Checklist holds key to predicting hepatocellular carcinoma

By Paula Gould

Mountaineering metaphors provided the framework for Sunday’s Josef Lissner honorary lecture: Ode to the liver.

“The liver, in my opinion, is for radiologists what the Matterhorn is for alpinists. It is a sort of litmus test for measuring your skills,” said Prof. Carlo Bartolozzi, chair of the department of radiology at the University of Pisa, Italy.

Bartolozzi began by acknowledging that he was not the first to compose an ode to the liver. Pablo Neruda, winner of the Nobel Prize for Literature in 1971, described the liver’s pathophysiology in a poem that ended with a prayer to the organ: “Do not betray me! Work on!”

Returning to the mountaineering theme, Bartolozzi observed that before climbing any peak, alpinists should be aware of the possible pathways, risks, and complexities ahead. The same is true when exploring an organ as complex as the liver, he noted. Radiologists need to understand what is going on.

The liver is the central homeostatic organ in the body and site of at least 100 functional processes. Its uniqueness derives from having peculiar cellularity, double vascularity, and a biliary system. The portal vein is responsible for 70% of the vascular supply in the normal liver. The remaining 30% comes indirectly from the portal artery via the peribiliary arterial plexus. Functional changes to the liver, such as unbalanced fibrosis, thrombosis and capillarisation cause a change in vascularity, with the portal flow decreasing and the arterial and capillarisation cause a change in vascularity, the peribiliary arterial plexus. Functional changes to the liver, such as unbalanced fibrosis, thrombosis and capillarisation cause a change in vascularity, with the portal flow decreasing and the arterial supply increasing.

This can be observed on perfusion imaging with CT and/or MRE, Bartolozzi said. Parameters such as hepatic blood volume and hepatic blood flow will drop, whilst mean transit time and hepatic arterial fraction will rise.

“It is very interesting to see how these parameters are related to the degree of fibrosis,” he noted.

Delegates were also shown the step-wise development of hepatocarcinogenesis in the cirrhotic liver. Starting with large, regenerative nodules (benign), the sequence progresses through low-grade dysplastic nodules (benign), high-grade dysplastic nodules (premalignant) and early HCC (premalignant), before ending with overt HCC.

“Neoangiogenesis is fundamental in making a diagnosis of HCC,” Bartolozzi said. “The question is: How do we explore the ‘grey zone’ of these equivocal nodules?”

The answer may lie with pathology. Certain precancerous pathological features can now be identified using non-invasive radiological techniques. One pathological sign of premalignancy is a change to clear cells, that is, cells rich in glycogen. Because glycogen causes a strong T1 shortening, these can be identified on T1-weighted imaging. Comparison with out-of-phase MR images will confirm that the suspect cells contain glycogen and not fat. Other premalignant features include iron-free nodules, impaired biliary function, and cholestasis.

Bartolozzi showed a series of MR images that could be used to diagnose a high-grade dysplastic nodule. The signs to look for are T1 and T2 shortening (glycogen content), no wash-in/wash-out on contrast-enhanced imaging (no neoangiogenesis) and hypointensity in the hepatobiliary phase (cholestasis).

Overt HCC, on the other hand, will show prolonged T1 and T2 relaxation (hypercellularity), contrast wash-in/wash-out (neoangiogenesis), and hypointensity in the hepatobiliary phase (loss of hepatobiliary function).

“All pathological features have a corresponding imaging feature. So in practice, when we acquire images of patients suffering from cirrhosis we have to follow this sort of checklist,” Bartolozzi said.

Screening dilemma goes hand-in-hand with advances in plaque imaging

By Paula Gould

The very latest options for plaque imaging were set out in Sunday’s ‘New Horizons’ session. But when challenged from the floor, speakers had to acknowledge that the question of when to image is just as important as which tool to use.

It was the dreaded ‘S’ word (screening) that provoked most debate in the end-of-session panel discussion. Atherosclerotic disease accounts for around 50% of ischemic strokes and the majority of myocardial infarctions and sudden cardiac deaths. Many deaths occur in people who showed no prior symptoms, yet unlike other ‘silent’ diseases, such as prostate cancer and breast cancer, there are no guidelines for screening for asymptomatic atherosclerosis, and no funding from national governments.

A raft of imaging methods are now being developed that promise to yield more information on the physiology of plaques and their likelihood of rupture. This has raised interest in the feasibility of these techniques as population-wide screening tools. But given the current economic climate, how can radiologists justify using such expensive tools to image a potentially large group of asymptomatic individuals? That was the question that all four presenters were asked to ponder.

Appropriate risk stratification has to be the key to any imaging-led screening strategy, said Prof. Carla Bartolozzi from Pavia.

continued on page 3
Croatians move swiftly to resolve problems with national breast screening programme

By Philip Ward

The organisers of the national breast screening programme in Croatia have encountered some initial difficulties, but they have taken decisive action to solve them, attendees at Sunday’s ESR meeting Croatia session were told.

“We met some problems because some regions of the country are under-equipped and understaffed,” said Prof. Miljenko Marotti, from the University Hospital ‘Sisters of Mercy’ Medical Faculty, University of Zagreb. “At the beginning, we had higher recall rates in some areas and mammography teams. We have tried to solve the problem with additional educational workshops.”

The programme was adopted by the government in June 2008, and started in practice in October 2008. Two local screening programmes were organised before the national programme was introduced.

The organisers’ goals are to reduce breast cancer mortality by 25% within 10 years of the beginning of the programme, to improve patients’ quality of life, and to reduce high costs from treating women in the advanced stage of the disease, Marotti said.

The target population is women aged between 50 and 69, of which there are nearly 614,000 in Croatia. The number of women invited was around 667,000. Women were invited for mammography for read, by the local Department of Public Health.

Mammography will be performed every two years. The equipment used in mammography screening includes 80 mammography units and two mobile units. All the equipment was less than 10 years old. Some new mammography units were installed in under-equipped areas.

The American College of Radiology’s BIRADS (Breast Imaging Reporting and Data System) Lexicon was translated into Croatian, with the permission of ACR and the support of Prof. Hedvig Hricak, who gave Friday’s opening lecture at ECR and was born in Croatia. Free copies were distributed to all Croatian radiologists.

A report of the Public Health Institute about the screening programme shows that up to February 2009, the overall participation rate had reached 56%, but that were wide regional variations.

“The differences between the counties cannot be explained by geographical position only because the difference is evident between the Dalmatian counties, as well as counties in the northern part of the country,” said Marotti.

Up to January 2009, there were 1,117 confirmed cases of breast cancer. There is a delay of between 14 and 21 months in the screening results. “It is generally accepted that auditing is a useful QA procedure that provides feedback, both to mammography facilities and to individual interpreting radiologists,” he said. “It is particularly important for BIRADS 3 and 4 lesions. Negative findings of breast biopsies require comparison of imaging findings, physical examination, and histology to decide whether re-biopsy or follow-up of the suspicious breast lesion yield satisfactory results.”

Some important radiological events are due to be held in Croatia over the coming months and years, Brijak noted.

A state-of-the-art seminar on breast imaging will take place at University Hospital Dubrava, Zagreb, from 14 to 16 May 2009. Among the speakers will be Prof. Edward Azouz from Stockholm, Prof. Carla Borris from Munich, Prof. Ingrid Scherer from Kid, and Prof. Brijak from Zagreb.

Between 15 and 18 October 2009, there will be an international educational course in Opatija. This will consist of the IV Central European Vascular Forum, as well as a meeting about vascular ultrasound organised by the Adriatic Vascular Ultrasound Society.

In an immensely great Day for Croatia, speakers at Sunday’s session reviewed their commendation.
Today's pulmonary infections pose multidimensional challenges

By Philip Ward

Radiologists should be clinically focused when handling HIV cases, according to a leading chest expert. They must know if patients are drug-naive or whether they are already taking anti-retroviral therapy. It is also important to determine how they acquired their HIV, whether onset is acute or more gradual, and how profoundly unwell the patients feel.

"If you have all this information, you are much more likely to make a meaningful contribution to the management of the patient," said Dr. Simon Padley, consultant radiologist at the Chelsea and Westminster Hospital and Royal Brompton Hospital, London.

Pulmonary infection is the commonest cause of infection-related death, and the sixth commonest cause of death overall. It is particularly important in HIV, he commented during Sunday's special session focused on the new face of pulmonary infections in Europe.

Chest x-rays remain the frontline imaging tool for HIV infection. "We use CT in a much more limited and tailored way," he said. "Sometimes we use CT when the chest x-ray is being debated: Is it normal or isn't it normal? CT can be very useful for solving that argument."

CT is also used if there are complex or atypical features on a chest radiograph that are difficult to interpret. It is used increasingly for staging and restaging of neoplasms associated with HIV rather than for the assessment of infection. Occasionally CT is used for biopsy planning and biopsy guidance when there is a lesion that may be infected, Padley noted.

Two of the most important infections, prognostic pneumonia and tuberculosis, occur above the point at which the patient is susceptible to opportunistic infections.

The quest for a single, 'best' modality for all plaque imaging studies may well be fruitless, according to a leading chest expert. They must know if patients are drug-naive or whether they are already taking anti-retroviral therapy. It is also important to determine how they acquired their HIV, whether onset is acute or more gradual, and how profoundly unwell the patients feel.

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Researchers still appear to be divided over use of CT or MR imaging in paediatric radiology

By Melisande Rouger

Imaging children raises many questions, and the choice of modality still fuels discussions between proponents of CT and those in favour of MR, as the session “Optimising imaging from fetus to adolescent” showed on Sunday at ECR 2009.

Major advances in CT have led to a rapid and widespread acceptance of this tool in clinical practice. For instance, CT requests at the Hospital Universitario Materno-Infantil Vall d’Hebron in Barcelona, Spain, increased by 70% between 1998 and 2009. This growth translates into a great increase in radiation dose being administered to the paediatric population.

With CT, radiologists are looking for ways to increase image quality while decreasing radiation exposure as much as possible. Children are more radiosensitive than adults and have a longer lifetime in which to develop radiation-related diseases. Radiologists must be aware of these facts and practice the ALARA principle (As Low As Reasonably Achievable) when they come to deciding on CT protocols and parameters,” said Dr. Pilar García-Peña, a radiologist at the Hospital Universitario Materno-Infantil Vall d’Hebron.

Adjusting parameters is key, and should be based on the patient’s weight, the body part being examined, image quality, radiation dose, and clinical indications.

For high-resolution CT (HRCT), García-Peña recommends the use of low kVp (90-120), low mAs (25-50), collimation between 1 and 1.25 mm and intervals of 10–20 mm, as well as a high-resolution filter that radiologists should not use scout view during the examination.

Another strategy to reduce radiation is to use a shield for the neck, breasts and orifices with overlapping bismuth radioprotective garments. This technique can reduce dose by 38%.

HRCT proves very efficient in the investigation of paediatric lung diseases, and it is more appropriate than MRI in some cases, for instance on intracranial and cortical bone anomalies or trauma injuries. But MRI opens the patient to ionising radiation and provides a wide range of image contrast. It also offers the potential for temporal information and quantitative evaluation. These advantages have convinced a number of researchers that MRI is the most appropriate tool for paediatric radiology.

“At the risk of sounding provocative, I must say that MR is, after birth, the best option in imaging children,” said Dr. Øystein E. Olsen from the department of radiology, Great Ormond Street Hospital for Children in London, UK.

Adjustments must be made when imaging children to make the most of MRI. The size of coils used during examinations needs to be changed to improve signal-to-noise ratio (SNR). Since protons are naturally less present in the body of a child, coils currently used during MR examinations are often not suitable for imaging younger patients. Using a coil with the appropriate size, preferably a transmit-receive coil, can help boost SNR, Olsen believes.

“This is something we already know, but we need to remind ourselves and technicians,” he said.

He also recommends adapting the field-of-view and the base resolution in approximately 0.8 mm in infants, 1 mm in children and 1.2 mm in adolescents. Altering acquisition time by changing the number of excitations, the number of phase-encoding steps and the bandwidth are other important factors to remember. Finally, optimizing contrast by considering intravenous contrast is still crucial.

Many factors, including funding issues and patients’ expectations, mean that the use of MRI for paediatric imaging is challenging. “Even clinicians are difficult to convince,” admitted Olsen, who is working towards doing just that. He plans to present future results at the European Paediatric Society of Radiology meeting in Istanbul in June.

“Quality in MRI has definitely improved in the past few years. It is up to us to understand what we have to do, then try to do it, try to teach it, and finally try to convince others of the value of this tool,” he concluded.

Dr. Marie Cassart from Brussels spoke about foetal imaging at the session.

Subspecialty stars light up Image Interpretation Quiz

By Melisande Rouger

The Image Interpretation Quiz, held on Sunday in Room A on the second level of the Austria Center, was a roaring success, and demonstrated once again that radiologists know how to add fun to professional excellence.

The theme, Subspecialty All-Stars, met with a very positive response from the audience, and about 1,800 delegates took part in the event. This was twice as many as last year.

Prof. Michael Laniado, chairman of the department of diagnostic radiology at the University Hospital Dresden in Germany, moderated the activities for 90 minutes, combining cutting-edge expertise with a charming sense of humour, under the aegis of ECR 2009 President, Prof. Borut Marincek from Zurich, Switzerland.

“The most important question first: Who is the most nervous person in the room today?” he asked an enthusiastic audience, before presenting Professor Marincek for his relaxed style and successful meeting.

The two teams, composed of top representatives from European subspecialty societies, were exceptionally well matched and competed in high spirits. The end result was a draw.

“The panellists did very well,” commented Laniado. “They had a hard time; they didn’t know each other for the most part, but they really worked as teams. I think they have been very brave, considering the short time they had and all the duties they were faced with during the whole meeting. I even received e-mails until 0.30 last night with their suggestions regarding differential diagnosis. They really worked hard!”

The audience also did their best to solve challenging cases, carefully selected by Laniado’s team in Dresden, balancing the need for educational input and quality entertainment.

“We tried to collect interesting cases and difficult diagnoses, and the selection is really the most challenging thing. On the one hand, we didn’t want to present cases that were too easy, because people have to learn something from the quiz. But on the other hand, we didn’t want to present any that were completely puzzling. The audience should be capable of solving at least two or three cases themselves, otherwise they would go home completely frustrated. Finally, you must come up with cases that are proven by histology to be sure that you can convince everyone that this is the right diagnosis,” Laniado explained.

If the audience were not always right in their answers, they were at least treated to a very dynamic performance from their moderator, and a cheerful contribution from the panellists.

ECR Congress President Prof. Borut Marincek thanked all participants for their contributions in his closing speech.

The Junior Image Interpretation Quiz will take place on Tuesday from 12:15 to 13:15 in room A.
Stretch the limits of X-Ray

On Monday March 9th please join us in Room C in the Austria Centre from 12:30 to 13:30. Lunch will be provided.

Chairman:
L. Katz, Buc, France

Breast tomosynthesis: clinical experience
Dr. A. Tardivon, Paris, France

Digital tomosynthesis of the abdomen: dosimetry, clinical experience and diagnostic performance compared to digital X-Ray and CT
Dr. K. Mermuys, Bruges, Belgium

Comparison of digital radiography, tomosynthesis and CT for evaluation of post-surgery lumbar spine
Dr. A. Scherrer, Suresnes, France

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Hybrid systems add metabolic and molecular information to anatomical images

By Karen Sandrick

Positron emission tomography can identify spots of increased activity associated with malignancies or function, but it does not offer clear depictions of anatomy. In combination with CT or MRI, however, PET is opening up whole new dimensions of clinical imaging.

In oncology, PET/CT transforms otherwise inconspicuous lymph nodes into stunningly clear hot spots of cancer. In neuroimaging, blood-flow level-dependent (BOLD) MRI studies provide a proxy measure of brain function. PET/MRI offers the promise of simultaneous, direct radioactive tracer studies of brain activity.

In a molecular imaging and contrast media refresher course on Monday afternoon, delegates at ECR 2009 will have the opportunity to learn about the current status and future applications of PET/CT, as well as the development of PET/MRI.

Hybrid imaging with PET/CT has very nearly revolutionised oncologic imaging by combining structural and functional information to more accurately stage disease, follow patients and monitor the effects of therapy. The most widely used tracer, FDG (18F-fluoro-deoxy-D-glucose), has already changed oncologic imaging of breast cancer, cervical carcinoma, gastrointestinal tumours, head-and-neck cancers, lymphomas and lung cancer.

Newer PET tracers will allow PET/CT to explore other forms of malignancy, such as brain and prostate cancer. Dr. Jan Grimm, a radiologist with additional training in nuclear medicine at Memorial Sloan-Kettering Cancer Center, New York, USA, will describe the uses of FDG as well as emerging tracers.

"Brain tissue is highly active and therefore takes up a lot of glucose. Because there is so much FDG background, it is often difficult, if not impossible, to see tumours in the brain with PET/CT," he said. "Methionine has been shown to be superior to FDG in imaging brain tumours. The metabolism of methionine is high in brain tumours, but it is not high in normal brain tissue, so you can see tumours much better with methionine."

FDHT (18F-fluoro-5α-dihydrotestosterone), methionine's analog used to image androgen receptors, finds hidden foci of prostate cancer. "A CT scan for prostate cancer may identify a very large prostate tumour or bony metastases. With FDG-PET, you can sometimes see a tumour, but prostate cancer does not tend to be an actively proliferating tumour, so it is not very high in glucose metabolism. For detection of lesions and metastases, FDHT, a new tracer under investigation, appears to be better than FDG," Grimm said.

Hybrid PET/MRI is still in the development stage. The first simultaneous PET/MRI examination of the brain in three patients was announced only two years ago by Dr. Bernd J. Pichler, head of the Laboratory for Preclinical Imaging and Imaging Technology, in the department of radiology, Tuebingen, Germany.

The feasibility study showed, nevertheless, that hybrid PET/MRI could bring together the soft tissue contrast and high specificity of MRI with the sensitivity of PET in the assessment of physiological and metabolic states. The prototype scanner used in the study integrated a PET detector into the bore of a 3T MRI machine so that images of the brain could be acquired simultaneously.

Simultaneous acquisition of PET and MRI data avoids misregistration and other problems associated with sequential acquisition of structural and functional imaging information, such as motion artefacts caused by breathing, heart, or patient movement and temporal correlation of data. Combined PET/MRI images acquired in the feasibility study, in fact, were similar to scans obtained by separate PET and MRI machines, but they were not compromised by distortion or artifact. During Monday's session, Pichler will describe the development and use of the prototype PET/MRI, as well as other hybrids and potential applications, including a better understanding of brain cancer and improved diagnosis of Alzheimer's disease, depression, epilepsy, Parkinson's disease and schizophrenia.

Hybrid PET/CT and emerging PET/MRI systems look set to play increasingly roles in diagnosis, treatment planning and patient follow-up.

"Multimodality imaging will be the way of the future to get more information than you can get now with a single modality," noted Grimm. "PET gives you the molecular information. MRI allows you to get physiological information easily and elegantly. In the future, we will be able to target molecular probes for MRI, and with PET/MRI, we will be able to save radiation dose. We will be able to do studies and get information we cannot obtain today."

By Mélisande Rouger

Metastases are the most common malignant tumours of the skeleton. But if their detection is rather simple, the characterisation of these masses can still be tricky for radiologists. The new hybrid PET/CT system look set to play increasing roles in diagnosing and monitoring bone metastases.

"Bone tissue is highly active and therefore takes up a lot of glucose. Because there is so much FDG background, it is often difficult, if not impossible, to see tumours in the brain with PET/CT," he said. "Methionine has been shown to be superior to FDG in imaging brain tumours. The metabolism of methionine is high in brain tumours, but it is not high in normal brain tissue, so you can see tumours much better with methionine."

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MRI allows visualization of the bone marrow with high spatial resolution. It offers higher sensitivity than x-ray, CT or scintigraphy, and provides precise assessment of marrow infiltration into adjacent paraosseus structures. Bone lesions originating from any primary cancer are made easily visible with MRI.

The modality choice depends, on the one hand, on material availability. In Belgium, the incidence of PET/CT is very high, with about 24 machines for 10 million inhabitants. But there are a lot fewer in other countries such as France.

On the other hand, it also depends on the actual risk of secondary cancer, explained Professor Bruno Vande Berg from Saint Luc University Hospital in Brussels, who will chair the session. "Brain tumours very rarely spread into the bones. Conversely, secondary localizations are very frequent in lung cancer. Every further radiological investigation has to be debated, bearing in mind that each patient has his or her own prior medical history," he said.

Once a bone lesion has been detected, it is necessary to determine if it is benign or not. CT or MRI, a dedicated system, will be able to save radiation dose. We will be able to do studies and get information we cannot obtain today.

Malignant bone lesions can result from osteoporosis or a focal anomaly in a vertebra. A patient may present with benign anomalies such as angiomata, when there are too many blood vessels in the same spot. But on the images, these anomalies may look like metastases. "It is not because there is a lesion that there necessarily is a metastasis, it is all the more important to remember since this problem is quite frequent in routine clinical practice," Prof. Van de Berg stressed.

The session will present the important morphological findings that help to differentiate benign from malignant pathological fractures.

Another stage in which radiologists can contribute is early treatment monitoring. Each patient reacts differently to chemotherapy and radiotherapy, and imaging can help detect patients or categories who do not respond positively, so as to adapt the treatment when possible. But it is still not clear how. "Up to this day we do not have the means to detect early modifications brought by the treatment. One
simple reason is that the network of cancellous bone distorts the MR examination, and data you could easily sample in other did organs are hard to get out of the skeleton,” Vande Berg explained.

The absence of a gold standard in this field is also a problem. Since many lesions may be treated at the same time, one cannot sample all lesions. In addition, bone biopsy cannot be repeated just for the purpose of treatment monitoring.

However, researchers are exploring several paths to take measures of tissue modifications that announce the response to the treatment. Different MRI and PET/CT sequences are currently being developed, with PET/CT showing more sensitivity for the lymphoma, and MRI for prostate cancer. “The earlier you can assess the treatment evolution, the better you can tailor the treatment to the patient,” Menu said. In addition, new treatment modalities are expensive and we do not want to use these drugs if they are not efficient,” said Vande Berg.

Finally, radiologists sometimes play a role in the treatment itself, for instance with percutaneous treatments in final-stage cancer sufferers. With a needle, the radiologist injects either cement to biomechanically stabilise the lesion or may treat selected bone lesions by heating or freezing lesions by means of specific devices. Clearly the management of secondary bone cancer remains a hot topic at ECR this year.

Vigilance and sound knowledge can avoid pitfalls in liver imaging

By Frances Rylands-Monk

The presence of white dots in a contrast-enhanced CT or MR image acquired in the arterial phase can be problematic for radiologists looking for hypervascular tumours. Small hepatocellular carcinoma (HCC) or metastases of endometrial and kidney tumours may be seen as transient white dots in the arterial phase, but these dots may also be visualised from this type of examination in normal or cirrhotic patients, without a tumour being present.

In patients with cirrhosis of the liver, it is important to exclude HCC. When an unidentifed bright object (UBO) or hypervascular lesion of less than 1 cm in diameter is visualised, most will prove to be benign. Therefore, many clinicians ignore abnormalities at this phase in the normal or cirrhotic liver, particularly if they display ‘benign’ characteristics of a hotula, e.g., the white dots are peripheral, triangular or cone-shaped. While CT and MR can provide images in several planes, which will better discern the nature of the UBO, imaging remains inconclusive when all three planes reveal dots to be round.

“The same examination should be performed between four and five months later. In 15–30% of cases, the lesion will show some growth, indicating malignancy. In this case, if the tumour was under 1 cm, the delay of four to five months will not change the patient’s treatment options and survival chance,” said Prof. Yves Menu, chair of the radiology department at Saint-Antoine Hospital, Paris. “Sometimes the lesion just disappears and you’ll never know what it was.”

If after the four to five month wait the lesion proves to be the same size, doctors should again perform the same imaging technique a further four to five months later because some malignant tumours are slow growing, continued Menu, who is moderating Monday afternoon’s special focus session on liver imaging. If there are no changes in 10 months, a lesion can be considered benign and usual follow-up protocols should be applied to the patient, depending on his or her condition or disease.

Guidelines about how to address the problems of differentiating benign lesions from malignant tumours were summarized in 2001 by the European Association for the Study of Liver Disease’s Barcelona Criteria for HCC, and then again in 2005 by the American Association for the Study of Liver Disease (AASLD). Both organisations make it clear that when doctors face hypervascular lesions of less than 1 cm, they may follow up with exactly the same modality and technique four to five months later. In the majority of research and clinical practice teams increasingly reach a diagnosis through imaging rather than histology. Although this may change with the use of genetic and molecular markers on biopsy specimens, to date clinical decisions are essentially made based on information obtained from imaging techniques inferred from the Barcelona criteria.

“According to these guidelines and concerns regarding the diagnosis of early HCC, hypervascularity must be demonstrated by the coincidental findings of two imaging modalities. The penalty is the possibility of false positives that may be reduced when a module displays portal or delayed washout on dynamic imaging after contrast administration. This sign, now incorporated in the U.S. guidelines for HCC diagnosis and management, uses the premise that contrast enhancement lasts longer in normal liver parenchyma but not within the tumour. If the lesion becomes hypodense, then it is, most probably, HCC. If there is no washout and the contrast agent remains, then it is not HCC but another lesion such as haemangiona or a cirrhosis-related perfusion abnormality,” said Prof. Filipe Caseiro-Alves.

“The U.S. guidelines produced by the AASLD are better transposed to today’s clinical practice than the relatively older EU guidelines. The washout principle should be integrated soon into EU recommendations,” said Caseiro-Alves, chair of the department of radiology at the University Hospital of Coimbra, Portugal.

Current techniques to demonstrate washout can rely on the use of contrast-enhanced CT, ultrasound and MR. Recent research shows that this finding may be more difficult to detect when using microbubble-enhanced ultrasound rather than the other imaging modalities, he noted.

“The U.S. guidelines produced by the AASLD and the European guidelines are strongly dependent on HCC number and size.”

SF 17a Bone metastases

- Chairman’s introduction: From basics to future
  B. Vande Berg, Brussels/B
- Detection
  G.P. Schmidt, Munich/DE
- Characterisation
  A. Saltuñin, Stanmore/UK
- Monitoring treatment
  F. Landocine, Leiden/BE
- Percutaneous therapy
  A. Bangi, Stratford/FR
- Panel discussion
  Bone metastases: Where do we stand?

SF 16a UBOs of the liver: Do not walk into the traps!

- Chairman’s introduction
  Y. Menu, Paris/FR
- Understanding the liver vascularisation: A tricky business?
  D.J. Breen, Southampton/UK
- Small hypervascular lesions in a cirrhotic liver: Who is the good, the bad or the ugly?
  F. Caseiro-Alves, Coimbra/PT
- Non-cirrhotic liver: The TDTU (too difficult to understand) hypervascular lesions
  G. Brancato, Palermo/IT
- Epilogue
Bridging the gap between cardiac perfusion, viability and functional imaging

New multimodality imaging systems now bring together anatomical and functional information. The major advantage of the integrated approach is the added sensitivity of PET or SPECT combined with CT angiography, according to Prof. Alberto Cassolo, from the department of nuclear medicine and functional sciences at the University of Naples – Federico II, Naples/IT.

Cassolo, who will moderate Monday afternoon’s Professional Challenges Session about coronary heart disease, said that PET or SPECT stress perfusion imaging complements the anatomical CT data by providing functional information on the haemodynamic significance of coronary artery stenoses, thus allowing more appropriate selection of patients who may benefit from revascularisation procedures. Additionally, the process of integration of imaging systems has progressed to MRI.

By virtue of their inherent sensitivity to detect processes that take place at a micromolar level, and of the flexibility of radioschemistry approaches, PET and SPECT techniques are ideally suited for cardiac molecular imaging, said Prof. Dr. Ignasi Carrió, director of the department of nuclear medicine at Hospital Sant Pau, Autonomous University of Barcelona, Spain, who will speak about hybrid imaging.

Current topics and areas of development in hybrid cardiac imaging include new strategies and protocols for more effective assessment of myocardial perfusion and viability, new approaches to ischaemic and necrotic myocardium, myocyte characterisation and integrity, gene therapy and gene product imaging, new approaches to evaluate hibernating and stunned myocardium, angiogenesis, receptor occupancy, vascular integrity, and imaging of unstable plaque and imaging for early atherosclerosis, he noted.

During today’s session, Dr. Claudio Marcassa, from the department of cardiology at the Salavatore Maugeri Foundation, Veruno/IT, will highlight advances in nuclear cardiology. He said that new software and camera architectures can produce high quality images employing either reduced tracer activity (thus further limiting a patient’s and an operator’s exposure) or fast acquisitions, increasing patient comfort and laboratory throughput, with an optimisation of resources.

New imaging radiotracers on the horizon include two perfusion tracers under development to be labelled with F18, Marcassa said. This will facilitate the assessment of myocardial perfusion with PET without the limitation of ammonia or oxygen, which require an on-site cyclotron because of their short half-life.

While cardiac CT holds promise, radiation exposure is a concern, Cassolo said. Understanding the dosimetry and the biological effects of cardiac imaging protocols in a first step towards implementing a test selection strategy that minimises risk to patients while providing optimal diagnostic information. The effective dose for myocardial perfusion imaging with nuclear cardiology techniques ranges from 2 mSv for N-13 ammonia and O-15 water studies to 10 mSv for standard rest-stress protocols using technetium-99m (Tc-99m) labelled sestamibi or tetrofosmin.

The effective dose of a 64-detector CT scan, with the use of tube-current modulation, is comparable to that of Tc-99m myocardial perfusion imaging, although it is somewhat higher in a female patient, he noted.

Every retrospectively ECG-gated coronary CTA scan, however, already contains functional information that is available without additional radiation or contrast material, according to Dr. Haimé Alkadhi, from the Institute of Diagnostic Radiology at University Hospital Zurich/CH, who will discuss the role of cardiac CT. He said that CT compares favourably to MRI to assess regional and global ventricular function and CT can accurately quantify the degree of aortic stenosis or aortic regurgitation, if, for example, echocardiography is not feasible or inconclusive. Cardiac CT with late enhancement to evaluate viability, however, requires an additional scan, and while the data are sparse, preliminary results show CT has a high correlation with histopathology or MRI.

Currently, the major limitations of cardiac MRI include high initial equipment and installation costs, the small number of trained specialists in operating and interpreting the images, relative lack of MRI scanners equipped with specialist accessories for cardiac scanning, and the still somewhat lengthy time for image acquisition, according to Prof. Dr. Konstantin Nikolaou, from the department of clinical radiology, Ludwig-Maximilians-University of Munich/DE.

CT has the advantage over MRI to directly depict the lumen of the coronary arteries and to reliably exclude the presence of significant coronary artery disease; however, CT does not play such a strong role in patients with known coronary artery disease.

"Here, MRI has the great potential to comprehensively assess the sequelae of coronary artery disease, including the outlining of remodelled anatomy and function of the ventricles, assessment of myocardial perfusion at rest and after stress, and detection of myocardial viability," Nikolaou said.

The distinct advantages of MRI over current conventional nuclear-based cardiac imaging techniques include its high spatial resolution and lack of exposure to ionising radiation.

In this stress-rest Tc-99m sestamibi study, mid-ventricular vertical and horizontal long-axis slices are reported, as well as the stress and rest polar maps. A severe reversible perfusion defect involves the lateral wall and partially the apex. (Provided by C. Marcassa)
Multislice CT provides boost for COPD patients, but concerns persist over radiation dose

By Emily Hayes

Multislice CT continues to spawn new applications in lung imaging, such as software techniques that allow depiction of airway morphologic abnormalities in the prevalent chronic obstructive pulmonary disease (COPD). But radiologists are still not doing enough to cut the radiation dose while using the latest imaging tools, resulting in unnecessary and potentially hazardous excess exposure, according to some experts.

A refresher course on Tuesday morning will feature practical tips for dose optimisation and new thinking on how CT should best be used in the classification of COPD, which affects an estimated 340 million people worldwide and is the fourth leading cause of death, said the International COPD Coalition.

Increasingly, there is recognition that patients can have different underlying causes for their disease — emphysema or irreversible reduction in the calibre of small airways (airway remodeling). Some have a combination of both conditions. Regardless of the cause, patients may have the same physiological profile and show similar degrees of airflow obstruction on pulmonary function tests, said Prof. Philippe Grenier, chairman of radiology at Pitié-Salpêtrière Hospital in Paris.

Finding the root cause is important because therapeutic options will differ. For example, those with very severe emphysema may be candidates for lung volume reduction surgery to improve function. Others have panlobular disease, which affects the secondary pulmonary lobules and is linked to genetic deficiencies that could be specifically targeted with therapies. Some other patients do not have emphysema but have abnormalities located on the small airways.

Using new software, radiologists are starting to use CT to segment and quantify the small airways, for example in measuring the walls of the proximal airways of the bronchi and in detecting inflammatory changes manifesting as abnormal thickening.

“We are able to quantify accurately both large, lobes by lobes. This was impossible before MDCT,” said Grenier.

Treatment of patients with airway predominant disease is typically pharmacological, involving prescription of inhaled steroids. New drugs are also in development and have the potential to expand the number of available treatments for this patient group. In the meantime, patients diagnosed with this type of COPD may participate in clinical drug trials.

Quantifying emphysema with CT is a complex task, and up to now a variety of techniques have been used with little standardisation. However, a consensus among experts is emerging. Grenier and other expert members of the Fleischner Society for Thoracic Imaging and Diagnosis are in the process of writing recommendations on the best methods for classifying patients with COPD. He will provide an update on their progress during Tuesday’s refresher course.

Though valuable for directing patient care, increased use of pulmonary imaging continues to cause concern about radiation exposure. During the course, Prof. Christian Herold, chairman of the department of radiology at the Medical University of Vienna, will address this issue in the context of management of incidentally detected pulmonary nodules.

He will review guidelines and explore a variety of criteria, such as patient age and nodule size, which may be used to manage workup. In many cases, very small nodules do not warrant a full follow-up, particularly in patients who are young and more vulnerable to effects of radiation dose and/or who have no risk factors for lung disease.

Statistics of average dose delivered suggest that dose optimisation has been slow to materialise throughout this decade, said Dr. Denis Tack, a radiologist at Hôpital Födonal Hospital de Médicine Sociale (H.H.M.S.) in Baudour, Belgium, and the third speaker at the refresher course.

“We still perform too many examinations in many countries in Europe as well as the U.S. The dose problem has still not been resolved,” he said. “Radiologists are overloaded with clinical problems, and diagnostic accuracy comes first. Care for dose reduction has no real place in everyday practice in CT. Very few radiologists know how to do it,” he said.

To prevent needless exposure, departments should analyse literature regularly to identify indications that are actually validated, he advised. Lung perfusion imaging for pulmonary embolism using dual-energy MDCT is an example of a study with questionable benefits that may be overused.

If we perform dual-phase acquisition perfusion studies to anybody undergoing CT angiography for pulmonary embolism, we deliver 40% more dose, but we still don’t know if that brings progress in terms of diagnosis or prognosis,” Tack said.

The predictive value of CT pulmonary angiography for pulmonary embolism is already close in 98%, so there is not a lot of room for improvement in accuracy, he added.

In association with national health authorities, Tack has been visiting imaging sites in Luxembourg and educating professionals about dose optimisation. On average, these facilities have been able to cut dose by 40%, with acceptable reductions in image quality.

“Dose can be reduced, while the diagnosis is unchanged,” he said.

Radiologists have many options for reducing radiation dose without any deterioration of image quality. In this optimised chest CT scan with a dose length product (DLP) of 176 mGy.cm in a standard patient (72 kg, +/-4 kg), the optimised dose was less than 40% of the reference dose levels (close to 500 mGy.cm) used worldwide. (Provided by D. Tack)
Europe-wide trend towards standardisation in clinical audits gains momentum

By Paula Gould

Quality control, outcome measures, external inspection, performance evaluation … These phrases are all too familiar in modern-day healthcare, medical imaging services included. But what does clinical audit mean in practice between people from different countries, and even within different countries, on what clinical audit actually means? Then we can get some idea of where this should go over the next few years because this could have quite a profound impact on the practice of radiology,” said Prof. Wil van der Putten, honorary professor of medical physics at the National University of Ireland, Galway, and chair of the ECR 2009 ‘Physics in Radiology’ scientific subcommittee.

In future, for example, all imaging-based screening programmes operated in Europe are likely to become subject to more internal quality checks. Double reading may even become mandatory for breast screening programmes.

“This session is going to help prepare delegations for something that is going to have a major impact on daily practice,” van der Putten said. “It is inevitable that some sort of Europe-wide standardisation is going to come. But this should be good for clinical practice.”

The growing importance of audit and accreditation procedures in healthcare is partly due to public demands for greater accountability. Radiology departments in European Union countries are also legally obliged to carry out clinical audits, according to European Council Directive 97/43/Euratom, a piece of legislation that deals with medical uses of ionising radiation. Directive 97/43/Euratom requires that clinical audits are carried out in accordance with national procedures. However, a Europe-wide survey has revealed that many EU member states seem to have no such procedures. Some are struggling to implement a system of audit in radiology, nuclear medicine and radiotherapy services; others are well abroad with implementation.

“There are a few countries that already have established some definite systems for clinical audit, but in most cases, it is still in the beginning. There was a real need to give some further guidance and encouragement to these countries to start these activities,” said Hannu Järvinen, principal adviser for radiation in healthcare at Finland’s Radiation and Nuclear Safety Authority (STUK), based in Helsinki.

Of the types of audits now undertaken within the UK, there are two: national and European. The requirements of the EC Directive 97/43/ Euratom have been transposed into UK law through the Ionising Radiation (Medical Exposure) Regulations 2000. He will give examples of the types of audits now undertaken within UK hospitals, and offer a UK perspective on Europe-wide and international initiatives on clinical audit.

A local view of clinical audit will be offered by Patrick Gilligan, medical physicist at Mater Private Hospital, Dublin, who will outline his own experiences of setting up and participating in such a programme. This process highlighted the critical need for clear communication of roles and responsibilities to those carrying out the audit and those being audited. Gilligan’s presentation will explain exactly why. He now believes that audit and accreditation procedures should be included in medical physicists’ training.

Järvinen acknowledges that some medical imaging organisations or professionals may be resistant to clinical audit initiatives. He is hopeful, however, that the forthcoming guidance will help overcome any scepticism, and that the potential benefits will improve motivation. Audit is not just merely a box-ticking exercise. Regular audits should ensure that good standards of care are delivered and maintained.

“Whatever quality improvements we do, these are for the benefit of patients. That is the main purpose of this healthcare tool: to get the best results possible when using imaging methods to help examine, monitor, and treat patients,” he said.

Audit procedures are having an increasing impact on clinical practice in radiology departments across Europe.

(Provided by Carestream Health)
CT and MRI provide valuable information in cases of rhinosinusitis

You may ask yourself why you should image rhinosinusitis. The answer is because the prevalence of it (principally of chronic rhinosinusitis) is rather high, implying that this condition may be frequently encountered in the daily routine of a radiologist, according to Dr. Davide Farina, from the department of radiology at the University of Brescia, Italy.

The revolution brought about by microendoscopic sinus surgery enhanced the role of imaging in treatment planning. The term ‘rhinosinusitis’, however, encompasses several conditions with different clinical implications, and knowledge of their patterns on CT or MRI is crucial not only for surgical planning of chronic inflammation but above all to allow for prompt diagnosis of potentially life-threaten- ing forms, explained Farina, who is chairman of a special focus session about rhinosinusitis on Monday afternoon.

The session will emphasise the necessity of having a detailed knowledge of the anatomy and physiology of the paranasal sinuses, which allows proper selection and optimisation of the imaging technique, as well as delivering a more confident interpretation.

Dr. Heidi B. Eggesbø, from Oslo University Hospital, Norway, thinks that CT is still regarded as the gold standard to image sinonasal disease. CT offers excellent delineation of bony anatomy and extent of sinus disease and serves as a road map during functional endoscopic sinus surgery, she said.

MRI, on the other hand, has the advantage of high soft tissue contrast, when CT has the advantage of no radiation and may be useful in order to differentiate soft tissue masses, when CT of no radiation and may be useful in order to differentiate soft tissue masses, when CT is too difficult to perform, or MRI may be added, using SE T1, SE T2, FLAIR and contrast-enhanced sequences to detect subdural abscess, cerebral abscess or sinus thrombosis, she said.

High-resolution CT is the modality for evaluation of chronic rhinosinusitis, he commented.

"The role of imaging is to show the extent of the tissue involved. MRI is a perfect tool to do this, as it may evolve into serious complications regarding the orbit and/or the intracranial compartment, according to Dr. Nicole J.M. Freling, from the department of radiology at the University of Amsterdam, The Netherlands. The best way to detect early complications is to use contrast-enhanced multislice CT with reconstructed coronal and sagittal images of the sinuses, the orbits and the brain.

When intracranial complications are suspected, MRI may be added, using SE T1, SE T2, FLAIR and contrast-enhanced sequences to detect subdural abscesses, cerebral abscess or sinus thrombosis, she said.

When post-treatment imaging is done when recurrent inflammatory disease is suspected, the study should include a description of the extent of the process performed, an assessment of the critical wall structures and anatomical variants unaffected by previous surgery, and an evaluation of the extent of persistent or recurrent inflammatory disease, Hermans stated.

"The daily routine: Chronic rhinosinusitis and endoscopic surgery"

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Liver intervention specialists seek to optimise the use of new systemic therapies

The future of oncologic interventions in the liver looks bright, and ECR attendees will find out why during a refresher course on Monday afternoon, when Prof. Riccardo Lencioni outlines the exciting direction of this field.

Lencioni, chief of the division of diagnostic imaging and intervention in the department of liver transplantation, hepatology, and infectious diseases at Pisa University School of Medicine, Italy, will discuss the latest in image-guided interventions, irreversible electroporation, or IRE, also termed NanoKnife (AngioDynamics), a non-thermal ablation technique that kills cells without damaging the supportive stroma, such as vessels, bile ducts, and so on.

“This new technique deserts the term ‘surgery at the cellular level’ as the limit between cells that are alive versus those that are dead is very sharp,” Lencioni said. “It is obvious that if the promising experimental findings are confirmed in clinical applications, the technique will be revolutionary.”

Another highlight Lencioni will showcase is the drug-eluting DC Bead (BioCompatibles). The most promising findings in this regard is PRECISION V, the results of which were presented by Lencioni earlier this year at the American Society of Clinical Oncology’s 2009 Gastrointestinal Meeting, held in San Francisco.

“Drug-eluting beads have demonstrated significant advantage in tumour response, as a local, catheter-directed therapy,” Sorafenib, delivered orally, has demonstrated a significant advantage in terms of time to progression and overall survival for patients with advanced HCC. In fact, it is the only systemic agent approved for the treatment of HCC.”

The treatment of HCC is rapidly evolving as developments in both loco-regional and systemic therapies continue to improve. In particular, increased understanding of the molecular signalling pathways involved in HCC has led to the development of targeted therapies aimed at inhibiting tumour cell proliferation and angiogenesis.

“Now the challenge is to determine how we can optimise the use of new systemic therapies to complement current interventional treatment strategies,” he added.

Sorafenib’s approval for the treatment of HCC was based on data from SHARP (Sorafenib HCC Assessment Randomized Protocol), a randomised, placebo-controlled, double-blind, phase III trial performed in patients with intermediate-stage HCC.

Before Lencioni’s presentation, Prof. Dr. Vlastimil Válek, from the department of radiology, Masaryk University, Brno, Czech Republic, will speak about indications and techniques regarding radiofrequency ablation (RFA). Surgery remains the only curative treatment option for liver tumours, but RFA offers a chance to extend the number of candidates for surgery and is also an alternative to other curative treatments in some cases, he said. He will go over the strict protocol they have for selecting patients.

Liver tumours are nourished exclusively by the hepatic arteries, so in patients with good liver function, endovascular treatments are the first-line therapy for non-surgical, non-ablative tumours, according to Prof. José Ignacio Bilbao, from the department of radiology, Clinical University of Navarra, Pamplona, Spain, who will lecture on aspects of embolisation. Different drugs in variously sized beads react differently depending on tumour size and location.

“Nevertheless, these treatments require a thorough anatomical study since the therapeutic agent needs to be deployed mostly in the tumoral areas, avoiding any nonhepatic vessel, he said.

Elastography could help characterise diffuse and focal diseases and monitor treatment earlier

By Melissande Rouger

Elastography is currently the most appropriate imaging tool to measure tissue elasticity, which can be crucial in the diagnosis and characterisation of tumours and inflammatory processes. It could potentially help monitor early treatment of cancer. However, it remains relatively unknown among radiologists. A dedicated session at ECR 2009 will educate participants in this new yet unexploited technique, by showing its current and possible applications.

If the physical principle of elastography is not recent, its application in vivo in a human being only started this century: Its principle is to transmit mechanical waves in a tissue and measure their propagation through the tissue. According to this propagation, the elasticity and viscosity of the tissue can be assessed.

Elastography is mainly carried out with ultrasound (US), using the Doppler principle, usually for imaging superficial organs. One of its main applications is in breast studies, which will be presented at ECR 2009. But US elastography hardly enables deep organs to be examined, since the wave propagation is limited by the viscosity of the tissue. As during a traditional US examination, it is for instance quite difficult to see the deeper part of the liver in an obese patient.

MR elastography, which uses movement sensitive sequences similar to the ones used in MR angiography, is powerful enough to image deeper organs. Most of the available literature concerns US elastography. Only a few radiological centres currently work with MR elastography, including the Hôpital Beaujon in Paris, the Chaîne Hospital in Berlin and the Mayo Clinic in Rochester, Minnesota.

Until now, elastography has been mainly used for the imaging of tumours and hepatic fibrosis. For the latter, the principle is quite simple: a fibrotic liver is harder than a healthy one, so its elasticity increases. With elastography, it is possible not only to detect, but also assess the severity of fibrosis.

A US elastography tool has been specifically designed for this purpose: the Fibroscan. With a device mounted on a probe, it takes measures of hepatic elasticity in situ. This method is mainly used by hepatologists during their consultations. “There are very few of them in radiological departments. Again, this is a fairly new method in our sphere,” said professor Bernard Van Beers from University Hospital Beaujon, Paris, who will chair the session at ECR.

ECR 2009 Oncologic Intervention in the liver

Moderator:
M.A. Farrell; Waterford/IE

• A. RF ablation
V. Válek; Brno/CZ
• B. New embolisation techniques
J.J. Bilbao; Pamplona/ES
• C. Future directions
R. Lencioni; Pisa/IT

The latest in image-guided interventions: irreversible electroporation, or IRE, also termed NanoKnife (AngioDynamics), a non-thermal ablation technique. This image is the first macroscopic demonstration with intra-operative colour Doppler ultrasound that vessels inside the ablation zone are not affected, although surrounding tissue is dead in histology. (Provided by R. Lencioni)
Expert speakers look again at how best to maximise women’s vast potential

By Mélisande Rouger

After the success of last year’s highlight on Women in Radiology, ECR 2009 will offer a Professional Challenges Session dedicated to improving the working conditions of female radiologists, who comprise an important part of the European professional workforce.

Malgorzata Szczep-Trojaskowa, General feminisation of medicine is already a fact. This also applies to radiology, where a growing number of women are entering this specialty. It can be foreseen that in a few years the percentage of women in radiology departments will rise up to 70% or even beyond this figure. It is not clear how this will influence the practice and development of radiology.

Last year it was for the first time that one of the ECR Professional Challenges sessions was dedicated to improving the working conditions of female radiologists in different European countries both in academic and non-academic environments. Various problems were explored that arise from an increasing presence of women in the radiological workforce. It has been identified that the situation varies greatly across Europe due to national employment laws, payment and pension policies, and social traditions. This year we will focus more on the development of strategies to face these challenges for the benefit of all.

ECRT: Do you think one can be a good mother and a good radiologist? MST: To be a good radiologist does not mean that one has to devote one’s whole life only to radiology, sacrificing personal and family life. I think that everyone can recall many examples that prove it is possible to be a good radiologist and a good parent, and that this goal can be achieved in many different ways. There is no universal prescription that is good for everyone, but merely requires more time and personal effort. One can plan the work-life balance on one hand and on the other hand good understanding and communication between parents and harmony in sharing family duties. Good partnership is important in achieving a balance between professional career and an adaptable work environment is very helpful.

ECRT: How is European radiology coping with the growing need for flexibility in professional life? Could you please give us some examples?

MST: It varies very much between countries and depends on national employment law as well as on tradition. It is much easier to achieve flexibility in professional life in big, non-academic centres. The most common solution is based on a more imaginative use of working hours. For example a radiologist in full-time employment works longer hours in the hospital for 3 days of the week and on the 2 other days stay at home. Another option is to begin work at 4 or 5 pm, which may be more beneficial not only for radiologists who share childcare with a working partner but also for the hospital, which in this way can have better specialist cover and supervision of juniors on call.

I am sure this solution would also be welcomed by the patients. Finally, teleradiology provides the option of working from home and using the working time flexibly.

ECRT: A year and a half ago, you told us that Polish doctors were required to work at least six nights a month even if they had small children, and that part-time work didn’t even exist in Poland. How far has Polish legislation gone on these questions?

MST: Poland has introduced the European Working Time-Directive, which limits the number of working hours. There is also much more flexibility in planning the part-time jobs, however this is still not very well appreciated or used by the hospital administration. In Poland, according to law, every doctor employed by a hospital is entitled to take six nights per month on additional salary, but this does not apply to women with children below 3 years of age. In big units with many doctors the number of on-calls per employee can be lower or it is even possible for some to refrain from additional on-call work completely.

ECRT: How do you integrate family-friendly work patterns in a radiology department?

MST: I am running an interventional radiology department where the work pattern is different from a diagnostic radiology department. Our working hours are less predictable due to emergency cases, which have to be treated urgently at any time e.g. patients with stroke, SAH etc. In my department women radiologists – mothers with small children – are not asked to remain at work beyond the usual working hours to treat emergencies. This is covered by other members of staff. They also do not take on-call duties.

ECRT: Are there male radiologists also asking for more flexibility?

MST: Yes, from year to year more men take advantage of increased flexibility in working hours. Just recently one of my young, married assistants applied for a half-time job, because he would like to dedicate more time to his two year old daughter thus enabling his wife to have a professional career.

ECRT: How relevant is it to hear a male radiologist’s perspective on the theme of women in radiology?

MST: It is very important to hear how men recognize the position of women in radiology and to learn whether they see the need for changes to maximise their potential. I am afraid that in many countries with traditional social relations this issue is neglected and that there is not even a willingness to introduce any changes including the working patterns. It is extremely important to have men involved in this discussion and make them more aware that this issue is as much their problem and that it may considerably affect their professional and family life.

ECRT: What do you think working life will be like in five years?

MST: There are major improvements underway in the field of specialisation, with development of subspecialisation that should make training and updating of knowledge less time-consuming. Computer-assisted evaluation of images, computer-assisted intervention in traumatology, and reduction of administrative tasks should also reduce the workload of a radiologist. This, together with the growing awareness of the importance of family for individuals and society, will allow working life to become more family-friendly. I hope work organisation with flexible hours will become available not only in selected radiological departments but everywhere in radiology in Europe. I hope many of us will change our life philosophies enabling a better balancing of time dedicated to work, family and our own interests outside of our profession.

ECRT: What would be the ideal scenario for a radiologist mum?

MST: The ideal scenario for a radiological mum will probably vary depending on the economy, social tradition and evolution, mum’s ambitions, and her system of values in life. To reach the ideal scenario it is important that society recognises the ideas and goals of the individuals and creates the legal, economical and social conditions that make it possible. I can’t think of one universal scenario ideal for every radiological mother.

ECRT: Do you think being a woman has an influence on a radiologist’s career? Was it the case for you?

MST: I am convinced that being a woman influences one’s career as a radiologist. Making a career in radiology demands a lot of devotion, time and sacrifices. This is usually in conflict with private life obligations and duties which are commonly more extensive among women. Their professional careers are frequently delayed by maternity. This usually comes in the initial, important and highly demanding stage of professional development. They reach the higher professional level later than men. Therefore they are able to compete for the leading positions late, when most leadership posts have already been taken by a man of their generation. In my case, it took me seven years to specialise in radiology. The delay was caused by two pregnancies, but I am happy having two sons. However, hard work, good organisation of family life and the supportive attitude of my husband allowed me to catch up and make the subsequent steps of my professional development in-time.

ECRT: How is European radiology coping with the growing need for flexibility in professional life? Could you please give us so some examples?

A. Tardivon; Paris/FR

Liver fibrosis

General principles

R. Sinitsa; Paris/FR

Liver elastography

M.R. Brunetti, Pavia/IT

Breast lesions

A. Jackson; Paris/FR

Bone, skeletal muscle and heart

I. Stock; Berlin/DE

Panel discussion: What is the future for US and MR elastography?
Regional solutions become increasingly common in maturing PACS market

By John Bonner

Are there any limits to what can be achieved with new PACS technologies? Yes, of course, but sometimes it seems that the only restrictions are those imposed by the scope of the human imagination.

Not so long ago, the first PACS were created to serve the information storage and communication needs of a particular imaging modality. Later they were designed to integrate information from all modalities used in the radiology department and then to assist decision-making for clinical staff throughout the hospital. Now there are systems being built to provide clinically efficient and cost-effective data management solutions for whole networks of hospitals across a region — and these are on show in the ECR's technical exhibition.

Carestream is demonstrating SuperPACS, an architecture designed to integrate multiple PACS located at different sites and supplied by different vendors into a single enterprise solution.

"Factors like the ageing population in developed countries are putting increasing pressure on health systems," says Ulf Andersson, Carestream Health's marketing director for northern Europe. "The only way to continue providing a high standard of healthcare is to optimise the working time of all medical professionals, and particularly radiologists. That is why we are seeing the consolidation of resources into large regional units. In Scotland, for example, 39 individual hospitals have now been linked by a single PACS solution. We will see that happening more and more in other countries."

Crucially, in today's difficult economic climate, the SuperPACS concept allows healthcare providers to form these networks without incurring the costs of replacing existing RSIs-PACS solutions. The new technology, being shown as a work-in-progress at ECR but available for shipping by around mid-2009, can help drive improvements in workflow and productivity. It will help create a "common global workspace," allowing radiologists to view images and reports originating anywhere within the enterprise to be examined by radiologists in one site or offline, he said.

Another feature of the system is its real-time volume-matching and automatic registration for CT, MR and PET/CT examinations.

"Synchronising the views from multiple datasets will allow radiologists to make rapid and accurate comparisons between the key anatomical structures, leading to improvements in report turnaround time and enhancing diagnostic accuracy," Andersson noted.

Regional e-health projects are also driving GE Healthcare forward with three interlinked developments of its Centricity PACS on show at ECR 2009. The Centricity Imaging Portal will be commercially available later this year. It allows radiologists to share a global patient history with colleagues working in other medical disciplines and at other centres in the network.

"This is how we can improve the quality of care for our patients because it allows access to the complete patient history, not just to our radiological history. It will also become an important tool for multidisciplinary team meetings to discuss specific cases," said Ben Bauerschaper, general manager of imaging solutions for GE Healthcare's Europe region.

Two other applications are already available — the Centricity Advanced WEB and the PACS-FW web-based PACS. The former is designed to meet the demands of referring physicians for advanced tools, and features GE's patented "pixel on demand" streaming technology.

"Even in situations with a low bandwidth, this solution allows access to a broad set of tools with a simple internet connection: MIP/MPR (maximum intensity projection/multi-planar reformatting), integrated ultrasound, mammography and orthopaedic tools, easy second opinion consultation, printing and burning of CDs from any PC, and a lot more," he said.

PACS-FW is designed to meet the demands of physicians working in small- to medium-sized hospitals for advanced post-processing. It is user-friendly and easy and fast to install, yet it offers modern clinical tools such as MIP/MPR and advanced 3D technology, which are necessary to readily evaluate large datasets, according to Bauerschaper.

As the power and complexity of PACS continue to grow, so will the potential for problems if and when the system breaks down. Philips' goal is to reduce hospital managers of the worry of dealing with such eventualities through the service delivery model for its eCare PACS installations, under which customers pay only for their use of the facility. This business model is common in other parts of the IT industry, and Philips' representatives will be explaining what they see as the advantages of this arrangement for visitors to the company's booth.

Philips' determination to innovate is further demonstrated by the presence on its ECR booth of representatives of third-party companies developing novel applications for use with its eCare portal.

"It is part of our business strategy to provide customers with increased functionality," explained Wilbert Benschop, marketing manager for healthcare informatics with Philips. "Our partners are small software development companies that may be providing a solution only needed at a local level. It makes use of our open interface, and we will support in developing the application but won't be responsible for marketing the product."

An example of this arrangement would be a software company that has created an application enabling radiologists carrying out an examination to compare the images on screen with those on a database of pathologies from previous examinations.

As the PACS industry matures, there are increasing numbers of smaller companies providing specialist services. One of these is PACSGERB, best known as a supplier of document and multimedia connectivity solutions. This year it is demonstrating a new product that received marketing approval in the EU only a few weeks ago, an encryption application for its MediaWriter CD burning technology.

"The security of medical records carried on DICOM CDs is becoming a concern in many countries of the world. In the UK, the Department of Health last year insisted that any CDs carrying such data should have security protection to protect patient confidentiality in the event that they get lost. Other countries may introduce similar controls, so our encryption system is a simple and inexpensive way of meeting those requirements," said Thomas Piekard, vice president for marketing and research development.

Agfa HealthCare came into ECR 2009 in a buoyant mood, having been selected by King Edward VII's Hospital Sisters Agnes, London, as the provider for its HIS, PACS and computed radiography systems. According to the vendor, its fully integrated IT solutions will transform the hospital's information workflow, improving efficiency and productivity and delivering high-quality services to staff and patients alike. At the independent, acute hospital, Agfa will install IMPAX RIS, IMPAX PACS and two CR 35-X digitizers with NX workstations.

Sectra, too, has every reason to be upbeat. For the second consecutive year, the company was ranked number two in the KLAS Community Hospital PACS 2008 report. KLAS monitors vendors' performance through active participation of healthcare organisations. Its report categories each vendor product into a market segment in which similar products are compared and ranked based on data reported by healthcare professionals.

You can visit the booths of PACS suppliers in the technical exhibition area, which is open on Monday from 10.00 to 18.00.

Finally, prior to ECR 2009, Fulfilin celebrated reaching a notable landmark: the 650th global installation of its Synaps PACS. This underlines just how ubiquitous digital systems have become.
Medical Oncology, Surgical Oncology, Radiation Oncology ... Interventional Oncology?

By Riccardo Lencioni, Pisa/IT

A column with this fascinating title appeared in 2005 in the Journal of the American College of Radiology (1). The author, Gary J. Becker, stated that he believed interventional oncology would earn a place alongside medical oncology, surgical oncology and radiation oncology in the clinical management of human cancer. During the past four years the use of image-guided interventions in cancer treatment has experienced unparalleled growth. Several innovative techniques and devices for direct tumour ablation and trans-arterial therapy have been introduced. Sophisticated imaging methods improving tumour targeting and treatment monitoring have been devised. A number of trials have been successfully completed in different clinical settings. Interventional oncology procedures are increasingly used as an alternative or complementary treatment for a variety of solid cancers. Interventional oncology procedures are increasingly used as an alternative or complementary treatment for a variety of solid cancers.

However, much remains to be done. A comprehensive, multi-pronged approach to the discipline of interventional oncology, with a robust portfolio of clinical, basic and translational research, is required to achieve significant discovery and clinical implementation of novel and effective therapeutic approaches to benefit patients with cancer (2). A central conviction underpinning the research strategy is that the core approaches to cancer treatment, namely systemic drug administration and surgery, can and will be supplemented by minimally-invasive treatments for locally-dominant disease to increase response, achieve a better side-effect profile, reduce cost and potentially improve survival.

An integrated multidisciplinary approach is instrumental for interventional oncology to be accepted by referring physicians, governing bodies and patients as another defined arena similar and co-equal to radiation oncology, surgical oncology and medical oncology in the field of clinical cancer care. Such an approach will eventually enable interventional oncology to have a pivotal role in the therapeutic management of cancer. The incorporation of interventional radiology procedures into clinical practice has always resulted in an important change in patient care. Many procedures initially developed as therapeutic alternatives' have now become first choice treatments (3).

Interventional radiology societies should take a leadership position in organizing a basic and clinical research agenda for interventional oncology and in implementing a structured educational programme to meet the needs of interventionalists who wish to acquire knowledge and skills in this emerging field. The Cardiovascular and Interventional Radiological Society of Europe (CIRSE) is highly committed to interventional oncology. It actively supports clinical trials and research development and carries out registries and studies in collaboration with other professional societies or on its own.

The CIRSE Foundation is a permanent source of funds in order to provide training programmes to doctors and other medical staff in the field of minimally invasive, image-guided procedures. The CIRSE Foundation has also recently started a very successful continuing educational programme with a focus on oncology, including a number of local courses of the European School of Interventional Radiology (ESIR) and the first European Conference on Interventional Oncology, held in Florence in the spring of 2008.

Interventional oncology will become the fourth pillar of cancer care. However, the more oncologic interventions become recognized, the more they will become a subject of turf issues. As other specialties continue to move toward minimally invasive approaches, a very competitive environment has already formed. Total patient care with direct referral will be the key to the long-term survival of oncologic interventions within interventional radiology and within the house of radiology (3).

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Industry support plays key role in advancement of imaging research

In August 2003, EIBIR created an industry panel on which all major companies in the field of biomedical imaging are represented, including hardware, contrast media and software companies. At the second industry meeting, which was held during ECR 2006 in Vienna, it was decided that the industry will be strongly involved in the efforts of EIBIR and most industry partners expressed their willingness to support the initiative.

Bayer Schering Pharma, Bracco, GE Healthcare, Philips and Siemens were the founding members of the EIBIR industry panel. For the first two years they each contributed €50K to support establishment of the structures of EIBIR, until the EIBIR Industry Panel Meeting 2008, during which it was decided to reduce the annual contribution to €35K per company. We regret that Bayer Schering Pharma has not continued its former commitment in 2008.

With regard to future support from the industry, EIBIR proposed a reduced annual support payment of €35K per company starting from 2010. This would be a reasonable amount for a larger number of industry partners and would thus allow EIBIR to broaden its liaison with industry in general and also to spread the risk in case of withdrawal of individual industry partners.

EIBIR sent out a survey to medical companies in 2008 to seek dialogue with the medical imaging industry in order to help assess their interests and to allow improved collaboration and increased networking between research institutions and industry, as well as an efficient dissemination and exploitation of research findings. We received a great response and are currently evaluating the new input and ideas.

Companies that showed great interest in our activities and would be suited to EIBIR are AGFA Healthcare, Carestream Health, COCIR, Covisiam, Fuji, Guerbet, Hitachi and Toshiba. We very much hope that we have the opportunity to welcome them to the industry panel shortly.

Benefits for Supporting Industry Members

- Access to the restricted members’ area of the website (incl. the fields of expertise of all EIBIR member institutions)
- Representation on the Industry Panel, regular meetings and direct exchange with key representatives of EIBIR
- EIBIR will provide input in the early stages of industrial development to translate new discoveries into industrial innovation.
- Supporting industry members may offer research grants and thus cooperate with fundamental research institutes on new scientific developments.
- Regular information and update on biomedical imaging research activities in Europe, EIBIR Newsletter, direct communication channels with Europe’s leading biomedical imaging researchers.

EIBIR relies on the continued support of its industry partners in order to secure sufficient funding of its initiatives aside from the EU support it receives for dedicated research projects. In addition, industry plays a key role in the advancement of the field of biomedical imaging. EIBIR looks forward to successful cooperation in the coming years.

EIBIR’s co-shareholders underline importance of multi-disciplinarity in biomedical imaging research

During 2008 we were pleased to officially welcome two new organisations as co-shareholders of the European Institute for Biomedical Imaging Research (EIBIR); the European Association of Nuclear Medicine (EANM) and the European Federation of Organisations of Medical Physicists (EFOMP), thus increasing the number of co-shareholder organisations to four.

Negotiations are underway with the European Organisation for Research and Treatment of Cancer (EORTC) and the European Federation of Societies for Ultrasound in Medicine and Biology (EFSUMB). Co-shareholders are represented at the general meetings of EIBIR, where major strategic decisions are taken and recommendations are developed for the other bodies and initiatives of EIBIR, and they are invited to nominate a representative to the Scientific Advisory Board of EIBIR. Below we will find a profile of the four organisations.

COCR, the European Coordination Committee of the Radiological, Electromedical and Health-care IT Industry, is a non-profit trade association representing the medical technology industry in Europe, with headquarters in Brussels.

COCR is able to represent the interests and activities of its members and act as a communication channel between its members and the European institutions and other regulatory bodies.

EANM, the European Association of Nuclear Medicine, is the umbrella organisation of nuclear medicine in Europe and represents the sector to the European Institutions. Within this role, it aims at advancing science and education in nuclear medicine for the benefit of public health as well as at promoting and co-ordinating, throughout Europe and beyond, discussion and exchange of ideas and results related to the diagnosis, treatment, research and prevention of diseases through the use of unreleased radiotracers and the properties of stable nuclides in medicine.

EFOMP, the European Federation of Organisations in Medical Physics, currently has 34 national organisations and three affiliated national organisations, which together represent more than 5,000 physicists and engineers in the field of Medical Physics. The mission of EFOMP is to harmonise and advance medical physics at the highest level both in its professional, clinical and scientific expression throughout Europe, and to strengthen and make more effective the activities of the national member organisations.

ESMRRB, the European Society for Magnetic Resonance in Medicine and Biology, was founded in 1984 as a platform for clinicians, physicists and basic scientists with an interest in the field of MR. It aims to support educational activities and research in the widest sense, in the field defined by the society’s name. ‘The ESMRRB is open to physicists, engineers, scientists and other individuals who are interested in developments or the introduction of new magnetic resonance techniques in the fields of medicine and biology.

News on the European Institute for Biomedical Imaging Research

In order to address the current needs in cell imaging and tracking and to address a significantly varied variety of cell therapies, horizontal (generic) and vertical (specific) subprojects within the ENCITE project comprise the following objectives:

- New imaging methods to improve the spatio-temporal tracking of labelled cells
- Dual- and multimodality imaging procedures to cross-validate each individual approach
- New contrast agents and procedures that will improve the sensitivity and specificity of cell labelling
- Combining of molecular biology for the generation of molecular and cellular imaging reporter gene and multimodal imaging techniques

The development of relevant imaging tools will lead to a better understanding of how cell therapy works, the possibility of response monitoring in patients and sufficient safety and the necessity.

The full text version including guidelines for applicants can be downloaded at www.encite.org

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News from the European Society of Musculoskeletal Radiology (ESSR)

By Remide Arkun, Izmir/TR, ESSR President

The European Society of Musculoskeletal Radiology (ESSR) was founded in 1994 by a group of experienced musculoskeletal (MSK) radiologists. Since the discovery of x-rays and from the first x-ray image of the hand in 1895, over 100 years have passed. Especially in the last 40 years, the advances in radiology and thefield of musculoskeletal radiology have led to the discovery of new imaging techniques which have revolutionised the field of diagnosis and treatments for clinicians while providing patients with new opportunities.

The mission of the European Society of Musculoskeletal Radiology (ESSR) is to advance the knowledge, diagnosis and treatment of the normal and abnormal musculoskeletal systems by means of imaging and providing a European forum for education and research of musculoskeletal radiology.

In the clinical application of musculoskeletal radiology, in addition to conventional radiology, ultrasound, multislice CT, MRI, PET/CT and the future applications of MR/PET not only provide morphological knowledge about skeletal diseases but they are important in providing physiological information about skeletal diseases too. With the help of these techniques, treatments involving interventional radiology are used extensively.

Radiological diagnostic techniques are of interest to clinicians of all radiology subspecialties, and orthopaedics, rheumatology, oncology, sports medicine and even general practitioners wish to diagnose and treat patients themselves using these techniques. Teraradiology, which has developed from filmless radiology technology, represents a threat in education and clinical practice to all radiologists, including the MSK radiologists. We, as MSK radiologists, must know the radiologic findings of diseases and be aware of the clinicians’ expectations in regard to imaging techniques. Radiologists must cooperate with clinicians and organise additional radiological research. To achieve all this, a constant state of learning is needed.

The European Society of Musculoskeletal Radiology’s Annual Congress provides updated information through invited lectures, scientific papers, scientific electronic posters and hands-on ultrasound demonstrations. A conference is held every year in June in a different city in Europe, which is the hometown of the conference chairperson. Sessions related to MSK such as cross-sectional imaging techniques and advances in molecular imaging are held at the annual congress. The sessions are for development, distribution of radiological concepts, and distribution of the latest developments in musculoskeletal radiology.

Within the ESSR, arthritis, sports, tumour, ultrasound and osteoporosis subcommittees are responsible for the promotion of defined topics of special importance and interest for the diagnosis and treatment of musculoskeletal diseases. Their goal is to support and to enhance the efforts of the ESSR in their special fields and especially to link to other radiological or non-radiological societies or working groups with similar fields of interest. The arthritis and ultrasound subcommittees have a close relationship with the European League Against Rheumatism (EULAR), while the sports and ultrasound subcommittees have been working with sports medicine groups. The osteoporosis subcommittee is one of the major scientific contributors to the International Osteoporosis Foundation (IOF).

Like the other European subspecialty societies in radiology, ESSR is a member of the European Society of Radiology (ESR) and has links with the European Congress of Radiology (ECR) through the scientific subcommittee on MSK radiology. Additionally, ESSR members have been intensively involved as teachers and course moderators involved in the Erasmus Course, the European School of MRI, the Galen Foundation Course and other educational activities related to ESR.

The increase of interest in MSK radiology in clinical practice, together with the educational programmes provided by many organisations, including the ESSR, will provide great benefits for patients. If you are interested in MSK radiology, please visit the ESSR website www.essr.org and learn about the benefits of becoming a member.
Medical image computing for assistance in diagnosis and therapy

By Dr. Guido Prause, Bremen/DE

Fraunhofer MEVIS, Institute for Medical Image Computing in Bremen/DE (formerly MeVis Research), has chosen a disease-oriented approach for solving significant diagnostic and therapeutic problems. Fraunhofer MEVIS has especially focused on epidemiologically relevant diseases such as cardiovascular disease, cancer, and brain, liver and lung diseases. Based on the highly efficient software platform MeVisLab, Fraunhofer MEVIS develops workflow-oriented software assistants that allow for efficient visualisation of image data, highly reproducible quantification of anatomically and pathologically important structures with minimal user interaction as well as reliable assessment of complex surgery and intervention. The software assistants are developed by Fraunhofer MEVIS in close cooperation with a worldwide network of more than 100 clinical partners and are utilised by globally operating industrial partners from medical technology.

At this year’s IMAGINE exhibition, Fraunhofer MEVIS presents software assistants for image-based diagnosis and therapy that cover a wide range of medical disciplines and clinical applications, from cardiology, breast and lung image analysis to radiotherapy, surgery and intervention planning. Visitors to the IMAGINE exhibition are invited to experience, hands-on presentations the capabilities and usefulness of modern image analysis and therapy planning that are increasingly integrated into the clinical workflow. Important take-home messages are:

- Multi-modal radiotherapy planning: Modern diagnostic imaging requires a combination of various modalities. Novel software tools facilitate the analysis and representation of image data from different modalities in diagnosis and radiotherapy planning. They combine state-of-the-art image analysis, e.g., for perfusion and diffusion imaging, with registration algorithms and fused visualisation.

Cardiac MRI: Multidirectional phase-contrast MRI allows the acquisition of time-resolved velocity fields of cardiac and vascular blood flow based on cardiac MRI imaging specialised software tools for the assessment of flow and vessel wall. These tools offer interactive exploration and analysis methods for velocity-encoded phase-contrast MRI images and multi-contrast MR plaque images.

Risk analysis for surgery and intervention planning: Advanced software applications provide support for risk analysis and planning of complex surgeries and interventions in lung, brain, and liver. Patient-specific anatomical and functional information is extracted from CT or MRI in order to preoperatively plan, quantify, and evaluate the risk of a procedure. This includes the assessment of postoperative functional volume and the risk of incomplete tumour destruction. The application and modification of a surgery or an intervention plan during the procedure is supported by intraoperative imaging (e.g. ultrasound, CT) and tracking of instruments (navigation).

Breast imaging: Today, a variety of imaging modalities and image-guided biopsy procedures exist to identify and characterise morphological and functional information of suspicious breast tissue. It is a major challenge to seamlessly integrate the available multi-modal images and the patient information on a single clinical workstation. Current research at Fraunhofer MEVIS focuses on solutions for computer-assisted characterisation of breast lesions in breast MRI and full-field 3D ultrasound that are combined with specific algorithms for motion correction and landmark detection.

Pulmonary image analysis: Chronic obstructive pulmonary disease (COPD), which includes chronic bronchitis and emphysema, is increasingly prevalent throughout the world. According to calculations by the World Health Organization it could become the third most common cause of death in western countries by 2020. New software applications combine lobe-based quantification of lung parenchyma with quantitative analysis of pulmonary Airways for diagnosis, therapy planning and monitoring of COPD.

The clinical impact of the image-based software assistants developed by Fraunhofer MEVIS is manifold. For instance, changes in tumour volumes can be measured earlier and more precisely compared to the diameter-based standard RECIST criteria, thus allowing an improved monitoring of chemotherapies. Clinicians can identify ineffective treatments earlier and, therefore, avoid unnecessary adverse effects in patients and reduce costs. The software assistants for liver surgery planning have been used worldwide in more than 5,700 clinical cases for oncologic resection and transplantation. The software assistants presented at the IMAGINE exhibition support radiologists and surgeons in their clinical work and provide a basis for evidence-based medicine.

Computer vision and radiology

By Georg Langs, René Donner, Philipp Tiedeck, Vienna/AT

The convergence of computer vision and radiology: accelerated research in computer-aided diagnosis

Recent years have changed several aspects of the radiological practice in providing semi or fully automated computer-based approaches for a number of diagnostic procedures. These two key influences are: 1. the automation of tedious and potentially inaccurate manual measurement, scoring or annotation schemes, and 2. the exploration of anatomical structures and novel approaches towards a quantitative assessment of disease and its progression.

An example of this rapid development is the computer-based monitoring of rheumatoid arthritis (RA). Recently a number of groups have been pursuing this goal in the framework of the OMERACT initiative. This initiative provides a platform to objectively compare and evaluate different approaches, and distinguishes itself for the close international interaction between rheumatologists, radiologists, and computer science experts. In the course of these efforts, our group could contribute model-based joint space width measurements methods, and the first automatic erosion detection approach for a computer-based monitoring of rheumatoid arthritis.

Our prime characteristics of the cutting-edge research is the close collaboration of experts from a wide spectrum of fields medical doctors involved in clinical application, neurologists, radiologists with a broad knowledge of imaging and pathologies, computer scientists, and mathematicians, who contribute methods and approaches that extract relevant knowledge from the rich source of the emerging medical imaging modalities.

The clinical use of computer-based image analysis

An essential step on the way to making computer-based approaches applicable to a wide range of anatomical sites, and pathologies, is the computer-based learning of models. They are important for segmentation of anatomical structures, the localisation of individual sites, and the detection and characterisation of pathological changes. Significant efforts are made in this direction, and preliminary results indicate the great potential of such approaches.

A second important factor of a broad and effective use of medical image analysis is the independence of algorithmic advances on the one side, and image acquisition hardware on the other. This is a natural development, which will allow for the consistent use of medical imaging data across multiple sites. It will push the rapid research on medical imaging and further its clinical impact. The standardisation and transparency of image acquisition, and a resulting hardware-independent common platform for computer-based analysis methods, are important parts of this development.

The Computational Image Analysis and Radiology (CIR) Lab at the Medical University of Vienna is an interdisciplinary research group with members from radiology and computer science working closely together. The group is focusing on research of computer-aided clinical decision areas, like the monitoring of rheumatoid arthritis, and osteoporosis, the assessment and understanding of the tumour effects of surgery and methodological advances that make use of and observation of anatomical details, function and pathology possible, in order to enhance the understanding and treatment of diseases, and the human organism.

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myESR.org
The Spanish Society of Medical Radiology (SERAM) in 2009

By Pablo Valdés Solis, Marbella/ES, Strategic Committee Chairman; Carmen Martínez, Palma De Mallorca/ES, Communication Committee Chairman

The Spanish Society of Medical Radiology (SERAM), having undergone a partial rebuilding of its board of directors last year, now faces the implementation and development of its strategic plan. This is an ambitious plan, but also essential for the positioning of SERAM as a leading radiological society with sophisticated communicative tools and far-reaching development ties with other European and also South American societies.

One of the priorities for this year is the creation of a new body, that of the international members, which is the result of the bilateral agreements between the Spanish society and various South American radiological societies. There are well-known historical and cultural ties between Spain and America that allow SERAM to act as a bridge between these radiological societies. We can now see some of the fruits of these agreements, such as cooperative teaching activities, continuous education, and molecular imaging. We think that the radiological community should lead these fields of development, and SERAM intends to be one of the main supporters of this research.

We also believe that thinking of the future means thinking of education. The residents training programme in Spain is well known as an excellent source of competent professionals, and SERAM fosters resources in education, with specific sections on resident training.

SERAM also promotes initiatives such as the IHE, in order to improve the development of standards DICOM and HL7, assuming the role of national secretary of the IHE in Spain.

Furthermore, this year will be important for the internal management of SERAM, with the drawing up of clinical guidelines and recommendations, in co-operation with the different sections of our society. The catalogue of radiological studies developed by SERAM is widely used as a reference in the management of the radiology departments, and has been accepted by the national administration authorities.

We see 2009 as an important year for SERAM; we are working on different projects, and we hope that the results will soon be evident.

The Slovenian Association of Radiology

The Slovenian Association of Radiology (SAR) was founded in 1990, as the Slovene Section of Roentgenology and Nuclear Medicine. Since the beginning it has served as a forum for radiologists to collectively voice common concerns and professional interests. Its purpose is to promote and develop the highest standards of radiology, and to exchange scientific information in all fields of radiology and related sciences through patient care, education and research. The SAR is governed by the President, the Executive Board, and the General Assembly. The Slovenian Association of Radiology is the official educational and scientific association of Slovene radiologists.

The articles of the association define the structure, constitution and regulations of the society, and provide guidelines. The Slovenian Association of Radiology seeks to foster closer fellowship and greater cooperation among all radiologists who share their scientific knowledge and administrative abilities.

The aim of the SAR is to promote close cooperation among radiologists from other international radiological societies, especially in neighbouring countries, and to promote common educational and research programmes such as the Alpe Adria Radiological Group. Since the first meeting of this group in Dobrna in 1984, radiologists from the university radiological departments of Trieste, Padua, Verona, Graz, Ljubljana and Zagreb have been meeting annually in one of their respective countries to share their research and scientific experiences.

The Slovenian Association of Radiology has been publishing the English language Journal of Radiology and Oncology in quarterly issues, covering all technical and clinical aspects of diagnostic imaging, nuclear medicine, oncology, radiation protection and interventional radiology. The history of the publishing of this radiological-oncological journal in Ljubljana dates back to 1964, when the first issue of Radiologija Jugoslovija was published. Despite the war on the territory of former Yugoslavia, in 1992, its 26th volume appeared under the new title Radiology and Oncology. Recently our journal has been indexed and abstracted by Science Citation Index Expanded (Scisearch®).

The Slovenian Association of Radiology holds a lecture in memory of individuals who have made a special contribution to radiology and to the Slovenian Association of Radiology, called The Ivo Obrez Memorial Lecture.

Today the Slovenian Association of Radiology has more than 400 radiologists in all sub-specialties.
Simulation based diagnostic software for aortic aneurysms shows promise

By Martin Auer, VASCOP's GmbH, Graz/AT; Carmen Gasser and T. Christian Gasser, Royal Institute of Technology (KTH), Stockholm/SE

Pre-therapeutical degradation of the aortic elastin and collagen determines aneurysm disease, and to date no proven therapeutic strategies are available, either to limit aneurysm growth or to prevent them from rupturing. Hence, evaluating rupture risk is critically important in reducing aneurysm-related mortality without unnecessarily increasing the rate of elective repair. Clinical methods are somehow limited, and according to the current practice, rupture risk is (mainly) estimated from the aneurysm's maximum diameter and/or expansion rate; an approach motivated from statistics but known to fail often in individuals.

In contrast, recent research has demonstrated that patient-specific biomechanical simulations can provide more reliable diagnostic parameters and different biomolecular models are discussed in the literature. However, many approaches still suffer from modelling limitations and severe inter-operator variability. Motivated by this clinical need, Aclinsic, an analysing tool facilitating a comprehensive structural analysis of aortic aneurysm, has been developed.

Methods

A structural analysis of the aneurysm relies on detailed 3D patient-based (hypothetical) models and their generation currently involves a number of different software products. Such analysis is time consuming, requires expertise in software from different disciplines. In contrast, Aclinsic facilitates fast processing by integrating the latest concepts: it fuses knowledge from vascular biomechanics and scientific computing.

Image reconstruction

Specially developed active contour (deformable) models support an artifical-invasive segmentation of image data, which is a fundamental requirement to provide computational grids for a meaningful biomechanical analysis (Fig. 1). Eventually, the desired segmentation data not a mesh generation algorithm splits the aneurysm tissue, i.e. wall and thrombus into a finite number of hexahedral-dominated volume (finite) elements, which supports an accurate structural analysis while limiting the computational effort.

Finite Element Model

Finally, the meshed (discretised) aneurysm is enriched by patient-specific information to render a Finite Element problem and, hence, facilitating a structural analysis by providing detailed information about biomechanical field variables like stress and strain (Fig. 2). In details, mean arterial pressure is prescribed and constitutive models for aneurysm wall and thrombus are used as proposed in the literature. Likewise, the patient's age, gender and family history are used to estimate spatially varying wall strength, again according to results from in-vitro experiments reported in the literature. Hence, the applied assumptions enrich known biomechanical aneurysm models in several aspects and more reliable conclusions are expected.

Validation

In cooperation with the Department of Vascular Surgery at Karolinska Institute, Sweden, the proposed software tool was used to investigate the reliability of the biomechanical rupture risk hypothesis by comparing ruptured (n=10) and diameter-matched non-ruptured (n=10) aneurysms. The study revealed that peak wall stress and peak wall rupture risk (stress related to strength) were respectively 1.48 times (p=0.019) and 1.73 times (p=0.022) higher in ruptured than non-ruptured aneurysms. Most interestingly, all non-ruptured aneurysms exhibited a peak wall rupture risk below 1.0, though to be the theoretical limit of rupture. Peak wall rupture risks of seven ruptured aneurysms were clearly elevated with respect to the non-ruptured group, whereas in three formations this was not the case. Assuming intact thrombus of these aneurysms could not explain aneurysm rupture and by relating that, i.e. considering thrombus perforation, (as partly indicated by the image data) final rupture could be predicted.

Conclusions

A novel procedure to develop structural Finite Element models of aortic aneurysms was implemented in Aclinsic, a stand-alone software tool to be operated without engineering skills. The computer program is highly automated and facilitates the extraction of various geometrical and biomechanical determinants from routinely taken clinical data. The software is entirely feasibility for analysis of realistic patient-specific models on standard personal computers, and hence can be fairly integrated into routine clinical workflow.

First validation studies underline the device's suitability to estimate the rupture risk of abdominal aortic aneurysms and to enhance current diagnostic methods. It might be promising enrichment in aneurysm screening programmes, (potentially) capable of identifying rupture-prone aneurysms. Likewise, the software facilitates in-depth investigations of aneurysm biomechanics and might provide useful data from a purely scientific perspective to enrich today's knowledge of aneurysm pathology.

Acknowledgments

The development of Aclinsic was supported by Sci-encod/Praz, and the pre-procedure programme was provided by the Austrian Federal Ministry of Economics and Labour, which is gratefully acknowledged.

1 The Finite Element Method is a widely applied numerical concept to solve problems in engineering and applied sciences.

How volumetric analysis quantifies therapeutic response of slow-flow vascular malformations

By T. Drebber, H. Kabibena, R. Kikinis, E. Ketterlinich; Vienna/AU

Slow-flow vascular malformations, such as venous and lymphatic lesions, are most often recognised in infancy and are thus characterised by a rapid expansion. The majority of these lesions are found in the head and neck region, where they may lead to rapid expansion. The majority of these lesions are found in the head and neck region, where they might be inaccurate. Nevertheless, accurate volumetric analysis can provide more reliable diagnostic parameters and different biomolecular models are currently discussed in the literature. However, many approaches still suffer from limitations and severe inter-operator variability. Motivated by this clinical need, Aclinsic, an analysing tool facilitating a comprehensive structural analysis of aortic aneurysm, has been developed.

Methods

A structural analysis of the aneurysm relies on detailed patient-based (hypothetical) models and their generation currently involves a number of different software products. Such analysis is time consuming, requires expertise in software from different disciplines. In contrast, Aclinsic facilitates fast processing by integrating the latest concepts: it fuses knowledge from vascular biomechanics and scientific computing.

Image reconstruction

Specially developed active contour (deformable) models support an artificial-invasive segmentation of image data, which is a fundamental requirement to provide computational grids for a meaningful biomechanical analysis (Fig. 1). Eventually, the desired segmentation data not a mesh generation algorithm splits the aneurysm tissue, i.e. wall and thrombus into a finite number of hexahedral-dominated volume (finite) elements, which supports an accurate structural analysis while limiting the computational effort.

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1 The Finite Element Method is a widely applied numerical concept to solve problems in engineering and applied sciences.
Icelandic radiology faces economic challenges

By Halldór Benediktsson, Reykjavík/IS, President of the Radiological Society of Iceland

The collapse of the Icelandic banking system in October 2008 shook the foundations of the funding of the health system as the Icelandic krona fell by more than 80% against the Euro. A new reality now governs the purchase of equipment, supplies and pharmaceuticals from abroad. The new director of Landspitali, Hulda Gunnlaugsdóttir, says that costs must be cut while at the same time maintaining a focus on preserving the hospital’s positive outcomes. Landspitali has already cancelled the replacement of two CT systems this year and a private clinic has reversed its decision to purchase MRI equipment.

As the use of PET/CT becomes more and more established, the need and rationalisation for PET becomes more apparent, even for a small population such as that of Iceland. Plans have been made for the installation of PET/CT with isotope production facilities in the proposed new National Hospital buildings. As the ambitious plans for the new hospital have been delayed as a result of the economic crisis, the future of PET in Iceland is in danger. Contingency plans for an alternative site for the facilities are being made for an alternative site for the facilities are being discussed in the Landspitali.

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In Iceland, with its population of just over 300,000, there is no domestic radiology residency training programme available, with most Icelandic radiologists receiving their speciality training at Scandinavian university hospitals, particularly in Sweden and Norway. Some are trained in other European countries and some in the United States. This has created an interesting mix of knowledge and know-how in radiology in Iceland, to the benefit of the profession and patients alike.

The society also organises scientific meetings and increase the current high standard of radiological practice in the belief that only by doing so, can radiology maintain its current position with respect to other specialties.

There is first class access to radiological imaging such as ultrasound, CT and MRI and, as in other Scandinavian countries, medical imaging is almost exclusively the domain of radiologists.

The main exception to this rule is in coronary angiography and intervention, which is managed by cardiologists, as is common practice in Europe.

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Inside the Královské Vinohrady Hospital in Prague

To close its series on emergency departments, ECR Today travelled to Prague to meet the team at the University Hospital Královské Vinohrady. As the hospital was just switching to PACS, radiologists were expecting a significant improvement in their collaboration not only with emergency medicine but also other partner disciplines ...

By Mélisande Rouger

It is a cold day in Prague. But you don’t feel it in the overheated corridors of the University Hospital Královské Vinohrady – Faculty nemocnice Královské Vinohrady in Czech – one of the three faculty hospitals of the Czech capital.

With 1,400 beds, it is the third biggest hospital in town. It provides every classic type of hospital care from ophthalmology and metabolic care to cardiology and trauma. Its plastic surgeons are particularly renowned, and patients come from across the whole country to be treated by them.

The Anaesthesiology and Critical Care (ACC) Department, the Czechs’ equivalent of the emergency department, is nothing like typical European centres. No administrative desk. No waiting room. No queuing. No cubicles. Instead, a huge hall with mobile beds, radiological and respiratory devices, its own operating room, and an army of freshly graduated doctors and nurses.

“This is the American style. Patients come in here from the street and we can treat them directly,” explained Professor Jan Pachl, Director of the ACC Department.

The ACC Department is equipped with 21 beds and dispatches patients according to the acuteness of their state. Acute emergencies, generally patients from pre-hospital care transferred by the Emergency Medical System (EMS), are called primary admissions. Less serious emergencies and patients from different departments or hospitals are referred to as secondary admissions.

Reflecting this division, the ACC Department is divided into two floors. The first floor, which is actually on the street level on the other side of the hospital, is equipped with ten beds and designed for short stays – hence no cubicles. Conversely, the third floor provides more intimacy to the patients who need longer care, such as chronic disease sufferers. A unification of the department is planned for 2012, with financial support from the EU, which will also enable the building of a helicopter pad on the roof of the hospital.

On average, the Královské Vinohrady ACC Department provides emergency care to 800 patients per year (figures from 1998), one half to primary admissions, the other to secondary. It carries out from 16,000 to 17,000 anaesthesias per year. Classic critical cases include patients presenting with failing vital functions, multiple traumas, brain injuries, confusion, epilepsy, episodes, asthma, etc.

Major trauma patients represent an increasing part of the department’s work. The ACC team treats about 200 major trauma patients per year, more than 30% of whom have brain injuries. “We see a lot of car accident victims, many of whom have been drinking and driving,” said Prof. Pavel Janík, Director of the Radiology Department.

Trauma will soon become a problem for the hospital if interventional radiology (IR) doesn’t develop faster. Pachl warned. “We have a problem finding the people to do that. We should increase the IR service on the level of standard care,” he said.

“We have no problem providing IR procedures on the standard level, including vascular procedures such as embolisations, recanalisations, thrombectomies, thrombolysis, punctions and drainage. But we are not able to guarantee IR service 24 hours a day,” said Professor Vaclav Janík, Director of the Radiology Department.

The hospital lacks experienced personnel: only three fully graduated interventional radiologists and one IR trainee are currently working at Královské Vinohrady.

Another burden faced by the hospital is the shortage of nurses. The ACC Department has, with 90 nurses, an exception. But the Radiology Department, for instance, employs only three nurses.

Radiology is located on the ground floor but some of its equipment is already available in the ACC Department. One ceiling-mounted radiographic unit, a mobile radiographic unit, one C-arm fluorographic unit and one portable US unit (including Doppler and TEE – transoesophageal – mode) are installed in the ACC.

In addition, a spiral CT scanner is located ten feet away from the department.

Emergency physicians carry out simple US examinations such as Doppler, and examinations of the pleural and pericardial fluids. Cardiologists also perform TEE examinations on their own. But every other procedure is carried out by a member of the radiological team, which comprises 39 radiologists, one resident and 37 radiographers.

EMERGENCY PHYSICIANS CAN NOW PERFORM SIMPLE PROCEDURES AND EXAMINATIONS, WHICH WERE PREVIOUSLY THE EXCLUSIVE PROVINCE OF THE ACC DEPARTMENT.

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ESR meets Australia & New Zealand

Radiology should not be treated as a commodity, according to Professor Mark Khangure, President of the Royal Australian and New Zealand College of Radiologists (RANZCR). As his delegation geared up for ‘ESR meets’ at ECR 2009, he talked of the challenges faced by radiology in remote regions and the innovative strategies developed by the RANZCR to defend the discipline’s interests in the health system.

By Melisande Rouger

ECRT: Today is how radiology doing in Australia and New Zealand (NZ) today? Mark Khangure: Radiology is booming in Australia and NZ with growth in diagnostic imaging (DI) services running at approximately 7% per annum. This is driven by population growth, increased financial burden on patients. Formed in 1949, the Royal Australian and New Zealand College of Radiologists (RANZCR) which is responsible for training, continuing education and radiation oncology, is working to address these and other quality issues.

ECRT: How many radiologists are currently working in Australia and NZ? What is the proportion of men, women and young people? How does it compare to the whole population? How many radiologists for radiography and radiation oncology, is working to address these and other quality issues.

MK: There are approximately 1,660 radiologists in active practice in Australia (1,380) and NZ (280). In Australia, with a population of 21 million, there are approximately 66 radiologists per 1 million, or 1 per 15,000 inhabitants. In NZ, with a population of 4.2 million, the ratio is 1 per 66,000 inhabitants. In 2006 20% of the Australian Workforce was female and 30% in New Zealand. Of the current radiology trainees, 34% are female, 20% of fully qualified radiologists are over 60 and about 25% are under 40.

ECRT: How do you see the demographic of your workforce changing in the near future?

MK: The RANZCR is concerned that the current number of training positions is inadequate to produce the number of radiologists based on our estimate of likely retirements in the next 20 years. There is a shortage of young doctors seeking to be trained but we do not have enough funds to access their positions. One of my key challenges is to persuade governments and to encourage private practices to support new training positions. In addition, doctors generally are questioning their work time commitment and ‘lifestyle balance’ and many are seeking to reduce working hours.

ECRT: How is Australian and NZ radiology meeting the growing need for a multidisciplinary approach in radiology?

MK: Radiology is rapidly in the direction of organ-based rather than modality-based expertise, with care delivered in clinical teams, of which the radiologist is a central partner. We have much to learn from our radiation oncology colleagues in this regard. Multidisciplinary trend is particularly evident in hospital-based services but also increasingly in private ambulatory practices.

ECRT: Skillful staff are a prerequisite for the implementation and maintenance of high-quality radiological services – what do you do to promote postgraduate education and training in modern imaging methods?

MK: The College is responsible for the training of radiologists and radiation oncologists in our two countries. RANZCR conducts a 3-year ‘preceptorship’ model training programme, which is regulary reviewed and accredited by the Australian Medical Council and the Medical Council of New Zealand. The curriculum for radiology training is currently being redesigned to reflect modern imaging and best practice education, and adopts the CanMEDS physician competencies framework. RANZCR also conducts a continuing professional development (CPD) programme. Members of the College are expected to participate in this programme, which involves accrual of CPD points for attendance at conferences and in-service training.

ECRT: Is there any competition between Australian/NZ radiological services and other services? If so, how does it work together with those specialists to improve the situation?

MK: Other clinical disciplines are always ready to step into areas that are not being developed by radiologists and to claim that they have the specialist skills in their particular area. This occurs in anaesthesiology and pain medicine, neurology and neurosurgery, vascular surgery, psychiatry and cardiology. The answer is in having specialists and skillful knowledge that at least comparable plus the advantage of having a thorough understanding of and training in imaging, the ability to integrate the clinical and laboratory findings with imaging. It also means recognizing the overlap of other radiologists with other clinicians in ‘value-adding’ partnerships.

This issue raises significant questions about the extent to which we can train generalist radiologists and at what stage in training should subspeciality skills be developed.

ECRT: How relevant is the use of teleradiology in the Australian/NZ context? How do you think this translates in radiology, putting to the ground the QUDI program?

MK: Teleradiology is increasingly being used to provide radiology services to more remote regions that are not able to support radiology onsite. It also enables patients to access specialist radiology and assists with out-of-hours and on-call arrangements. Most teleradiology is delivered from other sites within Australia and New Zealand but some services are provided internationally. The College believes that teleradiology must be subject to the same quality standards and meet certain minimum requirements, such as ensuring that the radiologist providing the opinion is a qualified specialist who meets the appropriate training, registration, certification, licencing, credentialing, malpractice insurance and CPD requirements for the referring and interpretation sites. The College subscribes to the principles for International Clinical ‘Teleradiology’ developed by the International Radiology Quality Network.

ECRT: In your presentation for the ‘ESR meets’ programme, you have already mentioned the International Radiology Quality Network. Can you tell us more about it?

MK: The International Radiology Quality Network (IRQN) was formed in March 2002. Its purpose is to promote quality in Radiology through collaboration, experience sharing and mutual assistance. It is interested in matters fundamental to the delivery of quality radiology services, the promotion of evidence-based and appropriate utilisation of radiology, the processes relating to quality control, quality assurance, quality improvement and practice accreditation. Information on IRQN and its current projects is accessible on its website: http://www.irqn.net

ECRT: How would you judge the importance of the exchange of knowledge between Australian/NZ radiologists and the rest of the world?

MK: Australian and New Zealand Radiologists have extensive connections with colleagues in the UK, USA, Europe and more recently Asia. They benefit greatly from the exchange of knowledge and learning of skills through joint academic interactions, attending international meetings and through working and undertaking clinical research. The research culture in Australia and New Zealand in radiology is not strong (unlike radiation oncology and some other clinical disciplines) and the College sees it as a strategic importance to train its members in research methodologies, to engage in collaborative research and to learn from overseas centres of excellence in order to build our research capacity.

ECRT: How are/are radiology in Europe and Oceania worlds apart, separated by two oceans in geographic and cultural terms? What is your take on this?

MK: Europe and Oceania are worlds apart, separated by two oceans in geographic and cultural terms. The approach to clinical problem solving is essentially the same although the investment in research and the level of research activity does not match that of the USA or parts of Europe.

ECRT: How would you judge the importance of the exchange of knowledge between Australian/NZ and European radiologists more similar than expected? How do you think this translates in radiology, putting to the ground the QUDI program?

MK: Having worked in the ‘twinning’ arrangement, regularly attending meetings in Europe and Asia, I have no doubt that the quality of training and practice in Australia and New Zealand is extremely high. The approach to clinical problem solving is essentially the same although the investment in research and the level of research activity does not match that of the USA or parts of Europe.

ECRT: Is there any competition between Australian/NZ radiological services and other services? If so, how does it work together with those specialists to improve the situation?

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ECRT: What strategy is RANZCR developing to address the situation?

MK: The College’s strategic planning includes: Lobbying governments and private sector practices to fund more training positions; developing and promoting standards of practice that promote safe and quality care including acceptable workloads of radiologists and technical staff; lobbying universities and governments to support academic positions in radiology; engaging with key stakeholders in the health system to establish structures, a culture and funding mechanisms that promote and support quality radiology services. How do you think this translates in radiology, putting to the ground the QUDI program?

MK: The Quality Use of Diagnostic Imaging (QUDI) Program is a research and development programme providing an evidence base for diagnostic imaging in Australia and New Zealand. The College through the QUDI Program has convened a wide range of projects addressing quality issues from the perspectives of consumers, referrers and radiology providers as well as considering economic issues in the delivery of services.

The Program commenced in 2005 and has been fully funded by the Australian federal government and managed by RANZCR. Its current annual budget is AUS 1 million. It aims to provide an evidence base for diagnostic imaging in Australia and New Zealand. The College through the QUDI Program has convened a wide range of projects addressing quality issues from the perspectives of consumers, referrers and radiology providers as well as considering economic issues in the delivery of services.

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more safe, effective, efficient and sustainable imaging services that lead to optimal diagnosis and treatment, support consumer choice and empowerment, are delivered by accredited practitioners using evidence-based guidelines and are sustainable within the national health system 'budget'. Comprehensive information on QUDI can be accessed at http://www.randc.edu.au/qualityprograms/qualityindex.cfm

ECRT: Where exactly is it put in practice? What changes will it bring about and how? MK: The QUDI Program has been able to bridge the gap between policy and radiology practice in hospital and community settings. It has been able to improve quality at a national level, for example, through informing the development of the RANDC's standards of practice and the curriculum for radiology trainers. A national resource is being developed to provide information that is reliable, credible, and consistent for both health-care referrers and consumers. These materials will be available from a variety of sources and formats via a variety of media. At a local level the Program has run a successful pilot project that has resulted in radiation dose reduction in paediatric CT examinations; and has implemented clinical guidelines in a variety of local settings. Trainees and members are also being trained in evidenced-based medicine and critical appraisal of literature through interactive workshops delivered online and face to face.

ECRT: What else will you talk about at ECR? MK: The key trends are likely to include: Increasing demand for imaging as clinicians seek to have as much diagnostic information available as possible; greater consumer awareness of imaging technologies and demand for access to them; DI will be used much more widely in screening and prevention programmes. Molecular imaging will provide new opportunities and challenges; other clinical disciplines will continue to claim ownership of imaging within their sphere of practice; the trend for radiologists and other medical practitioners to want to control their workloads and to work flexibly and part-time together with increasing demand for services, will require a major expansion in workforce and challenge the profession's ability to provide the required training. Sub-specialisation of the radiology workforce will continue in response to the increasing sophistication of technologies and practice in multidisciplinary teams.

ECRT: What was your main motivation for choosing your profession? MK: In the mid 1970s with the advent of CT and ultrasound, the diagnostic capabilities of radiology expanded enormously. My interest in neurology was the impetus to move to radiology. A desire to work with my hands led me to interventional neuroradiology which enables me to practice across the full scope of investigation, diagnosis and treatment, and to interact with clinical colleagues in team environments.

How to make use of EURORAD

By Stefanie Münch

Created in 1999, EURORAD is the largest peer-reviewed online database of radiological teaching files worldwide. It was founded by Prof. Albert L. Baert, Leuven/BE and co-workers, and since its first steps and submissions it has become an ever growing collection of over 2,800 published cases from all different kinds of radiological specialties.

Submission, peer review and publishing are based on a system of 14 different sections, all chaired by section editors who are experts in their field. On top of this structure is Prof. Johann L. Briesem from Leiden/NL, the Editor-in-Chief since 2007.

EURORAD is one of the major educational tools of ESR, and it helps to spread knowledge and expertise teaching all around the world. To ensure that as many people as possible can make use of EURORAD, access is free for all members, and can be gained with your last name and ESR personal ID. Furthermore, EURORAD is in the translation of cases into Spanish and French. There are already more than 100 cases available in French and almost 700 cases in Spanish, with many more to come!

So, what can EURORAD do? EURORAD provides radiological cases for researchers, teachers, students, residents and anyone interested. Visiting www.eurorad.org, at the first glance you will not only find a well arranged and informative website, but you are also right in the midst of the action: most recently published and most frequently viewed cases and authors, and a clever quick search engine to find all you need, can all be accessed easily. Using the advanced search tool, you can find cases by title, author, keyword, section or language. Furthermore, EURORAD aims to crosslink knowledge: all references that are available in the PubMed database are linked to it. If you are interested in doing quiz games or testing your own or your students’ knowledge, you can also access ‘teaching cases’, where all parts of the case that could reveal the diagnosis are hidden and must be opened separately.

How can I get my case into EURORAD? If you are not only interested in being a user, but would also like to contribute, you should consider submitting your case to EURORAD. All radiological case reports are welcome and go through a peer-review process, which involves being examined by one reviewer and the section editor of the respective section. Under the tab ‘submit a case’, which can be found at the home page www.eurorad.org, you are invited to follow the submission procedure as indicated by the system. Cases must have a title and must belong to a section, which can be chosen by the author. Each case should be structured with the following parts: clinical summary – clinical history and imaging procedures – discussion – final diagnosis. Each part has a word limit that must be observed, and Mesh keywords (Medical Subject Headings) must also be entered to ensure the case is easily searchable. References, which should be provided to underline discussion content, can be supplied separately and tagged with the PubMed-ID of the original work. Finally, the most important part of a case – the images – can be uploaded as JPEG, PNG, EPS or TIF files. Up to 10MB of cumulative file size can be used per case and divided into main figures with numerical order, which can again consist of more than one image with alphanumeric labelling. After going through all the steps, you can check at one glance if your submission is correct by looking at the ‘submission status’ bar to see if all checkmarks are green. If something is not right, you can see it easily from the red cross marking the section that still has to be edited. You should make sure that all image files can be viewed correctly, no patient data is displayed or revealed by other images or text, and language and content of your case are correct to the best of your knowledge.

Once you have submitted your case, it will be checked by the Electronic Publication Coordinator (EPC) for omissions and errors, and then forwarded to the respective section editor. He will have a first look at the case and, if there are no major issues, he will select a reviewer and forward the case. After the reviewer has been completed, the section editor will make a decision based on his and the reviewer’s opinion, which can be acceptance, rejection or revision. If a revision is needed, the case is sent back to the author with comments on how to revise it for resubmission. If a case is accepted, the online basis of EURORAD makes it possible to publish it right away and for it to be viewed in the same instance. EURORAD cases are also fully citable via unique DOI (digital object identifier) numbers, which are allocated and registered periodically.

EURORAD provides many free services for its members that can broaden horizons and share knowledge, and EURORAD is one of the most comprehensive of these educational and electronic learning tools, addressing radiologists with all levels of experience or training. All information is available on the website www.eurorad.org.

Visit the EURORAD Booth on the entrance level in Foyer E!
Internationally acclaimed neuroradiologist delivers Monday’s Honorary Lecture

By Milicenda Roeger

Anton Valavanis was born in 1952 in Athens, Greece. He received his medical degree in 1977 and completed his residency in radiology at the University Hospital of Zurich. He started his career as Assistant Professor in 1984 and obtained full professorship at the chair of neuroradiology in 1994. The same year, he founded the Institute of Neuroradiology at the University of Zurich, and has been its Chairman ever since.

In the early eighties, he started developing and applying endovascular techniques for the treatment of CNS and head and neck vascular and oncologic lesions. The Institute of Neuroradiology at the University Hospital of Zurich is recognised as one of the leading centres of intervention neuroradiology worldwide.

Since 1982, he has been a member of the governing council of the Neuroscience Center Zurich and ETH Zurich and later co-founded the Clinical Neuroscience Center at the University Hospital of Zurich, where he currently serves as Chair of the governing council. He is also a founding member of the European Society of Head and Neck Radiology, the Swiss Society of Neuroradiology and other prestigious organisations.

A dedicated researcher, his leadership abilities have been recognised by his peers both nationally and internationally. He served as President of the World Federation of Neuroradiological Societies from 1997 to 2002 and has been President of the Swiss Society of Neuroradiology since 2001. He served in the Executive Committee and Chairmanship of the European Society of Interventional Neuroradiology and Head and Neck of the European Society of Neuroradiology, and also chairs the Scientific Programme and Scientific Award Committee of the World Federation of Interventional and Therapeutic Neuroradiology.

Over the years, he has received numerous honours for his outstanding work, including the Scientific Award of the German, Swiss and European societies of neuroradiology and the James Pollack Award of the British Society of Neuroradiologists. He has been awarded Honorary Membership of the Hellenic Radiological and Neuropsychological societies, and of the Italian Society of Neuroradiology. He holds honorary directorships at the neuroradiology departments of the International Neurosciences Institute, Hanover, Germany, and Beijing, China.

He currently serves as Editor-in-Chief of Neuroradiology Helvetica, and was the Editor-in-Chief of Neuroradiology from 1991 to 2003. He is also a member of the editorial board of various journals on neuroradiology, neururosurgery and skull base surgery.

He has authored or co-authored 200 original scientific publications and two books, 'Clinical Imaging of the Cerebellopontine Angle' and 'Interventional Neuroradiology'.

In addition to his prolific research, he has lectured extensively and has been invited to give more than 400 lectures all around the world. He has also remained interested in the history of medicine and held the 17th Congress of the European Society of Neuroradiology, the International Congress of Head and Neck Radiology and the 1st Congress of the World Federation of Diagnostic and Therapeutic Neuroradiology, Zurich in 1991. In 1992 he founded the ‘Zurich Course on Interventional Neuroradiology’, which has been held annually ever since and is recognized as one of the premier educational activities in the field. He has recently been honoured as the inaugural lecturer for the 36th Gazi and Durna Yusurgi Lectureship by the University of Arkansas for Medical Sciences. His book was shortlisted for the Symposion Neuroradiologicum in Venice in 2010.

Prof. Valavanis is married to Dr. Susanne Valavanis-Bürli and has two daughters.

ESR puts EU affairs high on agenda to ensure utmost safety of patients

By Monika Hierath

ESR is closely monitoring planned EU legislation and EU affairs with a potential impact on medical imaging, and has started to successfully build relevant relations with relevant EU institutions and EU consulting agencies.

However, there is one group that is crucial in any campaign: the patient groups. ESR would like to express its sincerest thanks to the patient organizations that have so far been highly supportive of the Alliance for MRI campaign, which aims to avert the threat posed by EU health and safety legislation to the clinical and research use of MRI: the European Federation of Neurological Associations (including the European Parkinson’s Disease Association and the European MS Platform), the European Heart Network, Europe Domina, the European Patients’ Forum, the International Diabetes Federation – Europe, AlzheimersEuropa, the WHO Collaborative Centre for Research, Training and Treatment in Epilepsy, the European Headache Alliance, the Austrian Epilepsy Association, Werkgruppe Hirnentzerrörunen vzw (Belgian Brain Tumour Group), and Epilepsy Centers of the Netherlands Foundation SEIN.

Your feedback and suggestions as well as information on additional patient groups willing to support our endeavours are most welcome and should be sent to eu-affairs@myESR.org.

Below, you will find a brief update on recent developments with regards to EU legislation relevant to our specialty, as well as an action plan to ensure the utmost quality of services to our patients. The activities of the Alliance for MRI, a coalition of European Parliamentarians, patient groups, leading European scientists and the medical community, who together are seeking to avert the serious threat posed by EU health and safety legislation to the clinical and research use of Magnetic Resonance Imaging (MRI), have already been presented in a separate article in the Sunday issue of ECR Today.

Directive on the application of patients’ rights in cross-border healthcare

In July 2008, the European Commission published a draft proposal for a Directive on patients’ rights in cross-border healthcare. The Directive concerns itself primarily with the movement of patients and professionals between member states and the quality of cross-border healthcare services.

The ESR has established contact with the Directorate General Health in charge of the content of this Directive in order to ensure quality and safety for patients whose treatment involves cross-border eHealth. Since in the case of telemedicine and telehealth, the patient does not travel and cannot influence or assess the quality of the telemedicine or telehealth services they receive, ESR is of the opinion that the control and responsibility for the quality and standards of telemedicine and telehealth should remain with the country where the patient receives the initial care.

In addition, the patient should be fully informed of the outsourcing process in the event of telemedicine or telehealth in particular and should give informed consent at the site of imaging prior to their images and interpretation being outsourced to another EU country.

In January, the ESR President Prof. Iain W. McCall met with Dr. Ilia laserskova, Deputy Head of Unit ICT for Health, Dr. Christoph Steffen, Scientific Officer Unit ICT for Health, who drafted the Telemedicine Communication and Flora Giorgio, Scientific Officer Unit ICT for Health, who co-drafted the Telemedicine Communication.

During the meeting, the concerns of the ESR regarding the telemedicine communication were discussed. It is important that the use of telemedicine is not just looked at on cost and efficiency terms, as these might neglect issues surrounding patient safety and quality assurance. Furthermore, the E-Commerce Directive referred to in the Communication does not cover telemedicine cases where the two contracting parties are not established healthcare providers, such as in the UK where telemedicine services are handled as commercial transactions.

The Commission is setting up a working group to look at the legal framework applicable to telemedicine services in the Member States. As a first step, the Commission held a workshop during the Ministerial Conference on eHealth in Prague on February 18, at which ESR representatives were present.

Moreover, the Commission is planning a large-scale event on eHealth in Barcelona in March 2010, for which the Commission has requested input from ESR.

For further information or comments, please contact eu-affairs@myESR.org.
By Mélisande Rouger

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

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Prof. Małgorzata Szczerbo-Trojanowska is ECR 2010 Congress President.

By Mélisande Rouger

ECR 2010 President urges radiologists to contribute to further development of specialty

ECR Today met ECR 2010 Congress President, Professor Małgorzata Szczerbo-Trojanowska from Lublin, Poland, to discuss her agenda for next year’s congress. Among other topics, ECR 2010 will shed light on imaging and interventions in both oncology and clinical emergencies, and perpetuate the congress’s tradition of innovation, with the introduction of a multidisciplinary symposium and organ-oriented courses.

ECRT: What are your ambitions and plans for ECR 2010?

MST: The majority of radiological congresses are focused on one radiological discipline or even a specific narrow subject. ECR is a unique forum addressing and accommodating all radiologists. There are sessions presenting the cutting edge of science in our own field of activity and at the same time there are opportunities to attend sessions presenting progress outside of our own discipline. This is a great advantage of a multidisciplinary meeting which provides possibilities to keep abreast of developments in other radiological fields.

I find it extremely important for every radiologist to be aware of the progress in various fields of our specialty. This knowledge may help in further develop our own field and to choose the modalities best suited to diagnosing our patients.

ECRT: What do you think of the programme for ECR 2009?

MST: The ECR 2009 programme continues the good tradition of the former ECRs very well but redrafts and enriches them with new items. It is an excellent and highly ambitious programme, accomplishing an optimal balance between sessions presenting the latest developments in diagnostic imaging, their critical appraisal, and educational sessions of various levels. The Cat-
gorical Course on spinal imaging and interventions as well as courses on cardiac imaging and breast imaging will draw the attention of many participants. Interactive teaching sessions with many interesting topics and educational sessions of various levels.

The programme committee devoted to abdomen imaging and drug-staining sessions.

ECRT: What are your ambitions and plans for ECR 2010?

MST: Every president of ECR, I would like to shape a very attractive scientific, educational and social programme. Working together with the Programme Planning Committee we have been trying to create sessions choosing topics that should meet the expectations of all participants. It is well known that every ECR introduces new technologies presented.

Among the scientific highlights in the field of contemporary imaging. New Horizon Sessions: on imaging in polytrauma patients and on paediatric non-traumatic emergencies, which will be extensively explored during the congress. There will be a Categorical Course on abdominal emergencies and two Special Focus Sessions: on imaging in polytrauma patients and on paediatric non-traumatic emergencies. I would like to draw your attention to the Special Focus Sessions: on imaging in polytrauma patients and on paediatric non-traumatic emergencies. They will be extensively explored during the congress. There will be a Categorical Course on abdominal emergencies and two Special Focus Sessions: on imaging in polytrauma patients and on paediatric non-traumatic emergencies. I would like to draw your attention to the Special Focus Sessions: on imaging in polytrauma patients and on paediatric non-traumatic emergencies. I would like to draw your attention to the Special Focus Sessions: on imaging in polytrauma patients and on paediatric non-traumatic emergencies.

Since I was invited to participate in the congress, I immediately started preparing for the meeting. I was very lucky that I can share my hobbies with my husband. We both love opera and try not to miss any new premieres. Plus we have the same favourite sports; we are happy yachting in summer and enjoying skiing in winter.

Prof. Małgorzata Szczerbo-Trojanowska is ECR 2010 Congress President.

The annual meeting of ECR is sponsored by myESR.org

ECR 2010

Virtuality in Radiology

March 4–8, Vienna / Austria

COMMUNITY NEWS

ECR TODAY 2009 Monday/Tuesday, March 9/10, 2009
What’s on today in Vienna?

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

MONDAY, MARCH 9, 2009

Akademietheater
1030 Vienna, Lutzstrasse 1
phone: +43 1 51444 4145
www.akademietheater.at
20:00 Macbeth
by William Shakespeare

Burgtheater
1010 Vienna, Dr. Karl-Lueger-Ring 2
phone: +43 1 51444 4145
www.burgtheater.at
19:30 Der Schein trügt
by Thomas Bernhard

Schlosspitalhau
1090 Vienna, Pfarzelfgasse 19
phone: +43 1 317 01 01
www.schlosspitalhaus.at
19:30 Aus dem Leben der Marionetten
by Ingmar Bergman

Theater in der Josefstadt
1080 Vienna, Josefstrasse 26
phone: +43 1 42 700 300
www.theater-in-josefstadt.org
19:30 The Second City Comedy Club Chicago
Best of Second City

Vienna's English Theatre
1080 Vienna, Josefsgasse 12
phone: +43 1 402 12 60 0
www.viennacheeseatre.at
19:30 Sonny Boys
by Neil Simon

Volktheater
1070 Vienna, Neutegasse 1
phone: +43 1 317 01 01
www.volktheater.at
19:30 Die Wirtin
by Peter Turrini

TUESDAY, MARCH 10, 2009

Akademietheater
1030 Vienna, Lutzstrasse 1
phone: +43 1 51444 4145
www.akademietheater.at
20:00 Unterthalbs
by Peter Handke

Burgtheater
1010 Vienna, Dr. Karl-Lueger-Ring 2
phone: +43 1 51444 4145
www.burgtheater.at
19:30 Das Leben ein Traum
by Pedro Calderón de la Barca

Schlosspitalhau
1090 Vienna, Pfarzelfgasse 19
phone: +43 1 317 01 01
www.schlosspitalhaus.at
20:00 Krieger im Galer
by Clausius Lüstoldt

Theater in der Josefstadt
1080 Vienna, Josefstrasse 26
phone: +43 1 42 700 300
www.theater-in-josefstadt.org
19:30 Die Reifprüfung
by Terry Johnson

Concerts & Sounds

MONDAY, MARCH 9, 2009

Konzerthaus (Classical Music)
1030 Vienna, Lothringerstrasse 20
www.konzerthaus.at
19:30 La Risonanza, Ensemble
F. Bonizzoni, cembalo; R. Milanesi, soprano
D. Santi, M. Corrette, G.F. Handel, H. Purcell

Musikverein (Classical Music)
1010 Vienna, Bösendorferstrasse 12
www.musikverein.at
19:30 Berliner Barock Solisten,
Thomas Quasthoff, baritone
J.S. Bach, G.F. Handel

Porgy & Bess (Jazz)
1010 Vienna, Kirchengasse 11
www.porgy.at
20:00 Lew Soloff Quartet
20:00 Kovács / Dreusch / Balogh / Strandal / Béli Bubul

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

TUESDAY, MARCH 10, 2009

Konzerthaus (Classical Music)
1030 Vienna, Lothringerstrasse 20
www.konzerthaus.at
19:30 Tchaikovsky Symphony Orchestra Moscow,
conductor Vladimir Fedoseyev
L. van Beethoven, P. I. Tchaikovsky

Musikverein (Classical Music)
1010 Vienna, Bösendorferstrasse 12
www.musikverein.at
19:30 Berliner Barock Solisten,
Thomas Quasthoff, baritone
J.S. Bach, G.F. Handel

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Szene Wien (Alternative Music)
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www.szenewien.com
20:00 Nusaeth

Opera & Musical Theatre

MONDAY, MARCH 9, 2009

Volkoper
1090 Vienna, Währingerstraße 78
www.volkoper.at
19:00 Guys and Dolls
Musical by Frank Loesser

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

Wiener Kammeroper
1010 Vienna, Hausmarkt 24
www.wienerkammeroper.at
19:30 Die Fledermaus
by Johann Strauss
conducted by Michael Halász
Ballet choreographed by Roland Petit

Raimundtheater
1090 Vienna, Wallgasse 18-20
www.musicalvienna.at
19:30 Rudolf – The Mayerling Affair
Musical by Frank Wildhorn & Jack Murphy

TUESDAY, MARCH 10, 2009

Volkoper
1090 Vienna, Währingerstraße 78
www.volkoper.at
19:00 Tanzhommage an Queen
Ballet by Ben van Cauwenbergh

Wiener Staatsoper – Vienna State Opera
1010 Vienna, Opernring 2
www.wiener-staatsoper.at
19:30 Le Pescezzerie – Die Fischerinnen
by Joseph Haydn
based on a libretto by Carlo Goldoni
conducted by Dand Huyvem-Carone

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1010 Vienna, Hausmarkt 24
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Musical by Frank Wildhorn & Jack Murphy

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Take a leisurely stroll through Vienna’s small serpentine alleys and across grand squares. Admire antique treasures, baroque palaces, Gründerzeit buildings, art nouveau villas and innumerable architectural gems from all ages and eras.
The ethics of authorship comes under scrutiny

By Sarah Edwards

Despite increasing research activity over recent decades, authorship proves to be a most provocative and nebulous issue. Conflicts arising from competing interests and occasional naive interpretation of criteria for authorship have generated much debate. In view of today’s highly competitive academic environment, which is characterised by an increasing trend toward collaborative teams, authorship criteria are easily overlooked.

Many scientists are involved in research across several disciplines and thus face the challenge of reconciling different authorship practices. As a result, researchers are often uncertain as to whom to include as an author on a paper or in what order to list multiple authors. Wherever authorship problems occur, there is a lack of awareness of authorship criteria and source attribution methods. This is because standards for acknowledgment practices are hardly as absolute as we sometimes imagine they are. In fact, there are many different views of what counts as ethical authorship and others whose work can be overlooked.

The International Committee of Medical Journal Editors (ICMJE) has drawn up a number of basic guidelines that are common across the entire field of biomedical scholarly publishing. In general, the most important rules are: a) persons designated as authors should qualify for authorship and all those who qualify (or without their consent) be named author. From the ethical viewpoint it is important to distinguish between recognised by authorship credit and equip them with valuable guidelines in their investigation of individual cases. European Radiology takes authorship very seriously and allegations of scientific misconduct are investigated thoroughly by the Editor-in-Chief with the help of systematic reviews and specialised software. In cases where there are substantial doubts about the originality and integrity of a paper, Prof. Dixon will ensure fair, rigorous and transparent assessment procedures.

In accordance with European Radiology publication policies, “The first and obvious sanction is that the paper is not accepted by this journal, especially when the reasons for this are clearly stated. In extreme cases, some journals suggest that an author or group of authors is not entitled to submit an article to that journal for a year or more,” says Professor Dixon. It is to be expected that, unless accompanied by a satisfactory explanation, instances of scientific misconduct would constitute definite grounds for retraction of the article.

The consequences of scientific misconduct are quite obvious, although the steps the journal editor takes following a confirmed case of such practices will depend on the severity of the research problem, the moment of detection and the level of notice it receives. Once suspicions of serious research misconduct are confirmed, the Editor-in-Chief is likely to refer the matter back to the author's head of department or institutional dean. Problems with research should also be addressed by the host institution which, unfortunately, is not always the case. However, prestigious research institutions now take research governance very seriously.

It is therefore completely necessary for authors submitting to European Radiology to operate to the highest ethical standards, precisely because responsible research conduct has become ever more important in today’s increasingly complex research environment. A highly constructive meeting of editors of radiological journals was kindly hosted by Radiology during the summer of 2008. The topic of redundant publication was discussed at length and the need for collaboration between editors on this topic was emphasised.

European Radiology Guidelines: how to prepare a manuscript.

The International Committee of Medical Journal Editors (ICMJE).
Uniform Requirements for Manuscripts Submitted to Biomedical Journals.
http://www.icmje.org/

Committee on Publication Ethics (COPE).
Guidelines on Good Publication and Code of Conduct.
http://publicationethics.org/