been on the ECR’s Programme Planning Committee, and will serve again for ECR 2011.

For almost a decade, Dr. Caramella has also continuously served on the congress committees of the CAR/CARS annual meetings. He is also among the founders of EURORAD, the European Society of Radiology’s online database of radiological teaching files, and is Chairman of the society’s e-Health subcommittee. Currently he is also Scientific Director of EURORAD.

His many publications include six co-authored books on advanced image processing and IT in radiology. He is also Deputy Editor of the International Journal of Computer Assisted Radiology and Surgery, a member of the Overseas Advisory Panel of the British Journal of Radiology, and member of the Scientific Editorial Board of European Radiology, the European Journal of Radiology and La Radiologia Medica.

“Radiologists are among the medical professionals on whom the demands in terms of continuing education are most stringent. Not only do they have to follow the advances in the various medical specialties, but they also must update themselves on the dramatic improvements of imaging modalities brought through by scientific research and by vendors’ R&D. In light of this, there is very little risk of incurring a turf battle between radiologists and IT experts. Radiologists are simply too busy for this, and when they are forced to devote a relevant part of their time to IT, thus becoming ‘experts’, this is due to a lack of specific expertise in the IT departments of the hospital.”

“On the other hand,” added Dr. Caramella, “it is true that a strong collaboration must exist between radiologists and IT experts in planning and maintaining the information systems that are crucial for seamless electronic management of the imaging workflow, hence the necessity of having a few radiologists with IT knowledge and, possibly, ‘vision’. A vibrant international community of radiologists of this kind has grown throughout the years, thanks to scientific societies and congresses such as EuroPACS and CARS (Computer Assisted Radiology and Surgery).

“However, for most radiologists IT is just a tool of the trade: it serves for interaction with their PACS systems, for performing image processing and in teleradiology applications. These features of the radiological profession require an initial IT literacy and a continuous upgrade of IT skills. Therefore, starting from the residency programme, the emphasis on teaching IT in radiology has been steadily growing and, very often, IT is both the end and the means of such education. In fact, e-learning is particularly well-suited for educating young doctors and for updating practicing radiologists on the advances of IT applications in radiology,” concluded Caramella.

Teleradiology perspectives from a local and pan-European approach

A problem that most radiology departments are facing with is a holiday time and half of your colleagues are away – but business has to proceed as usual. Added to that there is a general lack of qualified radiologists in most European countries, so resources are actually always bare. Digital radiology has come so far that it is easy today to produce hundreds of radiological images – but who will read them?

This is the initial point where the teleconsultation services of pan-European diagnostic company Unilabs is deployed. Maria Lohm, Manager of Unilabs’ teleradiology operations in Sweden, will speak at the Hospital Management Symposium 2010 about this true alternative in times of radiologist shortage, and how to identify a good teleradiology service, in her lecture “Teleradiology perspectives from a local and pan-European approach.”

“If a clinic considers outsourcing radiology reporting services, they first need to ask for the high standards of the radiologists and secondly of the technology platform,” says Maria Lohm. “My company provides services from MRI and CT to x-rays exams. We have different experts on the different imaging modalities and medical specialties, we are able to decide which one of our co-workers would be the best for every single case. We also guarantee that images as well as findings can be shared via very fast and secure data lines. The strict observance of data protection constraint is essential.”

Another quality criterion of teleradiology providers is flexibility: are they able to fit the customer’s demands to their special requirements? Unilabs’ clients range from large university hospitals to small clinics, from public to private facilities.

“Normally, we are looking for long-term solutions and our clients send us exams on a weekly or daily basis. For example, we provide our services to the Swedish County Council Ostergotland which has one university hospital and ten smaller hospitals. It is already clear that in 2010 they will have a big gap between radiologist resources and capacity because the county lacks radiology trainees. That’s why we have a long-term contract with them so that we can already plan what exam volumes we are able to handle for them. But we can also close short period gaps such as in case of sickness.”

The service costs are mainly driven by how much the exams cost but are also negotiable.

Unilabs’ Rent a Radiologist business is at the heart of the company’s business model. The company has partnerships with the Nordic countries and Benelux, but they plan to expand their special service to other European countries.

Cooperation between IT and medical engineering in hospitals – relevant aspects for and beyond diagnostic imaging departments

After earning a medical degree and followed by a board certification in diagnostic radiology, Dr. Peter Gocke worked as an assistant medical director at the university hospital of Essen, Germany. He passed several trainings in management and information technology and became the director of the department of information technology and information of Hamburg-Eppendorf in 2003.

“Modern hospital infrastructure heavily depends on information technology. For an efficient use of technology, IT should deeply integrate several complex systems and structures throughout the hospital, directly affecting clinical workflows”, Dr. Gocke declares.

This, of course, needs governing structure which often origin in IT departments. The complex interaction between medical engineering and Hospital IT go far beyond a simple REU/PACS-integration: other examples include order entry, image and report distribution up to charge capturing issues. As Dr. Gocke points out, “This makes some CIO even act as CFO-chief process officer...”

Dr. Davide Caramella, MD, Associate Professor of Radiology at the University of Pisa, Italy, will speak on ‘Turf Battles in IT at the “Information Technology and Radiology” session at today’s symposium.

Maria Lohm, Manager of Teleradiology at Radiologygenerate AB, Unilabs AB in Stockholm, Sweden, will speak on Radiology and Staff Management at the ‘Management and Economics’ session at today’s symposium.
ESPR issues: what’s hot and what’s not

By Catherine M. Owens, London/UK, General Secretary ESPR and Jean-François Chateil, Bordeaux/FR, President ESPR Bordeaux 2010

The European Society of Paediatric Radiology (ESPR) is a popular society with a membership of 100, and a year on year increase in membership from younger radiologists with a passion for imaging children in a safe and informed environment.

The society has strong links with its equivalent societies in North America (SPR), Latin America (SLARP) and Asia and Oceania (AOSPR), thus enabling a worldwide network of like-minded practitioners, in order to improve the quality and safety of care for children throughout all countries. Improved communication networks help us to identify and share common approaches to problem solving and to address solutions. With this in mind we offer associate membership to all of the above societies for a nominal fee.

In the last five years we have put together task forces in oncology, urology functional imaging, CT-dose and hip dysplasia. The foundation of a junior ESPR group has helped to introduce young radiologists to the subspecialty and has been replicated by our sister society, the SPR.

Via the task forces we have devised protocols and guidelines, which are available on the website, to help address and homogenise the best care of children across Europe, and to share this worldwide. Improved communication networks help us to deliver teaching to a wide range of ECR practitioners, in order to improve the quality and safety of care for children throughout all countries.

The ESPR is also a member of EIBIR – The European Institute for Biomedical Imaging Research, sharing important goals in developing molecular imaging and furthering related research projects within paediatric radiology. Our locally formed European Excellence Network on Paediatric Radiology Research (EENPR) works to lead and coordinate specific topical research areas within children’s imaging.

The paediatric element of the ECRs educational programme provides an excellent opportunity for us to deliver teaching to a wide range of ECR attenders in subjects that we feel are relevant and topical to a heterogeneous group of radiologists.

Prof. Maria Argyropoulou from Ioannina/GR, our second ESPR vice-President, has chosen five excellent refresher courses addressing areas deemed important, such as safety first issues (RC 1312). This area is of fundamental importance to radiologists, as escalating (often inappropriately high) CT doses in children are prevalent in the public eye and adverse publicity has resulted in the attraction of funding from the NIH within the U.S., with the formation of the Image Gently campaign (www.pedrad.org/associations/5364/ig), of which the ESPR is a member. The newly formed ESPR CT-dose task force, led by Prof. Richard Fettter from Great AV, has enabled production of paediatric phantoms to enable society members to interact with their chosen departmental CT and record/develop CT exposure using the ALARA principle.

The ESPR has a healthy and productive relationship with the European Society of Radiology and we have held several well attended and highly commended ESOR/Erasmus courses in cities throughout Europe. We have hosted and co-funded ESOR scholars in the U.K. and Spain and are currently organising further attachments to large, well established teaching centres in an attempt to address a crisis in manpower, which adversely affects many European countries. This problem has already had a serious impact on staffing within paediatric radiology units in many countries and indeed, this is being replicated worldwide.

Imaging in Non-Accidental Injury in Children (RC1412) a complex and emotive issue. RC712 and RC1512 address the best ways to image the gastrointestinal/genitourinary systems and the chest respectively. These systems provide a large proportion of the imaging workload in general radiology departments. An advanced brain imaging course (RC 1112) completes the excellent programme addressing diffusion tension imaging, spectroscopy and functional aspects of MRI.

We believe that ECR 2010 will, as always, be an excellent meeting and a great opportunity for all to join together, to address best practice for imaging children. We welcome and encourage all to attend the paediatric courses and scientific sessions.

Further information on the society can be found at www.espr.org.

Children and infants require careful handling during imaging examinations. (Provided by Siemens)
ENCITE: Primary results promise advances in cell therapy

By Eva Haas

The ability to non-invasively monitor the fate and action modes of transplanted cells over time is crucial for a better understanding of the mechanisms by which cell therapy works in the disease areas. Although promising results have already been obtained in pre-clinical and clinical studies, success rates are still variable and limit clinical benefits. The project ENCITE – European Network for Cell Imaging and Tracking Expertise (www.encite.org) – addresses these issues by its ambitious mission to develop and test new MR and optical imaging methods, and biomarkers to get a more comprehensive picture of cell fate and the reaction of the immune system, and to ultimately improve and develop cell therapy for the benefit of the European patient.

In the long-term, ENCITE should lead to extensive collaboration on the development of novel imaging tools and implementation at the level of translational medicine across Europe, paving the way for a significant global impact. This 4-year project is coordinated by EIBIR and funded with €12m by the 7th Framework Programme of the European Commission.

Significant scientific progress towards ENCITE’s goals

Due to the cooperation of ENCITE’s 29 partner institutions and their long-standing expertise in cell imaging, some promising results were obtained in various areas during the initial project phase:

Novel Imaging Technologies

MR imaging methods for cell tracking based on iron oxides were successfully implemented, and clinical methods for pre-clinical evaluation of novel drugs were adapted and optimized. The imaging groups generated 3D and 4D datasets from the brain and heart, recorded under variable conditions using different MRI contrast and spatial resolutions. It was also discovered that the application of advanced techniques allows for an objective optimisation of the compromise between denoising efficiency and information retention on dynamic contrast-enhanced MR images after contrast agent injection.

Novel Imaging Reporter Probes

The project work comprised a range of activities on major classes of MRI contrast agents. The main results achieved during the first year were the successful synthesis of iron oxide nanoparticles at gram scale and the synthesis and in vitro testing of an MRI reporter based on detection of beta-galactosidase activity.

Novel Tools for Cell Labelling

First experiments in novel tools for cell labelling and cell fate imaging (recruitment, differentiation, cell death) were successfully conducted. Initial cell labelling experiments indicated the ability of porphyrin incorporated in endosomal membranes to induce the endosomal escape of contrast media by UV irradiation of labelled cells. Another highlight is the successful construction of the Adenovirus TK vector. Cell fate imaging experiments showed that it is possible to image tumour-stroma cell activation and differentiation by fluorescence intravital microscopy.

Pre-Clinical Validation

In terms of pre-clinical validation, the main results related to neurological diseases are the design of paramagnetic CEST (Communications Exchange on Saturation Transfer) agents with improved properties for cell labelling purposes. By using a bioluminescent reporter, a generated transgenic mouse model significantly repaired on astroglia and allowed the detection of an increase in neurogenesis after stroke. The major breakthrough related to musculoskeletal diseases was the use of CEST to assess glycosaminoglycan (GAG) concentration in the intervertebral disc, which may lead to early diagnosis of disc degeneration and a way to monitor repair mechanisms with stem cells.

With respect to diabetes, the labelling of stem cells was verified by fluorescence microscopy, and in vivo tests on rat models were started. The method of semi-automated and automatic calculation of the number of pancreatic alveoli was tested and found to be ready for routine application.

Translation towards Clinical Applications

The main results refer to cancer and diabetes. With respect to cancer, clinical trials that incorporate imaging techniques were approved. In the DERMAL-EC-DC-06 trial, several patients already demonstrated broad response to numerous peptides prior to vaccination. Furthermore, tetra- and octa-aza-8 colour flow cytometry has become a routine monitoring assay, showing extended phenotype and functional characterisation of T-cell subpopulations. The identification of polyfunctional T cells was of particular interest, since these have been shown to elicit more effective immune responses in HIV vaccination trials.

With respect to diabetes, a sequence was developed for the measurement of high resolution MR images at 3T Imager Trio Siemens. The positions of labelled pancreatic islets were found to be visible as black spots.

In view of these results, the ENCITE consortium is confident of providing novel imaging technologies and post-processing tools for more efficient diagnosis, research and monitoring in the field of cell therapy, to provide highly sensitive agents and procedures for an efficient labelling of cells, and to contribute to the better understanding of the fate of transplanted cells and how cell-based therapies provide therapeutic benefit.

Original articles published in the framework of ENCITE, as well as full citations, are available at www.encite.org.

ENCITE reacts to European needs for training

Based on an increasing level of interest and a great need for educational activities in the field of cellular and molecular imaging in the last three years, one of ENCITE’s aims is to conduct training workshops. In 2009, EIBIR and ENCITE jointly organised an Educational Workshop on Molecular Imaging, in Prague. More than 110 radiologists from 19 countries, medical scientists, physicists, biologists, technicians and postgraduate students, with expertise mainly in MRI, optical imaging and probe development engaged in inspiring discussions and exchanged experiences in an interdisciplinary and international environment.

Be sure to keep up with the news:

The 2nd ENCITE Educational Workshop on cell imaging is envisaged for May 18–19, 2010 in Moné-Hammam/BE, within the framework of the 12th Bi-Annual Conference on Contrast Agents and Multi-modal Molecular Imaging. Highly qualified experts will present outstanding scientific project results and other latest advances in the field of cell imaging and tracking. The 2nd workshop in the planning stage, attendance is free of charge (pre-registration required).

Detailed information and registration: www.encite.org > News

Please visit the EIBIR Lounge in Foyer F at the entrance level of the congress venue to get more information on the project results and other EIBIR networking activities.

More information on the session programme: www.eibir.org > News
The national structure of the society consists of six local branches, founded in the traditional university centres, Bucharest, Iasi, Cluj, Timisoara, Craiova and Timișoara, which are led by local committees. The branches coordinate the scientific activity in their area and have autonomy in developing scientific projects. The SRIM organizes its own congress every two years and publishes a journal named Imaging four times yearly. The board of the society consists of 33 members and meets twice a year.

According to European trends regarding subspecialties, since 2003 we have developed the following curricula – conventional radiology, emergency radiology, interventional radiology, US, CT, MRI, breast imaging, pediatric radiology, nuclear medicine, and neuroradiology. These societies are totally autonomous, led by their own boards, and their presidents are included on the board of the SRIM. The Romanian Society of Radiology and Medical Imaging is the body responsible for the provision of postgraduate training in diagnostic radiology in Romania. The residency programme in radiology in our country consists of five years of training with the following curricula – conventional radiology, US, CT, MRI, breast imaging, paediatric radiology, emergency radiology, interventional radiology, and neuroradiology.

After completing five years of training, and having passed the final exam, the resident becomes a radiodiagnostic specialist and is eligible to apply for a post as a radiologist in the public or private sector.

There are approximately 1,200 radiologists and 250 radiology residents in Romania. The number of posts in the public sector is controlled by the Ministry of Health. The ratio of radiology specialists to population is low in comparison to most European countries and thus the number of studies performed by individual radiologists is extremely high.

The standard of equipment in diagnostic departments in the country is relatively low, with the purchase and replacement of the equipment being a function of the Ministry of Health. Due to the worldwide economic crisis, the healthcare budget was dramatically cut in 2009 and 2010 (to less than 4% of the entire country's budget) and major new developments are in doubt at present. Budgeting for radiological equipment is not based on a clear model and therefore replacement of old machines is not planned and is a subject of controversy.

Today, we face another important problem: due to low salaries and the low reimbursement rate for radiological studies, a huge number of our colleagues are choosing to work abroad (especially in other EU countries). The private sector is growing rapidly and is extremely aggressive, partially due to a lack of clear rules stated in Romanian law. On the other hand, it offers much more attractive salaries and better conditions.

In order to try to solve the problems mentioned above, together with all my colleagues from the board of our society, we decided to work closely with the central authorities on the following issues:

- improve communication with the Ministry of Health
- harmonise the curricula for residents according to EU rules, including hybrid imaging
- increase the number of specialists and residents in radiology according to need
- plan the replacement of old radiological equipment in a clear way according to competences all over the country
- purchase high-end technology for six to eight university centres
- gradually increase the salaries for our colleagues on the basis of the importance of their work and responsibility
- implement guidelines
- develop clear rules for the private sector
- develop and implement new healthcare programmes (e.g. breast cancer)
- develop coherent measures to educate and inform the population concerning radiological procedures so as to set realistic expectations

Despite the difficulties mentioned above, radiology remains a strong specialty in Romania, which attracts some of the brightest graduates each year, leading to intense competition for residencies.

We are looking forward to better integrating Romanian radiology into Europe and building honest partnerships with the ESR and all other European radiological societies.

Find further information on the society’s website: www.srim.ro
Publishing with pride: Introducing the work behind the ESR journals

By Stefanie Mushik

Since its foundation in 1991, European Radiology has become a popular choice for publishing original articles, research and cutting-edge science. The founding steps of its success were prepared by Prof. Albert L. Baert (Leuven/BE), and are now continued by Prof. Adrian K. Dixon (Cambridge/UK), the current Editor-in-Chief. In his daily business, he is supported by a senior Editor and several deputy Editors in making decisions, and by a team of Editorial Board members in performing reviews.

European Radiology can rightfully be considered a high-flyer, bearing in mind the recent impact factor rise up to 3.651 in 2009, which consolidates its firm establishment over the past 19 years. This success is very positive for the ESR and the readership, but its increased attractiveness to authors also results in a very high rejection rate, which is often disappointing for those submitting.

Publishing is an important part of a radiologist’s career. Pressure on publication space and originality is immense and even good papers have to be rejected from many journals, if priority is not high enough. “The pressure on publication space in European Radiology stems from the fact that the journal enjoys the encouraging position of reaching international medical journals worldwide and that the number of authors to submit their educational work has increased over the years,” explains Dixon.

Insights into Imaging is intended to become the ‘missing link’ in ESR publications. To give authors a new opportunity to publish their material, the European Society of Radiology, and in particular Prof. Dixon, in his function as chairman of the Publications Committee, developed the idea of introducing a new journal with a different focus to European Radiology. He further explained, “On the whole, European Radiology is interested in new scientific information and review articles about such new findings. At present we are unable to accept to as much in the experimental line as we would like and many good pictorial reviews and educational articles have to be rejected. This is exactly where Insights into Imaging provides a niche role.” Insights into Imaging will also be able to accept more of the controversial and management papers which European Radiology cannot currently accommodate.

Looking to the future of radiological publishing, borders have fallen and additional markets have been opened up to the industry. An increasing amount of excellent scientific work from non-Western countries and the Far East is reaching international medical journals worldwide. “In the last few years, many radiological departments in Eastern Europe and throughout Asia have installed radiological equipment that is as good as or better than that which can be found in many leading European centres. Partly because of this, but mainly due to hard work by the individual groups, research competition around the world continues to increase,” explained Dixon, underlining the pressure on publication space.

Insights into Imaging will publish educational material, such as reviews, articles, pictorial essays and “how to do it” articles, reflecting state-of-the-art evidence-based radiological clinical practice. I anticipate that this facet of Insights into Imaging will prove to be popular with the average European radiologist, seeking relevant information to improve his daily work,” assured Hermans. On the other hand, the new journal is designed to become an appropriate platform for societies to publish their official advice papers. This should address every radiologist in Europe, he states: “The second purpose of I3 is to serve as a platform for disseminating guidelines and recommendations, topics of controversy and formal statements concerning European radiology.”

In conclusion, it means that Insights into Imaging will not have an Impact Factor until 2012. “The new journal will attract an audience as wide as possible. Hopefully, a reasonable impact factor will be acquired; this will help to increase the interest of authors to submit their educational work to I3,” said Hermans. Obviously, the loyal support of the ESR membership is needed for it to become successful and compete with other similar journals in the future.

Any topic related to the field of radiology will be considered for publication in I3, and as this journal is focusing on educational articles, the style of the articles is not as strict as required for a research journal. “A well-written abstract is necessary, as this part of the manuscript is the appetizer that will assure the reader’s attention to further explore the content of the article,” Hermans pointed out. All manuscripts should contain at least an introduction, a body, and a discussion. An educational manuscript should preferably have a conclusion summarising the teaching points or stating a take-home message. The references are also an important part, which is often rather neglected – these should always be up to date and link the article to recent literature. More detailed author’s instructions can be found on the website www.i3-journal.org.

What should not be submitted, explains the Editor-in-Chief, is case reports. “We decided not to consider case reports for I3, as the ESR already has an electronic platform for this kind of articles, with EURORAD.”

Once submitted via the online submission system at www.editorialmanager.com/i3, a paper goes through stringent peer review by European experts, serving the authors’ need for critical feedback. After acceptance, manuscripts are published online at SpringerLink, the publisher Springer’s own platform.

For ECR 2010, and as a special introduction for the ESR community, a premiere edition, containing a special collection of papers from within the ESR, has been printed and distributed to all participants in their congress bag.
Suzanne Anderson, a highly-esteemed musculoskeletal radiologist and renowned educator, is currently Chair and Professor of Medical Imaging at the University of Newcastle, Australia, and has an affiliated position at the University of Bern and Inselspital in Switzerland.

In 1986 she obtained her medical degree at the University of Newcastle, Australia, where she completed her medical training with a special focus on orthopaedics and surgery. In 1995, after specialising in radiology at the Royal North Shore Hospital in Sydney, she spent three years at the University of San Francisco (UCSF). There, she undertook fellowships in musculoskeletal radiology and neuroimaging, before taking on clinical, teaching and educational roles as an adjunct professor in musculoskeletal radiology. Three years later, she joined the University of Bern and Inselspital, Switzerland, as Chief of the musculoskeletal radiology section, which she built up over a period of ten years. In 2005 she received a further degree in radiology (Habilita-tion, Privatdozent) from the University of Bern. Anderson’s focus is on education in musculoskeletal radiology, and interdisciplinary research, funded by government bodies and industry. She is also currently finishing off a Swiss National Foundation multicentre study on whiplash.

In recognition of her accomplishments, she has received several awards for scientific projects and papers, notably from the European Society of Musculoskeletal Radiology (ESSR) in 2003 and 2006. She also received distinctions from European Spine journal in 2004, the Society of Skeletal Radiology of North America (SSR) and the International Skeletal Society (ISS) in 2005. Her scientific achievements in musculoskeletal imaging have been as important as her commitment to organising and refining the subspecialty, and she supports the development of the international musculoskeletal community, through active work in Europe, USA and Asia. She is a member of several prestigious societies including the ISS, the ESSR and the International Society for Magnetic Resonance in Medicine (ISMRM).

Among other contributions, she has previously chaired the ESSR Tumour Sub-committee, and has been a member of the ECR MSK organising committee and the ESSR research and education committee. She is currently on the Education Committee of the Radiological Society of North America (RINS) and the organising committee of the ISS. She supports radiology in developing countries through the ISS Outreach programme, Asian series in Thailand and MSK tumour assessment through AGKT (German Bone Tumor Group) and the Swiss Tumour Registry. Her involvement in the SSR, Australian Musculoskeletal Society (AMS), and Asian Musculoskeletal Society (AMSJ), as well as in the Swiss and German MSK Tumour Registry continues.

Anderson’s focus is on education in musculoskeletal radiology, and interdisciplinary research, funded by government bodies and industry. She also has a 7-year-old son. She dedicates her free time to studying art history of Central Europe, practicing winter sports with her family and enjoying nature and gardening in summer.

**Suzanne E. Anderson from Sydney/AU.**
Cross-border healthcare presents new challenges for eHealth

By Sonja Gottenbrenner

On July 2, 2008 the EU Commission issued a proposal for a directive on the application of patients’ rights in cross-border healthcare. This directive is currently focused on ensuring that patients from one country within the EU may obtain healthcare within another EU country without hindrance. The main emphasis of the directive is to make it easier for patients to obtain approval and for an organised financial framework to be put in place to pay for the healthcare.

This approach is overdue, as there have been several cases settled by the European Court of Justice since 1998 and this proposal would bring about the needed legal clarity. In addition, it emphasises the importance of quality and safety of care for patients travelling across borders for healthcare. Moreover, there is little in the draft to ensure the quality and safety of patients whose treatment involves cross-border eHealth.

In the proposed directive, the responsibility for the monitoring of the standards has been laid on the country where the healthcare is provided for an EU national of another EU country. However, in the case of teleradiology and telemedicine, the patient does not travel and cannot influence or control and responsibility for the quality and standards of teleradiology and telemedicine remain with the country where the patient receives the initial care.

In the case of teleradiology in particular and telemedicine in general, the patient may undergo the imaging or clinical procedure in their own country, but the most important part of the process, the interpretation of that imaging study or clinical opinion, will be performed in another EU country, in a country outside the EU or even outside Europe.

For teleradiology in particular, the patient is unaware of the qualifications, regulatory status or quality of the reporting radiologists or of the content and quality of the report. The report will be returned to the imaging centre and distributed to whoever has referred the patient. Many of these investigations are requested by general practitioners or are even patient self-referrals, and there is no opportunity for them to review the images, meaning they have to rely on the report to treat the patient.

New specialty

The Swedish Society of Medical Radiology (SFMR) is a specialist section of the Swedish Society of Medicine as well as of the Swedish Medical Association. As a result of the new classification of medical specialists in Sweden, the SFMR has applied to the Swedish Society of Medicine to be renamed. We now all plan to become Imaging and Functional Medicine physicians, an amalgam of former radiology, nuclear medicine, radiology, and clinical physiology.

As told in ECR Today two years ago, the new classification of specialties is based upon ‘base specialties’ and the addition of ‘branches’. Imaging and Functional Medicine is the new base (trunk) and after five years of training young specialists can undergo further training to one or more of the branches neuroradiology, nuclear medicine, or clinical physiology, respectively. Yes, you noticed. Radiology is no more and we have now voted for a name change of our society to the Swedish Society of Imaging and Functional Medicine (in Swedish the acronym will become SFMB). The branches are, as before, represented by their own societies.

At the time of writing, we have not yet arrived at the final decision on the new name.

The problem with the new specialty is that not everyone is happy to be in the same melting pot. First, it should be mentioned that most of us believe in a new specialty to bring together traditional x-ray, CT, MR imaging, ultrasound, nuclear medicine including PET/CT and functional diagnostic information obtained by other methods. Most specialist are some members of clinical physiology. They believe that their profound knowledge in physiological processes will not be addressed adequately in the new specialty. Their analysis may be right to some extent, but no change comes without any drawback and the new specialty offers the traditional clinical and radiologist more from imaging. One can argue that this is a clear advantage. Clinical physiology has approached the National Board of Health and Welfare to reverse things to how they used to be. However, no decision in this matter, or those regarding a handful of other specialties feel excluded. In this case, disputes over cross-border healthcare would continue to be settled by the European Court of Justice.

The European Parliament adopted a legislative resolution (Bowis Report) amending the proposal of the Directive (first reading in co-decision procedure) on 23 April 2009 that also partly reflected the ESR position.

However, the ball is now with the EU member states. During the Environment, Social Affairs and Health and Consumer Policy Council (EPSCO) in December 2009 no common position on the proposal could be reached.

Discussions will continue on this topic under the Spanish and Belgian Presidencies. However, the possibility of a withdrawal of the proposal by the European Commission has not yet been excluded. In this case, disputes over cross-border healthcare could continue to be settled by the European Court of Justice.

Interested in further information on this topic? Visit the joint session of the ESR and the European Commission!

News from the Swedish Society of Radiology

By Katrine Åhlström Riklund, Umeå/S, SFMR President

The next ‘Röntgenveckan’ (radiology week), the annual meeting of the Swedish Society of Radiology will take place in the beautiful city of Örnsköld on 10 September 2010.

As told in ECR Today two years ago, the new specialty is no more and we have now voted for a name change of our society to the Swedish Society of Imaging and Functional Medicine (in Swedish the acronym will become SFMB). The branches are, as before, represented by their own societies.

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At the time of writing, we have not yet arrived at the final decision on the new name. The problem with the new specialty is that not everyone is happy to be in the same melting pot. First, it should be mentioned that most of us believe in a new specialty to bring together traditional x-ray, CT, MR imaging, ultrasound, nuclear medicine including PET/CT and functional diagnostic information obtained by other methods. Most specialist are some members of clinical physiology. They believe that their profound knowledge in physiological processes will not be addressed adequately in the new specialty. Their analysis may be right to some extent, but no change comes without any drawback and the new specialty offers the traditional clinical and radiologist more from imaging. One can argue that this is a clear advantage. Clinical physiology has approached the National Board of Health and Welfare to reverse things to how they used to be. However, no decision in this matter, or those regarding a handful of other specialties feel excluded. In this case, disputes over cross-border healthcare would continue to be settled by the European Court of Justice.

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Recent developments in Lithuanian radiology

By Jurate Demantavičienė, Vilnius/LT, LRA President, Nomeda Valevičienė, Vilnius/LT, Saulius Luksevičius, Kaunas/ LT, Darius Palionis, Vilnius/LT

The Lithuanian Radiologists Association is one of the youngest members of the European Society of Radiology. Nevertheless, the roots one of the youngest members of the European Radiological Community was the International Baltic Congress of Radiology in Lithuania, Latvia and Estonia. The first Congress was held in Kaunas, Lithuania, in 2006. It was followed by one in Tartu, Estonia, in 2008 and the upcoming congress will take place in Riga, Latvia, in October 2010. The target of the congress was to make a starting point for our young specialists to get more experience and to get introduced to the international community more easily.

The first x-ray examination laboratory in Lithuania was founded by F. Dembovski in 1986. The specialty underwent continuous growth and development in the healthcare sector in Lithuania. The Lithuanian Radiologists Association (LRA) was founded in 1947 by V. Krestovas and today it has around 313 members, including 35 honorary members. Asoc. Prof. Justas Demantavičius is the elected president of the LRA.

The radiology chair at Kaunas University of Medicine was established in 1957 and at Vilnius University in 1967. Since then we have introduced medical education, scientific investigations, and advanced courses at two universities.

In the first half of the 20th century the only specialty was conventional radiology. Interventional radiology started in the 70s and 80s. Ultrasound was introduced widely to conventional vascular radiology started in the 70s and 80s. Ultrasound was introduced widely to medical practice in Lithuania in the 90s. The first CT machines were installed in 1985 in both Vilnius and Kaunas university hospitals. Nevertheless, the most rapid technical development in Lithuanian radiology was reached in the 21st century. Today there are 49 CT machines, 14 MR installations, 20 angiography and 24 mammography units, as well as five nuclear medicine departments.

The roots of Vilnius University Hospital Santariskiu Klinikos Centre of Radiology and Nuclear Medicine begin at the Faculty of Medicine of Vilnius University, where a Department of Nuclear Medicine was founded in 1957 and at Vilnius University of Medicine. The scientific personnel consisted of two professors and six assistant professors. The residency training programme conforms to European standards; however there are some specific adaptations regarding duration. Nuclear medicine is included in the radiology training programme, so it is not a separate branch as it is in some other European countries.

There is room for improvement in our teaching programmes, in training teachers for the future. We see great advantages in international cooperation regarding this purpose. Our qualified radiologists are running high-quality teaching programmes for local radiologists and building up material for training on an international level. We ran an international Heart MRI course in summer 2009.

The present continuous education in Lithuania includes renewed courses at Vilnius University (VU) and Kaunas University of Medicine (KUM), educational lectures, conferences and courses by the Lithuanian Association of Radiology (LRA), and some international courses (School of MRI, RSNA visiting professors program).

Our radiologists deliver not only excellent patient care, but also contribute to science. Main research topics are imaging in cardiology, oncology, and neuroradiology. Cardiovascular MRI, cMRI in Vilnius University Hospital Santariskiu Klinikos (VUHSK) have been performed since 2002. Every year approximately 1,000 heart MRI exams are carried out using now 1.5T Siemens Avanto MR machine (dedicated for cardiology). The cMRI in VUHSK is performed according to criteria for cardiac computed tomography and magnetic resonance imaging, which was accepted worldwide in 2006.

The spectrum of research at Kaunas University of Medicine is very broad, e.g. at present there are ongoing doctoral studies on non-invasive intracranial pressure measurements, monitoring of colorectal cancer, and mammography screening.

Lithuanian radiologists are members of multiple international societies, such as the European Society of Neuroradiology, the International Society for Magnetic Resonance in Medicine, the European Society of Gastrointestinal and Abdominal Radiology, and the European Society of Urogynaecological Radiology; and are also members of clinical specialty organisations, like the ILAE (International League Against Epilepsy), the ESR (European Society of Cardiologists), the EFE (European Federation of Endocrinologists), etc.

For many years Lithuanian radiologists have had strong relations with American radiologists (Universities of Rochester and Chicago), who not only tutor the study process (lectures, seminars) and offer consultations to patients, but also provide charity. Since joining the ESR in 2008, radiologists of Vilnius University and Kaunas University of Medicine, as members of Lithuanian Radiologists Association, have been involved in ESR administrative and scholarly bodies, participating in annual ESR leadership meetings, and taking part in the ECR.

Over the years, multiple radiological articles and textbooks have been published by our specialists. In recent years articles have been accepted and published by international medical and radiology journals with increasing frequency.

Needless to say, the situation cannot be attributed only to good luck. Several factors are responsible for the rapid development of Lithuanian radiology in the past 20 years. One of the most important factors is the enthusiasm of the community of radiologists, especially our young colleagues. Around 30% of our radiologists are younger than 40.

The reality in Europe today is that some regions are experiencing a shortage of radiologists while other regions have a surplus. This inefficiency can be levelled out by means of eRadiology and telemedicine. UHKS Radiology and Nuclear Medicine Centre has been the clinical partner in several international telemedicine projects, such as BITNEL, eHealth, R-Bay, and is ready to connect with other Baltic countries to provide teleradiology services. Kaunas University of Medicine has successful cooperation with other Baltic countries in teleradiology. However, we still need some decisions to be introduced by our authorities to create an equal radiology service.

One of the problems in the situation of rapid development in radiology technique is the remaining lack of imaging modalities and personnel in rural areas; this is where we see the future for our teleradiology.

Our vision is to establish a team for imaging services consisting of a radiologist, a medical physicist, and a radiology technician. Unified statistical information in imaging is necessary. We are looking forward to extending international cooperation, having an increasing role in creating the imaging solutions for e-health projects in Lithuania, and introducing a education by sharing cases and teaching files. Involvement and cooperation with our government should enhance, based on the experience and in cooperation with other European countries. We are also trying to mobilise public opinion and the media towards radiology services (many people still understand radiology only as conventional x-ray examinations).

Despite these problems, Lithuanian radiology has taken very definite steps forward and our commitment to better radiology is firm. Hopefully the results, in our opinion, are already seen and more can be expected.

For more information on the Lithuanian Radiologists Association, see our website: http://radiologi.is
News from the Turkish Society of Radiology

By Mehmet Erturk, Istanbul/TR, Secretary-General of the Turkish Society of Radiology

The Turkish Society of Radiology is an apolitical, non-profit organisation promoting radiological education and cooperation among its members with regard to professional, social and legal issues. The main radiological issues and problems that we are facing are very similar to those of any other nation. However, the most important issue we are currently facing is the necessity to promote radiology in Turkey.

The Society of Radiology in Turkey is currently provided predominantly by university hospitals and government education and training hospitals. There are 42 state university hospitals, six private university hospitals and 14 government education and training hospitals in Turkey. Radiology residency training programmes are under the care and responsibility of the Ministry of Health. The training period is five years and the Turkish Society of Radiology actively collaborates with the Ministry of Health in planning education and preparing guidelines for radiology residency programmes.

Radiology board exams have been administered since 1991 by the education committee of the Turkish Society of Radiology. The board exams are composed of two parts: one theoretical exam and one practical exam. Only the participants who succeed in the theoretical exam can attend the practical exam.

The Turkish Congress of Radiology was held on November 4–9, 2009, in Antalya, with 1,600 radiologists attending the meeting. Every year the number of attending radiologists is growing. At the Turkish Congress of Radiology 2009, sessions were held by 185 Turkish lecturers and 6 lecturers from Europe and the United States. Several workshops were held by a limited number of participants. These are the CT-Colonography workshops. Several are organised every year in different European cities, each accommodating an average of 100 participants. These workshops are original because there are many workstations, from different vendors, which means that every learner can attend the training material and use his daily routine time. ESGAR thanks all the vendors who kindly agree to participate in this very fruitful teaching programme.

Another emerging topic is the role of imaging beyond morphology. As abdominal tumours are extremely common, abdominal spread of extra abdominal malignancies is even more frequent, and modern therapies change the paradigm of tumour evaluation, one can expect that oncology is a major concern for ESGAR. Nowadays, international standards relying on tumour size, while still adequate and necessary are not as many sufficient to describe the effect of treatments on tumour biology, and to pronounce therapy success or failure. Modern tools have broken into the landscape of imaging like Perfusion imaging with Ultrasound, CT or MRI. Diffusion imaging with MRI, and metabolic imaging with PET-CT. Even shear wave elastography with Ultrasound or MRI could be of importance in this topic.

ESGAR is heavily involved in promoting the recognition of the technique, and in defining the exact role of CT-Colonography in the diagnosis of cancer screening or early detection. Most of the newest scientific studies are presented and analysed during the ESGAR annual meeting, which is the showcase of cutting-edge science for this topic.

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What’s on today in Vienna?

**Theatre**

Please note that all performances, except at Vienna’s English Theatre, are in German!

**Akademietheater**
1030 Vienna, Lisztstraße 1
phone: +43 1 51444 4145
www.burgtheater.at

**Burgrtheater**
1010 Vienna, Dr. Karl-Lueger-Ring 2
phone: +43 1 51444 4145
www.burgtheater.at

**Rabenhof**
1030 Vienna, Rabengasse 3
phone: +43 1 712 82 82
www.rabenhof.at

**Schauspielhaus**
1090 Vienna, Porzellangasse 19
phone: +43 1 317 01 01
www.schauspielhaus.at

**stadtTheater wölflinggasse**
1010 Vienna, Wölflinggasse 4
phone: +43 1 512 42 00
www.stadttheater.org

**Theater in der Josefstadt**
1080 Vienna, Josefstädter Straße 26
phone: +43 1 42 700 300
www.josefstadt.org

**Vienna’s English Theatre**
1080 Vienna, Josefsgasse 12
phone: +43 1 402 12 60 0
www.englishtheatre.at

**Volkstheater**
1070 Vienna, Neustiftgasse 1
phone: +43 1 52111 400
www.volkstheater.at

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**Concerts & Sounds**

**Konzerthaus (Classical Music)**
1030 Vienna, Lothringerstraße 20
www.konzerthaus.at

**Musikverein (Classical Music)**
1010 Vienna, Bösendorferstraße 12
www.musikverein.at

**Porgy & Bess (Jazz)**
1010 Vienna, Riefergasse 11
www.porgy.at

**Arena (Alternative Music)**
1030 Vienna, Baumgasse 80
www.arena.co.at

**Szene Wien (Alternative Music)**
1110 Vienna, Haußkastraße 26
www.szenewien.com

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**Opera & Musical Theatre**

**Volksoper**
1090 Vienna, Währingerstraße 78
www.volksoper.at

**Wiener Staatsoper – Vienna State Opera**
1010 Vienna, Opernring 2
www.wiener-staatsoper.at

**Ronacher**
1010 Vienna, Sellarstraße 9
www.musicals-vienna.at

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Vienna around 1930
at the Wien Museum
1040 Vienna, Karlsplatz
Opening hours:
Tuesday–Sunday 10 am–8 pm
www.wienmuseum.at
How to prepare a scientific manuscript

By Lisa Loeb

Publishing is an essential part of a scientific career and also of science itself. Original material must be published to make it a part of the existing body of scientific knowledge and available to the scientific community. But whether or not a manuscript gets published depends not only on its content, but also on its form. Significant flaws in preparation and presentation can delay or even prevent good science from publication. The following article focuses on some points that should be considered during preparation of a manuscript in order to present the research in the best possible way and help it get the attention it deserves.

Choice of journal

It should be decided ahead of manuscript preparation to which journal a paper will be submitted. This should be done by taking a close look at the scientific aims and scope of various journals under consideration and choosing the one that seems the most appropriate. Choosing correctly will help to ensure the best conditions for acceptance, to the research to the most suitable audience and, consequently, gain the recognition it deserves. The authorship should also be chosen at outset.

Find and follow the guidelines

The guidelines of the chosen journal should be reviewed before manuscript preparation is started. What is the required reference format? If there are multiple submission categories, how are they defined (for which would the research fit in best) and what are the recommended lengths and specific file types required? What are the numbers of tables and figures necessary should be submitted. Image quality and their affiliations the manuscript might either become hard to read once blinded, or might have to stay partly un-blinded and therefore reveal information about the authors' identities. There are too many indications about the authors and their affiliations the manuscript might either become hard to read once blinded, or might have to stay partly un-blinded and therefore reveal information about the authors' identities. Furthermore, no identifiable patient data of any sort should appear in a manuscript – a specific concern with regards to figures.

Not every reader of a scientific paper will be familiar with its topic and therefore the introduction should always give some basic information and refer to background literature. Throughout the text it should be clarified which questions the paper addresses, what the main conclusions are, in which way the data supports the conclusions, and why they are important. Also, a study should not just be described, but the logical connections should be included and a clear road-map through the paper should be provided. The materials and methods section should be written with specific care because this is where the information is provided that would be needed to repeat the experiment. If the given information is not sufficient for this purpose, a paper cannot be accepted. The introduction and discussions/conclusion should each emphasize, in their respective contexts, that which makes the study original. In general, repetition between sections should be avoided.

Blinding

Considering the question if and how a manuscript should be blinded by its authors, the guidelines of the journal in question should provide an answer. However, it is always good advice to be as sparse as possible with indications about the authors' and their institutions' identities, as well as indications of their country of origin. If there are too many indications about the authors and their affiliations the manuscript might either become hard to read once blinded, or might have to stay partly un-blinded and therefore reveal information about the authors' identities. Furthermore, no identifiable patient data of any sort should appear in a manuscript – a specific concern with regards to figures.

References

Especially with regard to reference style, the authors' instructions should always be consulted. Journals also have different practices concerning references in press, or manuscripts that are accepted but cannot yet be found online, and it is advisable to inform oneself about these practices ahead of manuscript preparation. Otherwise a paper's progress might be considerably slowed while it waits for the deletion and new order of references before it can be forwarded to reviewers. It is also important that the selected references are up to date and refer to previous work on that topic within that journal.

General remarks about scientific writing

There are a few cornerstones of scientific communication that should always be kept in mind when preparing manuscripts: scientific writing should be authentic – only what was actually done should be described. It should be accurate – the results should be reported as they are. And it should be original – it should not already be published anywhere else; originality also means not splitting a study into the smallest publishable units (also known as ‘salami slicing’), but publishing it as a whole if it was conducted as a whole. It is important to give the appropriate credit: scientific work is almost always built on other people's ideas and it is bad scientific practice not to acknowledge those scientists, whose ideas have contributed to the research conducted. Lastly the paper should be as brief as possible, as Francis Bacon said, 'Why use two words when one will do.'

Selected references:
